The Rise of Commercial Bank Deposits in the United States

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Abstract

Bank deposits by individuals grew steadily from about 4 percent of GDP at the time of the National Banking Acts in 1863 and 1864 to nearly 25 percent by the founding of the Federal Reserve. Using a comprehensive collection of bank-level data, we show that most of these gains occurred immediately after the Acts, Specie Resumption in 1879, and the Election of 1896. The deepening was not just the result of new banks or the resurgence of state banks after 1880, as deposits increased across all banks regardless of age or type. Checking accounts, clearinghouses, rising incomes, and urbanization contributed to the switch to deposits, but increases in confidence in banks among the public also seem to be central, with more highly capitalized banks from earlier entry cohorts seeing the largest gains.

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1. Introduction

Despite the pervasiveness of deposits in banking systems today, personal banking accounts were not always so popular. Indeed, before the Civil War, the majority of bank liabilities in the United States took the form of dollar-denominated notes issued by individual banks. This changed over the fifty years of the National Banking System (1863–1913), when individual deposits expanded from 4.2 percent of gross domestic product (GDP) in 1864 to 22.6 percent by 1913. The rise in relation to bank capital is just as extraordinary, with deposits increasing from 111 percent of capital to 574 percent. General economic growth and changes in financial regulation can account for part of the rise, but greater confidence in banks among the public was also at play. Detailed econometric analysis of the relative contributions of these factors, however, has always been limited by a lack of the digitized bank-level data.

We offer such an analysis, and relate factors associated with depositor confidence to the growth and distribution of individual deposits across banks and over time, and we argue that deposits would have followed a very different trajectory otherwise.[1] It turns out that deposits evolved differently in state and national banks, and accumulated most rapidly in older and better capitalized ones. At the same time, the rise in deposits was quite general and occurred across all banks – whether old, new, state, or national – so that increased confidence in deposit accounts seems to have had spillover effects from established banks to the entire banking sector. All of this fueled the longest sustained episode of financial deepening in the nation's history.

[1] Because we are interested in consumer preferences over bank liability types, we focus on individual deposits rather than interbank or government deposits. We therefore refer to "individual deposits" and "deposits" interchangeably, and refer to interbank deposits as a distinct quantity when applicable.

Friedman and Schwartz (1963) and James (1978) describe the time path of aggregate deposits over the National Banking period and offer several hypotheses for their rise such as the utility of checking accounts for making payments, increases in national income, and the spread of the market economy through urbanization, but could not test each hypothesis empirically. Other studies using bank-level data focus on large financial centers or more isolated areas. James and Weiman (2011) and Rousseau (1998, 2011), for example, examine deposit growth in New York City, while Krueger (1933) and Keene (1974) examine deposit growth in Wisconsin. All find specific reasons for local increases in deposits but do not test whether the mechanisms they propose generalize to the nation as a whole.[2]

Our analysis uses data for all U.S. commercial banks before 1913 from several sources including Weber (2005, 2008), the *Merchant and Banker's Directory*, the *Annual Report of the Comptroller of the Currency*, and various state banking reports. When possible, we work with bank-level data to test various hypotheses for explaining the rapid ascent of individual deposits. In doing so, we link deposits to a county's population, the availability of clearing facilities, and U.S. bond prices. But factors related to confidence in individual banks, such as capital levels and the number of years in business, are also central to sustaining the rise.

The first sharp increase in deposits relative to GDP occurred after the passage of the National Banking Acts by Congress in 1863 and 1864. The ratio also rose rapidly after the resumption of specie payments on government-issued notes in 1879 and the election of 1896. Remarkably, the ratio of deposits to capital doubled within two years of each of these three

[2] James and Weiman (2011) describe the conversion of New York banks from state to national charters at the conclusion of the Civil War as instrumental to initiating the rise in deposits. Rousseau (2011) emphasizes the effects of published bank stock prices on the distribution of deposits across banks through 1897.

events, never to return to its previous level. The deepening was not caused by state banks, national banks, or the entry of new banks in isolation. Rather, deposits rapidly increased across all banks.

2. Data

The comprehensive collection of bank-level data that is the basis for our study comes from a variety of sources. Data for the antebellum period are from two databases collected by Weber (2005, 2008). The first is a census of banks that provides the location and dates of operation for each bank ever in existence. The second contains items from their annual balance sheets including information on size and portfolio composition. While the most complete source of bank data for the period, balance sheet data are missing in some years for several banks, and a few banks have no balance sheet data available at all. The gaps occurred most frequently for years prior to 1830 and for banks that operated for less than a year. When building aggregates we linearly interpolate across missing observations in a single bank's time series, and fill in observations for banks that lack any balance sheet data with the average values of their closest geographic neighbors.[3]

The decline of state banks for some time after 1861 and their resurgence after 1880 creates challenges for building a comprehensive bank-level dataset for the postbellum era. But at least coverage for national banks is complete. For this, we use the dataset digitized by and

[3] Most of the gaps in a bank's time series are for single years so a linear interpolation will not bias our aggregates very much. For banks missing balance sheet data altogether, we fill in using the average values of the lower quartile of the bank's closest geographic neighbors. The process begins by matching banks in the same county. Banks without an immediate match are then matched with banks in the same state. Because banks in a given area often had similar balance sheet compositions, the matching process should lead to reasonable aggregates for examining general trends in liability structures.

described in Jaremski (2013), which provides annual balance sheet data from the *Annual Report of the Comptroller of the Currency* for each national bank in operation from 1865 through 1913.[4] To facilitate building an aggregate series of banking variables that includes state banks, we obtain the total number and aggregate balance sheet composition of state banks for 1861-1864 and from 1873-1913 as reported by the Comptroller.[5] We use the number of banks from the Comptroller's report to estimate balance sheet quantities for the few state banks that operated between 1864 and 1872.[6]

To compare national and state banks at the bank level, we collect balance sheet data from official reports for Indiana, Michigan, Pennsylvania, and Wisconsin from 1890 through 1913.[7]

[4] The Comptroller's reports do not report individual full bank balance sheets for 1864, 1885, and 1905. When building aggregates we fill in the missing data with averages of the preceding and succeeding years.

[5] The data for 1861-1864 are from the Comptroller of the Currency (1908, Table XXIV, pp. 436-437). Data for 1873-1913 are from individual issues of the Comptroller's reports.

[6] The Comptroller reports the number of state banks and aggregate capital for 1865-1872, but does not report deposits or circulation. To fill in deposits, we assume that state banks adjusted their balance sheets linearly from the average per bank in 1864 to the average in 1873. Because the impending tax on state bank notes generated a sharp decline in notes between 1864 and 1865, we assume that each bank issued the same amount in notes between 1865 and 1872 as it did in 1873. This approach produces smooth aggregate statistics with estimates that merge seamlessly into the actual series. Note also that the number of state banks was small compared to national banks between 1865 and 1872. For example, there were 349 state banks and 1,512 national banks in 1865 and still only 566 state banks and 1,918 national banks in 1872.

[7] The only reports missing for these states are for Indiana (1890-1898), Pennsylvania in 1907, and Wisconsin in 1893. Data for Indiana are from the *Annual Report of the Auditor of State of the State of Indiana*. Data for Michigan are from the *Annual Report of the Commissioner of the Banking Department of the State of Michigan*. Data for Pennsylvania are from the *Reports of the Several Banks and Savings Institutions and Banks Organized under the Free Banking Law of Pennsylvania* before 1895 and the *Annual Report of the Commissioner of Banking* thereafter. Data for Wisconsin are from the *Semi-Annual Statement on the Condition of State and Private Banks of Wisconsin* (1890-1895), the *Annual Report of the Bank Examiner* (1896-1902), and the *Annual Report of the Commissioner of Banking* (1903-1913). To create consistent measures of

We use data from these states for a variety of reasons. First, banking data for these states are plentiful. Second, these states saw many new banks and there are only a few pre-existing financial centers that might affect our comparison of bank types. Finally, banks in these states operated in a wide range of locations including urban and rural areas.[8]

In all, the data represent the largest collection of postbellum balance sheets in existence. The national bank database contains 159,171 observations from 10,483 banks, whereas the Midwest database contains 37,682 observations for 1,612 national banks and 1,975 state banks.

3. Individual deposits, 1800-1913

Figure 1 presents aggregates for the number of state and national banks (panel a), the ratios of deposits, circulation, and capital to GDP (panel b), and the ratios of deposits and circulation to capital (panel c) from 1800 through 1913.[9] The number of banks in operation is a general measure of financial development that reflects extensive growth in banking. Increases in the ratio of deposits to GDP indicate that individuals as a whole were placing more of their income in deposit accounts. The fresh deposits could arise extensively from new accounts in recently-formed and existing banks, or intensively as additional deposits in existing accounts. Given that GDP was growing more rapidly than the population, the rise in deposits with respect to GDP also implies increases in deposits per person. Increases in the ratio of deposits to capital,

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individual deposits across reports, we combine time and savings deposits in the few cases where they appear separately.

[8] The Northeast was the only other region that had available data for the period, but given the region's large number of existing banks in 1860 and high concentration of savings banks and trust companies, it is not well suited for our study.

[9] Krueger (1933) examines the ratio of deposits to liabilities, but James (1978) points out that such a measure is problematic for the National Banking period as state banks were prohibited from issuing notes.

so long as other liabilities are unchanged, reflect compositional shifts on the liability sides of bank balance sheets. The decreases in the ratios of circulation to GDP and to capital indicate that note issues were not keeping pace with growth in deposits, thereby losing ground as a preferred liability. In this section we relate fluctuations in Figure 1 to historical events, whereas in later sections we analyze changes in the deposit ratios at the bank and county levels.

3.1. Deposits before the Civil War

The early U.S. banking system emerged as a product of economic and political forces within individual states. Each bank charter required passage of a specific state legislative act, and this could make the process of starting a bank tedious, expensive, and corrupt (Bodenhorn, 2006). The earliest banks formed in the population centers of New York, Philadelphia, and Boston, and attracted deposits with relative ease. The few banks established outside of the largest cities, however, typically did not have many deposits. Gradual growth of deposits in larger banks from 1800 to 1820 brought the deposit-to-GDP ratio from 2.5 percent to about 5 percent, and a general expansion in the number of banks with low deposits after that kept the ratio hovering around 5-6 percent of GDP from 1818 until the close of the Civil War. Fluctuations in the ratio of deposits to capital were also small until 1860.

The very gradual rise in the ratio of deposits to GDP from 1820 to 1860 was more a result of new banks than existing ones. This is most evident in the expansion of banks that followed President Jackson's 1832 veto of the Act to renew the charter the Second Bank of the United States. While the ratio of deposits to capital grew only slightly in the aftermath of the Bank War, deposits jumped briefly to almost 25 percent of GDP by the mid-1830s before falling back to 5 percent in the wake of bank closures brought on by financial panics in 1837 and 1839. Indeed,

deposits rose only slightly from 44 to 54 percent of capital across the entire period from 1800 to 1860, suggesting little change in fundamental banking practices.

The lack of trend in the deposit ratios is not surprising given that deposits were not the dominant bank liability before the Civil War. Rather, banks issued paper notes that circulated among the public and were payable on demand in specie at the issuing bank. Various state laws of more or less stringency required banks to collateralize their notes with securities such as government bonds. In addition, banks usually had four to five times as much capital and twice as much circulation as deposits, implying that, if all capital was paid in, a typical bank would have adequate resources to support its notes and deposits. So long as a bank did not expect to redeem many notes in any single period, it could thus issue large amounts and keep only a fraction of their value in the vault as cash. While circulation declined slightly over the period, banks in 1860 still had as much value outstanding in the form of bank notes as they attracted in deposits.

3.2. Deposits after the Civil War

The early 1860s saw a retrenchment in banking due to the start of the Civil War, and panel (b) of Figure 1 shows sharp declines in aggregate deposits, circulation, and capital. These coincided with many bank closures in Illinois and Wisconsin. The actual fighting led to the closure by 1864 of nearly all banks in the South.[10] Since the closed banks typically had large amounts of outstanding notes, this second wave of closings produced a decline in aggregate banking activity but a slight rise in the ratio of deposits to capital.

The National Banking Acts and the end of hostilities brought a sharp increase in deposits. Though originally designed to raise revenue for the Union during the war, the Acts also aimed to

[10] See for instance, Dwyer and Hasan (2007) and Jaremski (2010).

lower default rates by making bank entry requirements more stringent. This was accomplished through creation of the Office of the Comptroller of the Currency, a nationwide requirement that national banks back their note issues with holdings of U.S. Treasury bonds, and increased capital and reserve requirements. In a further effort to raise revenue and gain tighter control on note issues, Congress followed the Acts with a 10 percent tax on outstanding notes of state banks that went into effect on July 1, 1866. Taken together, these changes led to larger banks and an initial rise in deposits as a substitute liability for circulation.

By 1868, 732 national banks were created with new capital, 934 state banks converted to a national charter, and 357 other state banks saw an orderly end to their operations. Converted banks were generally large urban ones that held both substantial circulation and deposits on their balance sheets, while closed banks were generally small rural ones with few deposits (Jaremski 2012). The few hundred state banks that continued after the tax generally had large deposit bases and little circulation.

The first sustained expansion of deposits began in 1863, with panels (b) and (c) of Figure 1 showing deposits rising from 101 percent of bank capital to 134 percent by 1868. The ratio of deposits to GDP more than doubled from 3.8 to 7.7 percent over the same period. These are the largest five-year increases in deposits achieved at any time before 1870, but unlike previous periods the expansion had only just begun. Individual deposits grew steadily after the Acts, and it was not until the Panic of 1907 that they saw a decline over multiple years. Indeed, by 1913 the ratio of individual deposits to capital stood at 574 percent!

Aggregate deposits rose after the National Banking Acts as newly-established national banks attracted more deposits than were lost through closures of state banks. Moreover, existing banks were affected by the legislation. Figure 2 shows average balance sheet quantities from

1850 to 1860 and from 1865 to 1875 for state banks that converted to a national charter before 1868.[11] Each panel contains a linear trend line based on antebellum data which suggests that state banks altered their liability structure after switching to a national charter. Panel (a) shows that by 1865 the average value of deposits was $175,000 higher than expected if deposits had followed their pre-war trend, and panel (b) shows that converted banks also tended to increase their circulations. Interestingly, panel (c) indicates that capital levels remained on trend. Given that capital requirements were based on the size of the community in which a bank was located, this suggests that banks continued to grow larger as the National Banking Acts took effect.

One reason why individual deposits grew steadily shortly after the Acts was a provision setting a ceiling of $300 million for the circulation of all national banks, which was reached as early as 1866 (Sylla 1969, p. 663). With additional circulation no longer available for issue, banks turned increasingly to deposits as a liability. The ceiling was raised to $354 million in 1870 and removed entirely in 1875, but by then rising collateral prices had made circulation even less attractive than deposits, for which reserves could fall significantly before reaching the minimum required ratios (Cagan 1963, Figure 2, p. 33).

Yet public confidence in the belief that the Acts had brought order and stability to a banking system replete with mismanagement was also at play. For example, William D. Gallagher, a special collector of customs and commercial agent for the Mississippi Valley during

[11] We use the *Merchants and Bankers' Directory* to determine which state banks converted before 1868. Similar to modern telephone books, the directories include the name and location of every operating bank at the end of each year, as well as the president, cashier, and capital level. We define a state bank as "converted" if its year of closing, location, and at least two of the three other characteristics match those of an opening national bank. We include a few additional conversions explicitly noted by Haxby (2009) and provided by Warren Weber. While we do fill a few missing annual observations for individual banks with a linear trend, we do not estimate the balance sheets of banks that did not have a single balance sheet to observe. The data include 898 of the 934 state banks that converted to a national charter.

the Lincoln administration, wrote to Treasury Secretary Salmon P. Chase from St. Louis on December 13, 1861 "commending [Chase's argument for a uniform national bank currency] and saying that many people thought the recommendations ought to be adopted and the unsafe and fraudulent local currency be utterly and forever driven out of circulation" (Davis 1911, p. 51).[12]

While the ratio of deposits to GDP rose steadily over the National Banking era, the ratio of deposits to capital more closely resembles a step function, taking three large jumps but otherwise increasing gradually. Specifically, the ratio grew from 59 to 132 percent between 1860 and 1866, from 136 to 244 percent over the four years following Resumption in 1879, and from 258 to 498 percent between 1896 and 1901. As a result, aggregate deposits climbed to nearly 25 percent of GDP by 1913, and the ratio of deposits to capital was ten times its value in 1860.

The remarkable growth in deposits after 1896 was not due to a financial crisis or changes in bank regulation. Rather, the year symbolically marks the end of the Bimetallic Era. Not only was the Democratic Party under William Jennings Bryan's "free silver" platform soundly defeated in the election of 1896, but gold became more readily available due to the discovery of new mines and mining technology. The increase in the money supply and clear support for a single monetary basis encouraged the growth of deposits, even though the Gold Standard Act would not be passed until 1900.[13]

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[12] The February 3, 1863 edition of the *New York Tribune* reports that "Considered, however, as a permanent plan, there can be no stronger argument in [The National Banking Act's] favor than that it tends to strengthen the Union by closely interwoven ties of common interest in the permanence and credit of the National Government." In citing this, Davis (1911, p. 112) notes that "these remarks upon the value to the General Government of a system of banks emitting a uniform currency, subject to national control, in the way of protection against future outbreaks, owing to the difficulty which would arise in financing them, have but little bearing on the evolution of the system, but the growth of belief in the truth."

[13] The Gold Standard Act lowered capital requirements for national banks in communities with less than 3,000 persons from $50,000 to $25,000 and allowed banks to issue notes up to 100

In this way, the increases in the ratio of deposits to capital correspond to the stabilization of the monetary system. First, the National Banking Acts eliminated the need for discounting notes by guaranteeing their redemption, creating a more uniform national currency, and installed additional bank requirements making their deposits safer to hold.[14] Second, the Specie Resumption returned the nation to a bimetallic standard, restoring both domestic and international confidence in the dollar. Resumption also marked the end of the sharp deflation that had been required, especially after 1875, for the nation to absorb the Greenback issues of the war, and brought with it capital inflows from abroad and a moderate rise in U.S. prices relative to English prices that were conducive to economic growth (Kindahl 1961, p. 48). Finally, the de facto adoption of the gold standard in 1896 meant the return of a single currency on par with the rest of the world, and the Gold Standard Act of 1900 committed the nation to this course.[15] All three events represented moments when the confidence of the public in banks and the safety of their deposits reached unprecedented levels.

3.3. Deposits in national and state banks

The previous sections examine broad trends across the entire banking system, but do not consider the dual system that the National Banking Acts ended up putting into place. As national

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percent of their bond collateral rather than the 90 percent limit previously in effect (Sylla 1969). This encouraged new banks in small communities to choose national charters and banks to issue more notes in general. Interestingly, the growth in banking that came with the Gold Standard Act apparently allowed deposits to continue their ascent despite the increased use of notes.

[14] Because bank notes circulated at varying discounts depending on the bank of issue and the city of use, they were largely inefficient and users ran the risk of bank default.

[15] Bordo and Rockoff (1996) illustrate the potential benefits of adherence to the Gold Standard in the international capital markets.

and state banks were structurally different, it is informative to ask whether deposits grew more within one system or the other, or whether the phenomenon occurred across all banks.

Figure 3 shows how deposits evolved for each bank type. It is immediately clear that national banks held nearly twice the aggregate deposits as state banks on average from 1864 to 1913 despite their exclusive ability to issue notes and the fact that state banks on average outnumbered them by a two to one margin. Yet national banks did not have a dramatically lower ratio of deposits to capital than state banks. This suggests that the prohibitive tax on outstanding notes of state banks that took effect in 1866 cannot be fully responsible for the nation's rise in deposit banking, as the shift occurred in banks of both types.

Deposits in state and national banks also saw a similar growth pattern. Not only did aggregate deposits in banks of both types grow at similar times, but their ratios of deposits to capital also rose together after 1879 and 1896. The only important deviation across the two bank types comes after the Panic of 1907. As discussed by Moen and Tallman (1992), the Panic of 1907 affected state banks more than national ones, with deposits continuing to grow for national banks as they declined for state banks.

Finally, the pattern of the circulation ratio is much more pronounced when state banks are excluded. While the prominence of bank notes as a liability had been declining since the late 1840s, the largest declines occurred during the 1880s. For instance, the ratio of circulation to capital fell from 55% in 1880 to 16% by 1892. All national banks began to issue more notes after 1892, but even then, they only rebounded to their 1880 value.

4. Explaining deposit growth

Explaining the rise of deposits requires distinguishing the contributions of growth in population, income, regulation, and the number of banks themselves from less easily quantified

yet fundamental shifts in confidence, individual preferences, and business practices. In Section 3 we established that deposits per bank rose sharply after the National Banking Acts, resumption in 1879, and the 1896 elections. We now discuss the role of bank-level and local factors affecting the rise and possible controls for aggregate trends. Next, we explore econometrically the determinants of deposit taking among all national banks after 1870, and the relative behavior of national and state banks in the Midwest after 1890. Finally, we examine the growth of deposits in national banks using county-level data.

4.1. Determinants of the deposit ratios

The growth of deposits is often associated with the increasing use of checking accounts, which allow customers to access funds easily and thus could serve as a substitute for bank notes. As most states did not separate checking from deposits accounts in their records, however, we cannot directly measure the effect of checking on overall deposits. But the Comptroller's reports do report state-level data on checking accounts for a few years, and the data in Table 1 indicate that 96.7 percent of bank receipts in reserve cities and 81.7 percent outside of them were already in the form of checks and drafts by 1881.[16] The table also shows little change in these shares between 1881 and 1890, a fact that led James (1974, p. 25) to assert that "checks were already widely in use by the end of the Civil War."

The expansion of clearing facilities may also have encouraged individuals and banks to use checking and deposit accounts more intensively. Clearinghouses were large institutions that sorted and processed checks, lowering a bank's cost of accepting them and increasing their use.

[16] Overall, 95 percent of all bank receipts were in the form of checks and drafts in 1881 and this number actually fell slightly in 92.5 percent by 1890. This reflects the fact that banks in reserve cities processed the vast majority of total receipts.

Figure 4 shows that early clearinghouses were concentrated primarily in the Northeast, but moved into the Midwest during the 1880s.[17] The South and the West eventually received a few clearinghouses but they never covered a large portion of these regions. We might therefore expect that clearinghouses could explain local deposit growth but not the rise across all banks.

The expansion of the banking system itself might also have increased the demand for checking, with checks from banks with correspondent relationships more likely to be accepted.[18] As the utility of checks depends on their acceptability, a large number of banks in a location would increase the consumer demand for such accounts. Competition amongst banks in an area might also lead them to offer higher interest on deposits to attract funds.

In addition to checking accounts, several other factors might have expanded deposits locally. For example, Cagan (1963) argues that urbanization can explain the rise. Indeed, the expanding railroad network and the rapid development of integrated national markets coincided with a wave of urbanization after the Civil War (Atack et al. 2010). Because individuals in densely populated areas were more likely to hold wealth in the form of deposits than in real estate, urbanization might have affected deposits more than increases in population alone.

We could also imagine that newer banks would pursue deposits and checking accounts aggressively, with older banks taking longer to adapt. On the other hand, older banks were often better capitalized and had reputations established over a number of years; these factors could increase confidence among depositors and lead them to prefer established banks. Banks that

[17] Dates of clearinghouse entry are from the *Merchants and Bankers Directory*, where existing clearinghouses are listed under the respective cities. We designate entry as the year in which the clearinghouse first appeared in the Directory. We then verify early dates with Cannon (1900) and later dates with the Comptroller's reports whenever possible.

[18] Friedman and Schwartz (1963) are among many to also advance this view.

survived the Civil War and successfully converted to a national charter could indeed be the most advantageously positioned. In this sense, a reputation built upon longevity, entry cohort, and capital level could allow deposits to expand without additional capital, in effect allowing reputation itself to substitute for capital.

Among macro-level factors, the price of U.S. bonds should affect the amount of notes in circulation, and potentially the quantity of deposits by extension.[19] Panel (a) of Figure 5 shows that the aggregate ratio of circulation to capital fell when bond prices were high and rose when prices were low, as might be expected given that national banks were required to back their notes fully with U.S. bonds and high bond prices made this collateral expensive.[20] On the other hand, panel (b) shows that bond prices do not have a consistently positive relation with deposits, with the rise of deposits after 1897 occurring in the face of falling bond prices. The rise continued after 1900 even though, as noted earlier, the Gold Standard Act made note issue more attractive. While there is no evidence of a stark tradeoff between aggregate note issues and deposits, however, these factors might still act to lower the pace of deposit growth among national banks relative to state banks.

The last potential reason for growth in deposits is the general stability of the postbellum

[19] See James (1976) and Champ, Wallace, and Weber (1992) for a discussion on the profitability of bank notes during the postbellum period.

[20] We build the bond price series from various issues of the Comptroller's reports. Since no single bond spans the entire National Banking period, we compute averages of several of the longer maturity bonds as they are available. To do this, we use US 6s of 1865 (1865-1878), US 6s of 1881 (1865-1881), US 5s of 1881 (1872-1881), US 4.5s of 1891 (1876-1890), US 4s of 1907 (1877-1907), US 5s of 1904 (1894-1903), US 4s of 1925 (1895-1913), US 2s of 1930 (1900-1913), and US 3s of 1908-1918 (1898-1913). All bonds are as quoted in New York and expressed relative to face value. The average of the available bonds for each year is computed over the average of the monthly high and low price in November. This synchronizes the series for bond prices with our balance sheet data.

period. For example, Jalil (2012) finds evidence of only three major panics: 1873, 1893, and 1907. With the exception of the Panic of 1907, the panics were less national in scope and led to fewer losses than those sustained over the antebellum period. The high capital and collateral requirements put into place by the National Banking Acts should also have protected depositors better from losses, potentially allowing national banks to lose fewer deposits during panics.

4.2. National bank deposits at the bank level (1870-1913)

We begin the econometric analysis by exploring the determinants of deposits and circulation across national banks from 1870 to 1913 using the complete database of national bank balance sheets. Each observation is a bank year. The dependent variables that we consider are the logarithms of deposits, circulation, and the ratio of deposits to capital.[21] The full specification is:

$$ln(Y_{i,t}) = a + \beta_1 X_{i,t} + \beta_2 Z_{i,t} + t_t + u_i + e_{i,t} \qquad (1)$$

where $X_{i,t}$ is a vector of county-level variables including the number of other national banks in the current year, the number of national banks that closed or merged over the previous ten years, and a dummy variable indicating whether the county had a clearinghouse. $Z_{i,t}$ is a vector of bank-level variables including the logarithm of capital stock and dummy variables for the decade in which the bank started operations. We also include fixed effects for years (t_t) and states (u_i). In some specifications we include the average price of U.S. bonds relative to face value in place of the year fixed effects.

Table 2 presents the results. Both the presence of a clearinghouse and other banks are positively related to deposits and the ratio of deposits to capital, and negatively related to

[21] We deflate all dollar values to an 1870 basis using Officer (2008).

circulation, with coefficients that are statistically significant across all specifications. These results are expected given that clearinghouses presumably improve the efficiency of non-cash payment services and, clearinghouse or not, more local banks generate demand for interbank transfers through checks. The capital stock of each bank relates positively to both deposits and circulation and is statistically significant at the one percent level. Because capital is a scaling variable in these models that controls for bank size, the results are also as we would expect.

We control for aggregate factors in two ways, and the choice matters for some of our findings. Given that the prices of bond collateral are critical in determining the potential profits from circulation for national banks and thus the relative utility of deposits, each panel begins by controlling for time using the level of U.S. bond prices. Interestingly, higher bond prices tend to lower both circulation and deposits. Though the effect on circulation is expected, the relation with deposits is not since high bond prices should encourage deposits as a substitute for notes.

Although bond prices may reflect general economic conditions, we saw in panel (b) of Figure 5 that they do not reflect the path of aggregate deposits very closely (correlation of -0.30). This suggests that bond prices are not the best available control for aggregate factors explaining deposits, such as the stability of the system brought about by the National Banking Acts, Resumption, and the election of 1896. To consider bank-level factors affecting the rise in deposits, it is thus more desirable to consider regression models that control for time with year fixed effects. The remaining columns in each panel of Table 2 do this.

The coefficients on the clearinghouse and capital retain their signs in the specifications with fixed effects for years, but the number of closed banks in a county over the previous ten years has a negative effect on circulation and the ratio of deposits to capital. Thus, after controlling for aggregate trends with year fixed effects, bank closures in a county tend to make

individual depositors more wary of depositing in a given bank. When controlling for time with bond prices, the coefficient is positive because bond prices do not pick up aggregate fluctuations in deposits adequately, and counties with more closed banks may be counties with more banks, and thus more deposits, in general.

Most striking, however, are the final columns of each panel, which include dummy variables for the decade of a bank's entry. With time already controlled with year fixed effects, these cohort indicators suggest that, after controlling for other factors, banks that were in operation longer, and perhaps those that entered in particular earlier periods, secured more deposits and maintained higher ratios of deposits to capital than banks entering later in the National Banking period. If longevity engenders confidence, and former state banks that operated before 1860, converted to national charters, and remained in operation were models of stability and good management, the cohort effects suggest that bank depositors lodged their surpluses in banks that were considered safe.[22] Column (3) of Table 2 indicates that, after controlling for size with the level of capital, national banks that entered earlier had consistently higher levels of deposits then those entering later. Column (9), though not as striking as column (3), shows that this general relation hold for the ratio of deposits to capital as well. Banks that entered before 1880, again controlling for size, had more circulation than those entering later.

[22] Rousseau (2011) comes to a similar conclusion for clearinghouse banks in New York City by showing that individual depositors responded to another publicly-available signal of quality, namely the price of a bank's stock.

Figure 6 plots the coefficients on the year fixed effects associated with the specifications in columns (3) and (9) of Table 2.[23] Note that even after all of our attempts to control for bank-level and local factors, the three main events still relate to the rise of deposits generally.

4.3. National and state bank deposits in the Midwest (1890-1913)

We now examine individual state and national banks together in our sample of Midwest states (Indiana, Michigan, Pennsylvania, and Wisconsin) from 1890 to 1913, where each observation is a bank year. The dependent variables are the logarithms of deposits and the ratio of deposits to capital.[24] The full specification is:

$$ln(Y_{i,t}) = a + \beta_1 X_{i,t} + \beta_2 (X_{i,t} * Nat_i) + \beta_3 Z_{i,t} + \beta_4 (Z_{i,t} * Nat_i) + t_t + u_i + e_{i,t} \quad (2)$$

where $X_{i,t}$ is a vector of county-level or nationwide variables and $Z_{i,t}$ is a vector of bank-level variables. Since the Midwest sample contains observations for both national and state banks, we examine the effects of each bank type on deposits by interacting the *X* and *Z* vectors with dummy variables set to unity if bank *i* is a national bank. As in Table 2, we include fixed effects for years (t_t) and states (u_i), and in some specifications include the average price of U.S. bonds in place of the year fixed effects.

Table 3 presents the findings. In all specifications, the value of a given bank's deposits or ratio of deposits to capital relates positively to the number of state banks in its county. This suggests that deposit-focused banks in a county created an externality through interbank linkages that encouraged banks in general to increase deposits. Deposits relate negatively in all cases to

[23] We do not report the fixed effects from the circulation equation because they correspond negatively to movements in bond prices, as might be expected.

[24] We do not examine circulation because state banks were prohibited from circulating notes.

the number of bank closures over the previous ten years, indicating that closures made potential depositors wary of placing funds with existing banks. In the left panel, the level of capital always relates positively to deposits as expected.

When included, dummy variables for whether bank *i* is a national bank have positive and statistically significant coefficients in all specifications other than column (7), where we include indicators for the decade of a bank's entry. When the entry dummies appear in columns (4), (5), (8), and (9), and with banks that started before 1890 as the omitted category, the coefficients on deposits decline with the lateness of entry. If banks that existed before the post-1890 resurgence of state banks had more established reputations, perhaps confidence among the public made it possible for them to attract more deposits.

The regressions in columns (1) and (5) control for time with U.S. bond prices, and since the time period begins in 1890, we confirm at the bank level the negative and statistically significant relation with deposits shown earlier in Figure 5. Because bond prices do not have the expected positive relationship with deposits over this period, the positive and significant relationship with the presence of a clearinghouse in these two specifications could well reflect their expansion over time rather than a network effect. We say this because clearinghouses do not have a consistent or significant relationship with deposits when we control for time more precisely with fixed effects in the other columns of Table 3.

Columns (4) and (8) add interactions between the national bank dummy and other variables in the model. Here we see that the presence of other national banks in bank *i*'s county relates to more deposits or higher deposit ratios if bank *i* is a national bank and fewer deposits if it is a state bank. The presence of state banks in the county also has a smaller effect on deposits in national banks than in other state banks. Interestingly, when controlling for time with year

fixed effects, the interaction of the national bank indicator and the level of U.S. bond prices recovers the expected positive relation between bond prices and deposits for national banks. This is likely because only national banks issued notes and were thus be affected directly by bond prices through the cost of collateral.

Figure 7 plots the coefficients on the year fixed effects from columns (4) and (8). In each panel, the plot shows that, even after controlling for bank-level and local factors, a general rise in deposits and their ratio to capital is apparent in our bank-level data starting around 1896.

4.4. National bank deposits at the County level (1870-1913)

While the bank-level data allow us to control for key historical events, their high frequency precludes the inclusion of local factors such as population and urbanization that are observed less frequently. To account for these factors and focus on the intensity of banking activity, we aggregate the data on individual national banks throughout the United States to the county-level and match them to decennial Census data collected by Haines (2004).[25] Aggregation at the county level allows us to average out idiosyncratic components in individual bank balance sheets. The baseline specification is:

$$ln(Y_{i,d}) = a + \beta_1 ln(Pop_{i,d}) + \beta_2 Urban_{i,d} + \beta_3 ln(Farm_{i,d}) + \beta_4 X_{i,d} + t_d + u_i + e_{i,d} \quad (3)$$

where the dependent variables are the logarithms of deposits, circulation, and bank capital, all measured at the same time as the dependent variable (i.e., 1870, 1880, etc.) on a per capita basis and deflated to reflect 1870 dollars. $Pop_{i,d}$ is the number of people living in the county, $Urban_{i,d}$ is the percent of the population living in a location with more than 25,000 persons, $Farm$ is the value of farm land in the county per capita, also measured contemporaneously. $X_{i,d}$

[25] We form a panel by excluding counties that had significant boundary changes between 1870 and 1913 as well as observations for which there were no banks in a given county.

is a vector of county-level banking variables including the number of national banks that closed over the previous ten years, whether there was a clearinghouse in operation, and an indicator for whether the county had a bank that converted from a state to national charter in the 1860s.

The regression results in Table 4 indicate that more urbanized counties had higher deposits, circulation, and bank capital per person, which suggests a relation between the intensity of banking services and the economic activity associated with greater population density. Given that such counties were more likely to operate a clearinghouse, it is not surprising that the coefficients on this indicator are also positive and statistically significant in all specifications. After controlling for urbanization and clearinghouses, the population variable itself relates to more deposits but less bank capital per person. This is reasonable given that the income threshold for having a deposit account is likely much lower than for contributing bank capital, and urban areas are likely to have broader distributions of income than less urban ones. Wealthier counties, as measured by the value of farms per thousand persons, relate positively and significantly to all three measures of banking intensity. Bank closures seem to lower banking activity, but the coefficients tend to hover around the 10 percent level of statistical significance.

Most remarkable is the positive and highly significant effect of having an early bank in a county on later banking intensity therein. Had we not already controlled for wealth, population, and urbanization, one might think that an early bank was just an indicator of economic potential. But with these controls in place, we interpret the coefficient as a measure of confidence in banks or at least familiarity with the benefits of banking services. Banks that had converted from state to national charters in the 1860s and remained in existence were ones that county residents had recognized for some time, and their survival may have served as a testimonial to the security afforded by a well-managed bank. Being more acclimated to banks and banking services than

counties that saw their first bank only later in the century, residents of such counties were most likely to use deposits and accept bank notes in transactions as the age of deposits took hold.

5. Conclusion

Deposits grew from 5% to 24% of GDP between 1860 and 1913. A comprehensive bank database shows that the aggregate growth in deposits was mainly caused by bank entry while the growth of deposits at the bank-level was mainly caused by historical events. Specifically, bank deposits across all banks rose sharply after the National Banking Acts, Resumption, and the Presidential Election of 1896. The nation's embrace of deposit banking thus seems driven by the stability of the monetary system and the confidence that individuals held for the safety and utility of established and well capitalized banks. A series of bank-level and county-level regression models confirm these patterns in disaggregated data for all national banks over the entire postbellum period and for a comprehensive sample of state and national banks for a selection of Midwest states after 1890. At the same time, we also find support for traditional explanations for the rise in deposits such as increasing incomes, urbanization, and more widespread clearing facilities.

Quantifying the idea of "confidence among the public" in banks and banking services is a challenge fraught with potential pitfalls. Yet economic historians well before even Friedman and Schwartz suspected it to be central to the rise of deposit banking. We consider our contribution a step towards assembling the hard evidence required to raise the status of "confidence" in banking over the "Age of Deposits" from a soft and imprecise notion to an empirical construct that can be plausibly measured and assessed.

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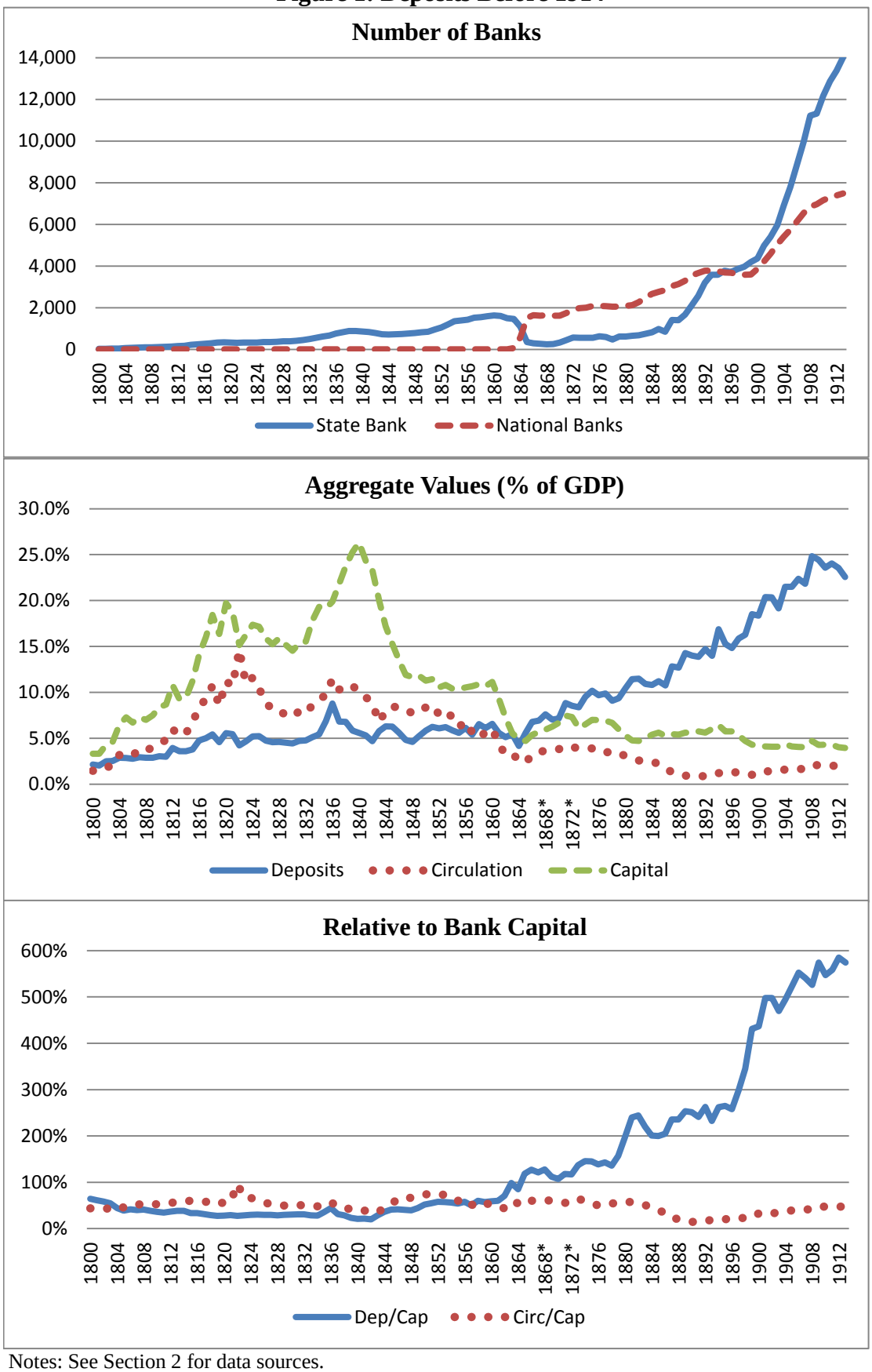
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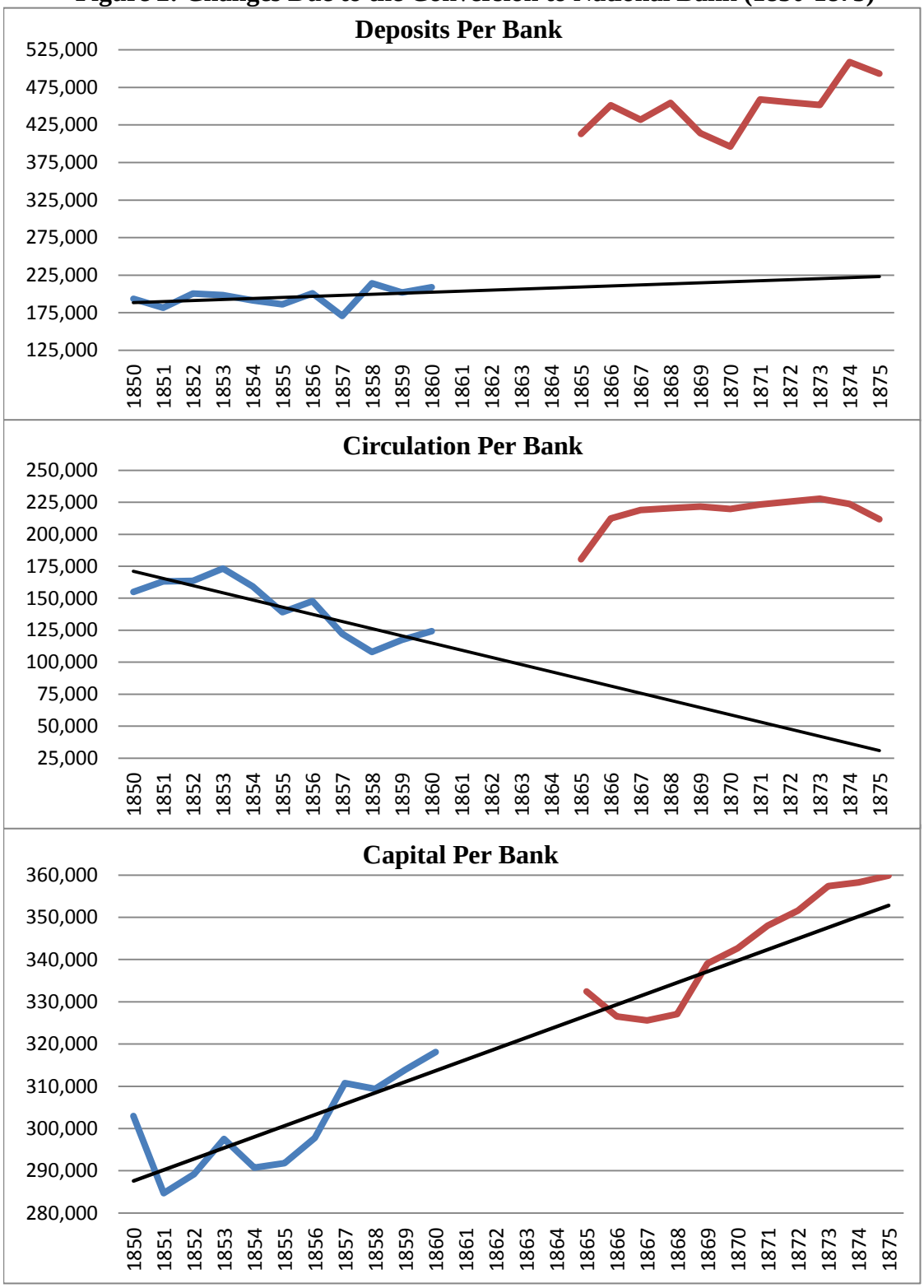
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Figure 1: Deposits Before 1914



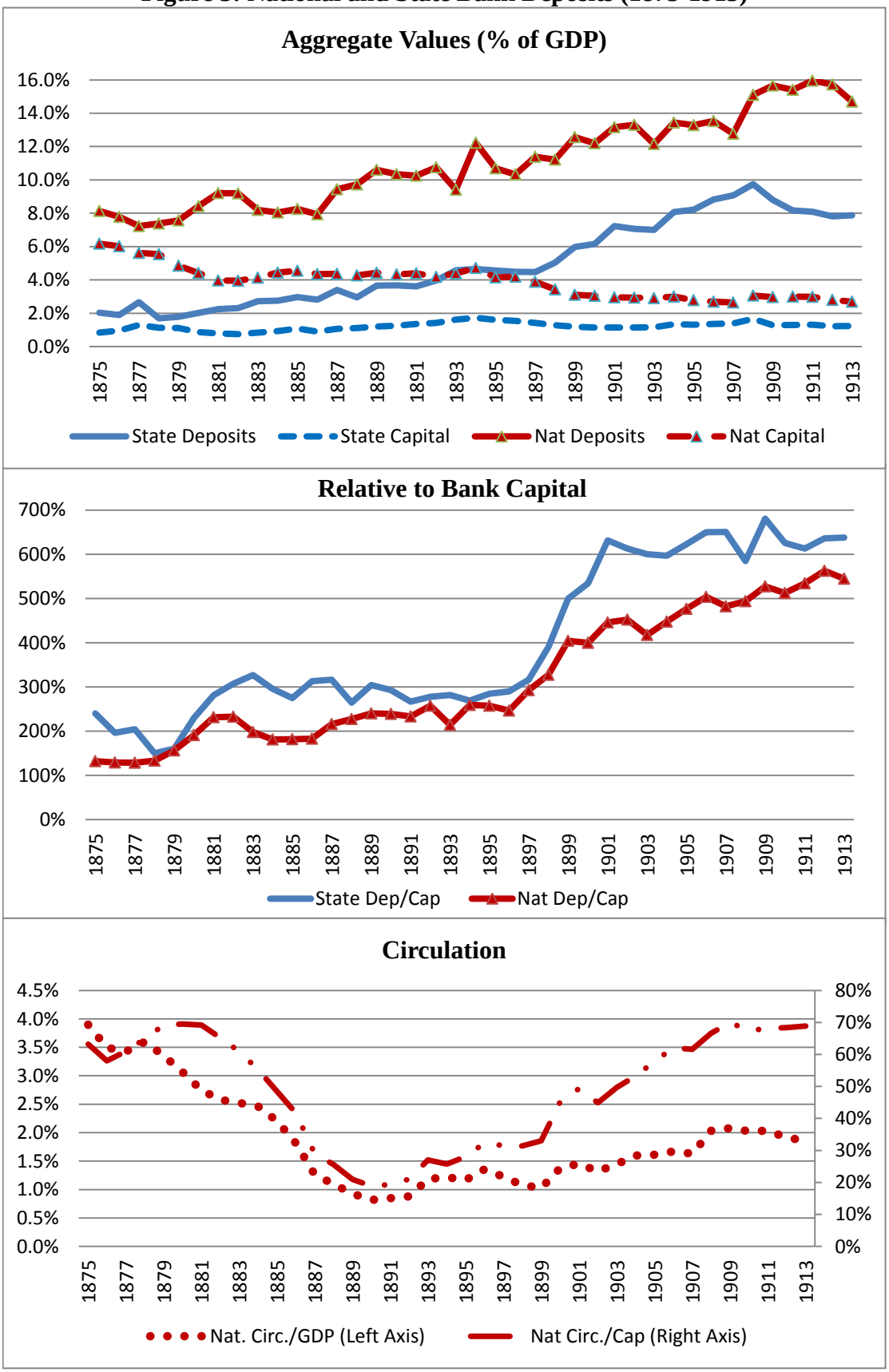
Notes: See Section 2 for data sources.

Figure 2: Changes Due to the Conversion to National Bank (1850-1875)



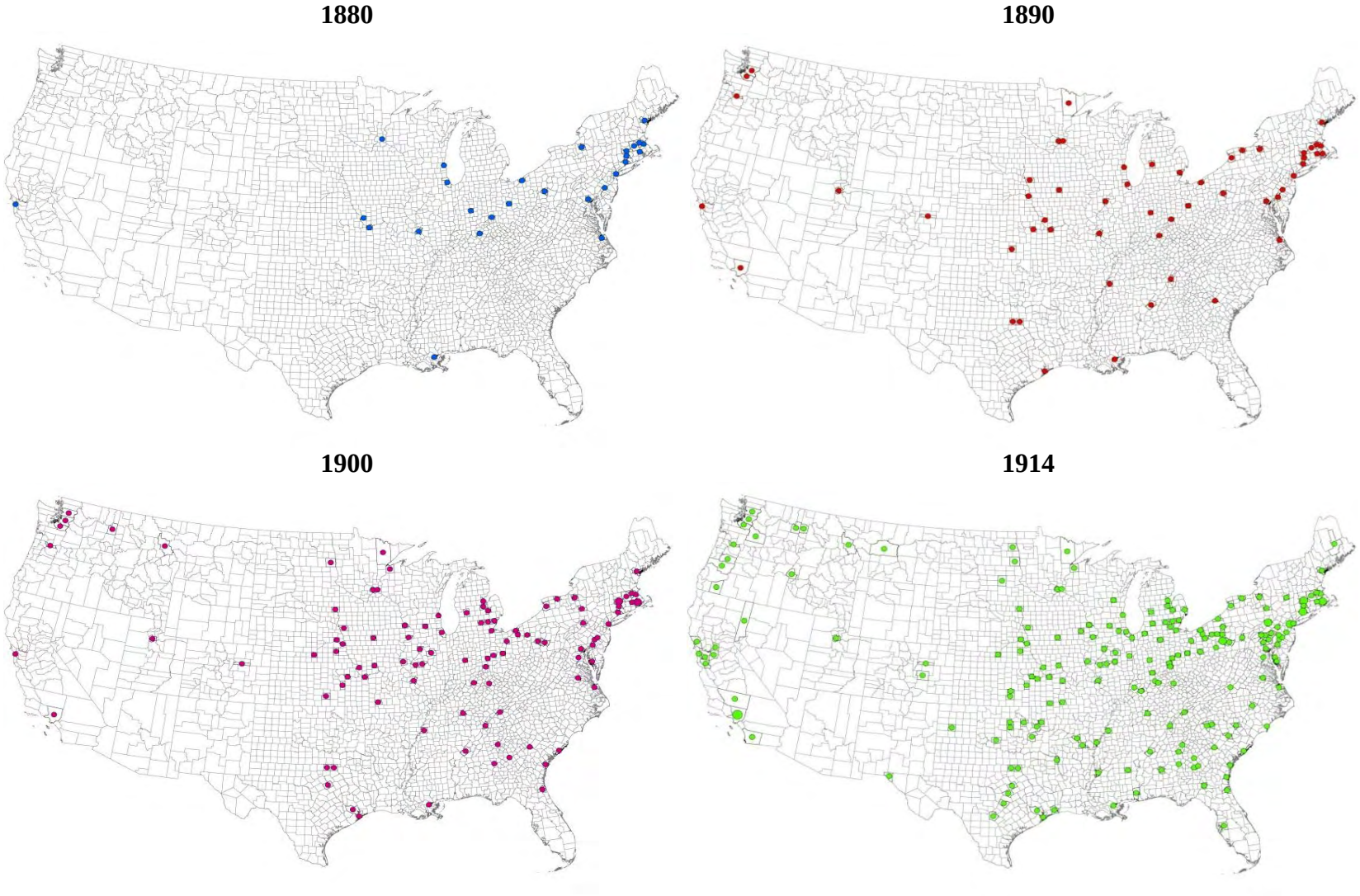
Notes: Figures display the average balance sheet variables each year for state banks that converted to a national charter between 1863 and 1868. Each panel contains a linear trend line based on the antebellum data. See Footnote 11 for a description of the matching process.

Figure 3: National and State Bank Deposits (1875-1913)



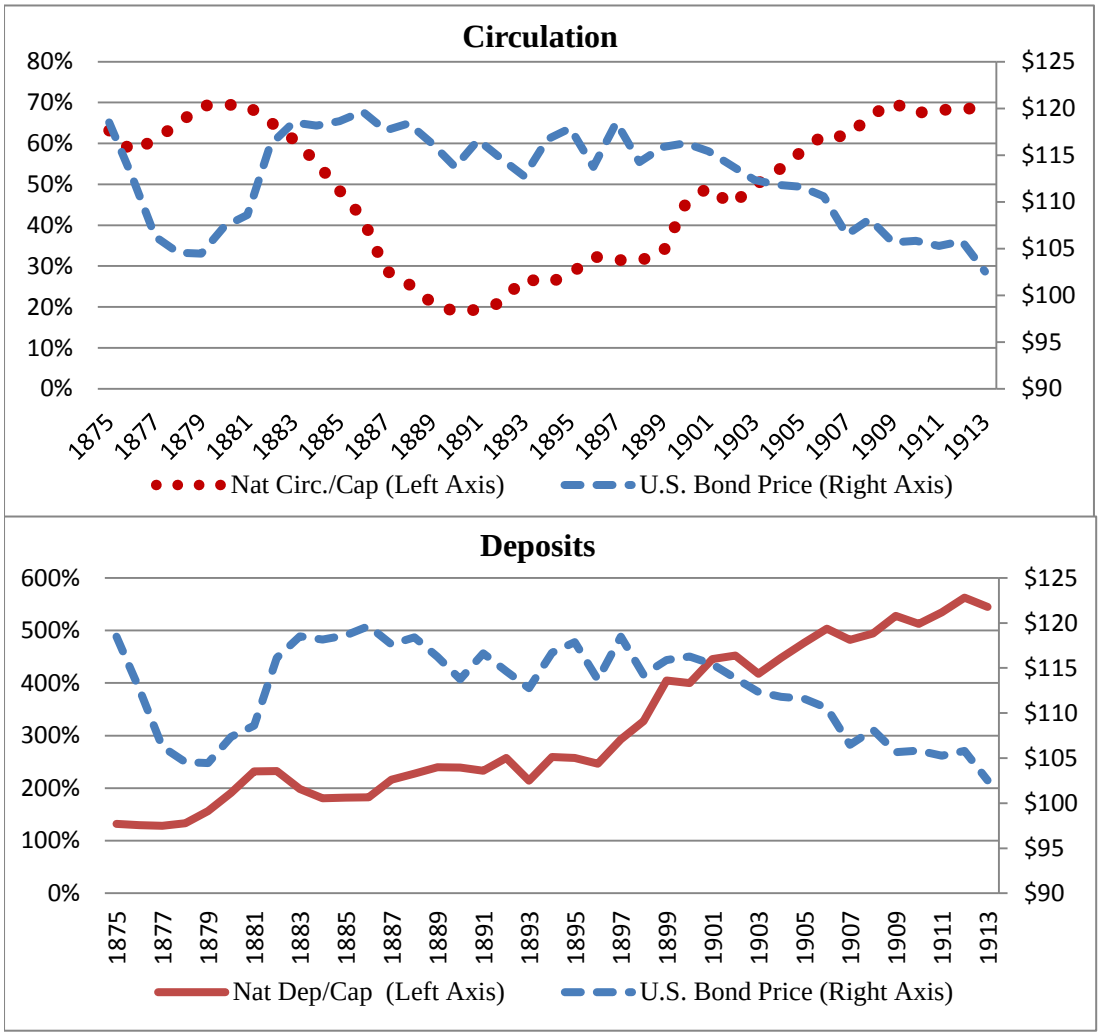
Notes: See Section 2 for data sources.

Figure 4: Clearinghouses By County (1880-1914)



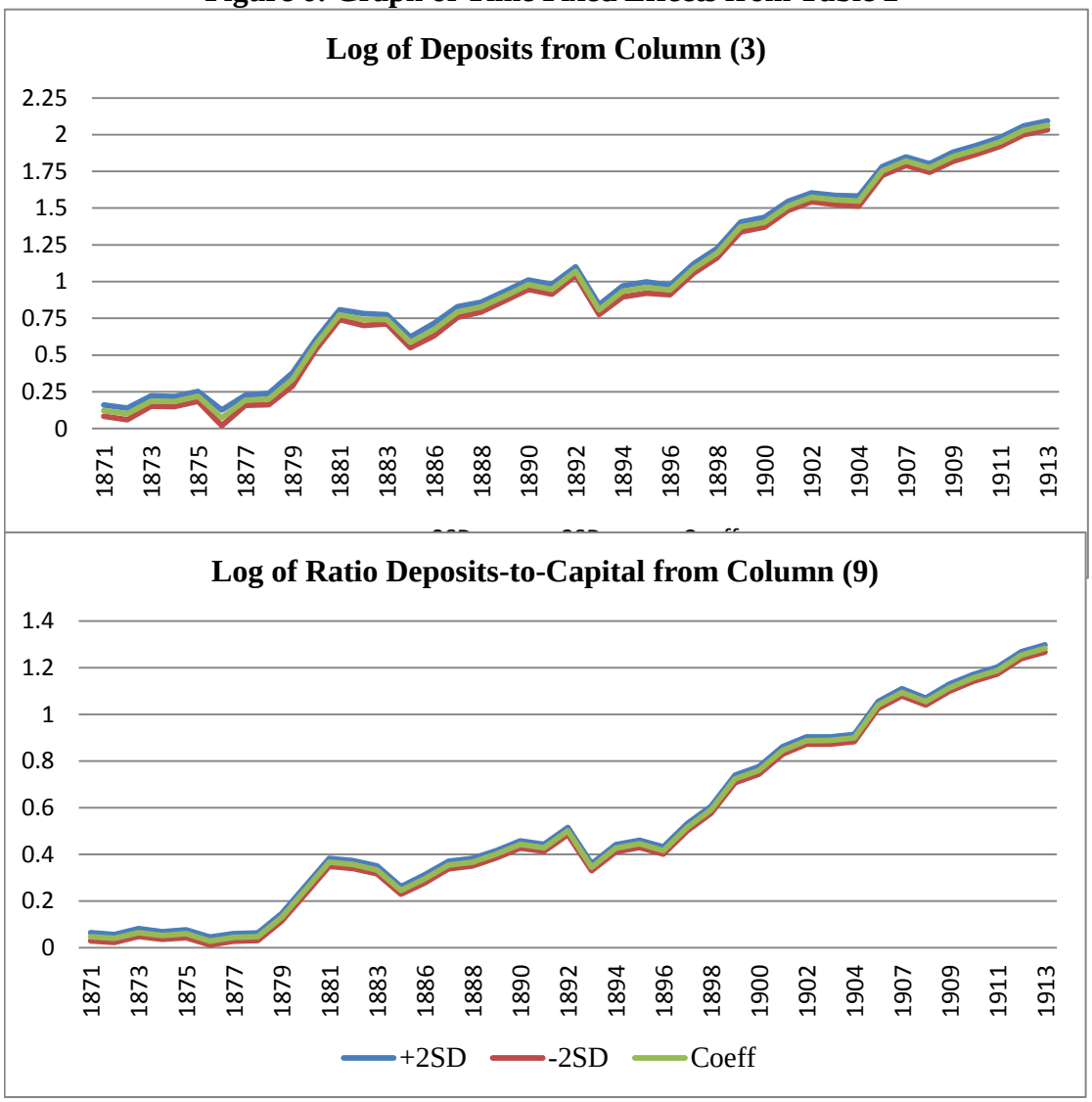
Notes: Figures display the active clearinghouses in each year. Locations and dates of operation are from the *Annual Report of the Comptroller of the Currency* and the *Merchants and Bankers Directory* . County boundaries obtained from Minnesota Population Center (2004).

Figure 5: U.S. Bond Prices (1875-1913)



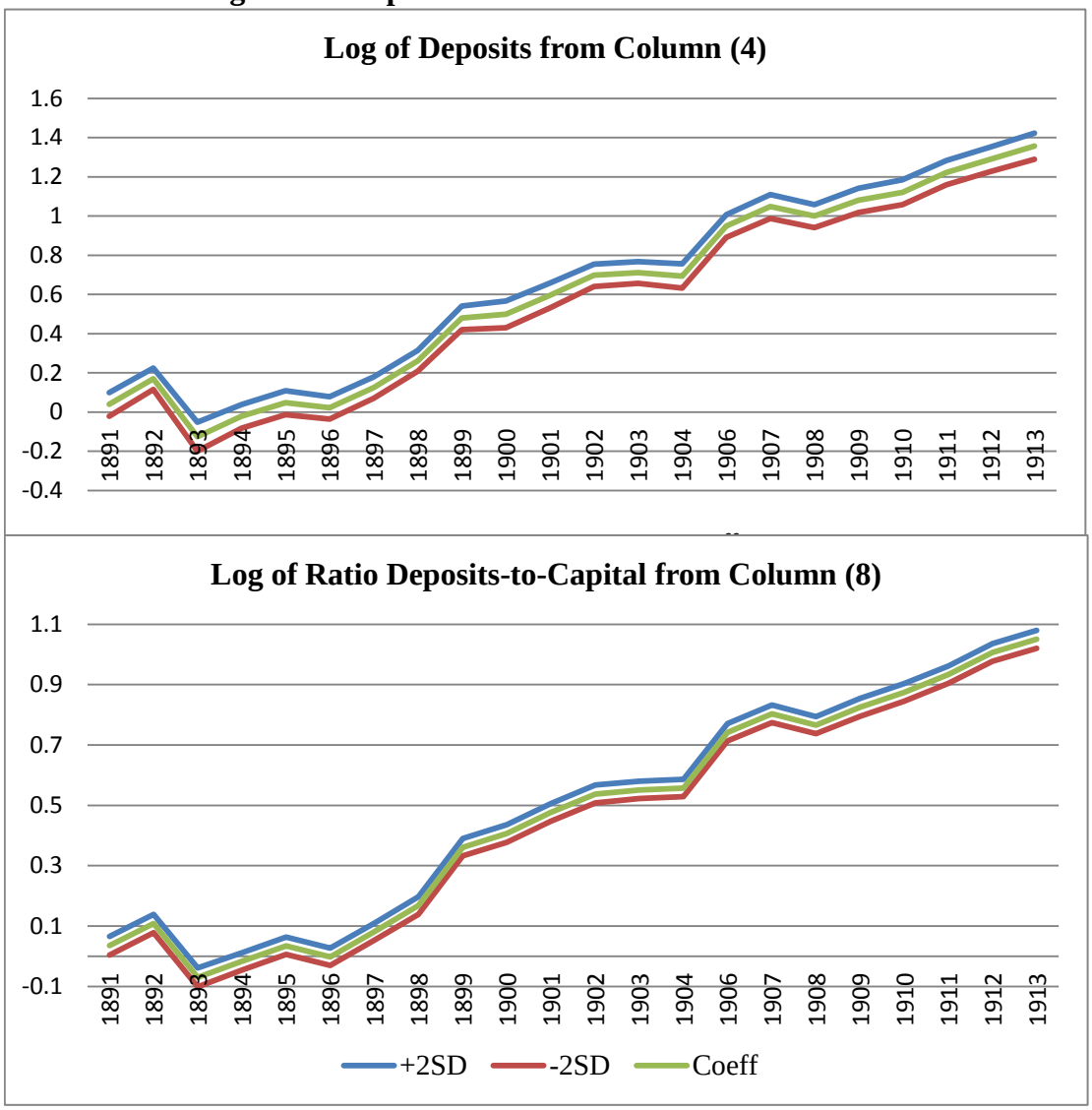
Notes: See Section 2 for bank data sources. Bond prices were obtained from the Comptroller of the Currency's *Annual Report* . The prices (relative to face value) were averaged from the high and low quotes from the New York City market in November of each year. The underlying bonds included are provided in Footnote 20.

Figure 6: Graph of Time Fixed Effects from Table 2



Notes: Figures provide the coefficient and standard error bands for the year fixed effects in Table 2. The omitted reference year is 1870. The Column number refers to the regression specification. The other specifications yield nearly identical patterns.

Figure 7: Graph of Time Fixed Effects from Table 3



Notes: Figures provide the coefficient and standard error bands for the year fixed effects in Table 3. The omitted reference year is 1890. The Column number refers to the regression specification. The other specifications yield nearly identical patterns.

Table 1: Proportion of Checks and Drafts in Total Receipts (1881-1890)

	Country banks		Reserve city banks	
	1881	1890	1881	1890
New England	82.6	879	96.5	94.1
Middle Atlantic	82.5	85.3	94.4	92.2
South	70	79	91.3	91.8
Midwest	74.5	79.2	88.7	90.7
Great Plains	72.6	79.6		95.9
West	52	69.9	91.8	85.6
All Regions	81.7	82.9	96.7	94

Notes: Cited from James (1973, Table 3). Originally obtained from Comptroller of the Currency's Annual Report 1881 (p. 17-19) and 1890 (p. 27-28). New England includes Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut. Middle Atlantic includes New York, New Jersey, Pennsylvania, Delaware, Maryland, District of Columbia. South includes Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Arkansas, Kentucky, Tennessee. Midwest includes Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri. Great Plains includes North Dakota, South Dakota, Nebraska, Kansas, Montana, Wyoming, Colorado, New Mexico, Oklahoma. West includes Washington, Oregon, California, Arizona, Nevada, Utah, and Idaho.

Table 2: Bank-Level Determinants of National Bank Deposits (1870-1913)

	Log of deposits			Log of circulation			Log ratio deposits-to-capital		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Number of other national	0.019***	0.004***	0.005***	0.002	0.002	0.002	0.013***	0.003***	0.003***
banks in county	[0.002]	[0.001]	[0.001]	[0.002]	[0.002]	[0.002]	[0.001]	[0.001]	[0.001]
Number of nat. banks closed	0.032***	-0.000	-0.001	-0.025***	-0.014***	-0.015***	0.018***	-0.002**	-0.002**
in county over previous ten years	[0.002]	[0.001]	[0.001]	[0.004]	[0.003]	[0.003]	[0.001]	[0.001]	[0.001]
Clearinghouse in county	0.181***	0.078***	0.083***	-0.142***	-0.104***	-0.100***	0.047***	0.002	-0.002
	[0.026]	[0.018]	[0.018]	[0.031]	[0.030]	[0.030]	[0.017]	[0.012]	[0.012]
Log of capital stock	0.667***	0.718***	0.646***	0.924***	1.058***	1.024***			
	[0.014]	[0.011]	[0.012]	[0.021]	[0.021]	[0.024]			
U.S. bond price	-0.043***			-0.066***			-0.035***		
	[0.001]			[0.001]			[0.001]		
Entered in 1860s but not			0.013			0.085**			0.067***
former state bank			[0.039]			[0.034]			[0.020]
Entered in 1870s			-0.132***			0.093**			0.052***
			[0.036]			[0.038]			[0.019]
Entered in 1880s			-0.187***			-0.044			0.034
			[0.035]			[0.038]			[0.019]
Entered in 1890s			-0.347***			-0.055			-0.018
			[0.038]			[0.041]			[0.020]
Entered in 1900s			-0.785***			-0.241***			-0.212***
			[0.038]			[0.046]			[0.018]
Year fixed effects	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	159,171	159,171	159,171	159,171	159,171	159,171	159,171	159,171	159,171
R-Squared	0.479	0.578	0.601	0.404	0.441	0.448	0.229	0.459	0.483

Notes: The table presents the results of an ordinary least squares regression. Each observation is a national bank-year, and the dependent variable is listed in the column headings. The "Entered" variables are dummy variables that denote the decade when a bank entered and the omitted reference group is national banks that were formerly state banks. All money values are deflated to 1870 dollars using Officer (2008). Standard errors appear in brackets beneath the coefficients and are clustered by state. *, **, and *** denote statistical significance at ten percent, five percent, and one percent levels, respectively.

Table 3: Midwest Bank-Level Determinants of Deposits (1890-1913)

	Log of deposits				Log ratio deposits-to-capital			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Number of other national banks in county	0.001 [0.002]	-0.001 [0.002]	-0.001 [0.001]	-0.008** [0.004]	0.001 [0.001]	-0.001* [0.001]	-0.002*** [0.001]	-0.006*** [0.001]
Number of other state banks in county	0.026*** [0.002]	0.016*** [0.002]	0.017*** [0.002]	0.027*** [0.003]	0.019*** [0.001]	0.011*** [0.001]	0.011*** [0.001]	0.021*** [0.001]
Number of banks closed in county over previous ten years	-0.002*** [0.001]	-0.003*** [0.001]	-0.003*** [0.001]	-0.003*** [0.001]	-0.001*** [0.001]	-0.003*** [0.001]	-0.002*** [0.001]	-0.001* [0.001]
Clearinghouse in county	0.121*** [0.018]	0.027 [0.017]	0.015 [0.016]	-0.036 [0.034]	0.087*** [0.010]	0.012 [0.009]	0.003 [0.009]	-0.015 [0.017]
Log of capital stock	0.702*** [0.017]	0.793*** [0.017]	0.650*** [0.019]	0.709*** [0.026]				
National bank dummy	0.414*** [0.043]	0.330*** [0.042]	0.242*** [0.040]		0.101*** [0.019]	0.087*** [0.019]	-0.008 [0.018]	
U.S. bond price	-0.065*** [0.001]				-0.055*** [0.001]			
Entered in 1890s			-0.365*** [0.046]	-0.365*** [0.044]			-0.122*** [0.025]	-0.105*** [0.025]
Entered in 1900s			-1.027*** [0.040]	-1.041*** [0.038]			-0.513*** [0.019]	-0.511*** [0.019]
National*Other nat. banks				0.013*** [0.004]				0.009*** [0.001]
National*Other state banks				-0.024*** [0.003]				-0.023*** [0.002]
National*Number of banks closed				0.001 [0.001]				-0.002*** [0.001]
National*Clearinghouse				0.082** [0.038]				0.025 [0.019]
National*US bond price				0.013*** [0.002]				0.001*** [0.001]
National*Capital				-0.105*** [0.022]				
Year fixed effects	No	Yes	Yes	Yes	No	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	37,682	37,682	37,682	37,682	37,682	37,682	37,682	37,682
R-Squared	0.508	0.538	0.566	0.566	0.186	0.235	0.300	0.294

Notes: The table presents the results of an ordinary least squares regression. Each observation is a bank-year, and the dependent variables are listed in the column headings. The sample only contains observations for Indiana, Michigan, Pennsylvania, and Wisconsin. The "Entered" variables are dummy variables that denote the decade when a bank entered and the omitted reference group is banks that entered before 1890. All money values are deflated to 1870 dollars using Officer (2008). Standard errors appear in brackets beneath the coefficients and are clustered by state. *, **, and *** denote statistical significance at ten percent, five percent, and one percent levels, respectively.

Table 4: County-Level Determinants of National Banking by Decade

	Counties with a Bank					
	Log of deposits person		Log of circulation per person		Log of capital per person	
	(1)	(2)	(3)	(4)	(5)	(6)
Log of population	0.085***	0.049*	-0.001	-0.037	-0.063***	-0.101***
	[0.027]	[0.027]	[0.026]	[0.025]	[0.023]	[0.023]
Fraction of population	0.248***	0.194**	0.184**	0.122	0.446***	0.391***
living in area of +25,000	[0.092]	[0.091]	[0.088]	[0.088]	[0.085]	[0.084]
Log of farm value per person	0.042**	0.038**	0.090***	0.085***	0.077***	0.072***
	[0.019]	[0.019]	[0.020]	[0.020]	[0.018]	[0.018]
Number of nat. banks closed	-0.014	-0.017*	-0.007	-0.011	-0.016	-0.019*
over previous ten years	[0.009]	[0.009]	[0.010]	[0.010]	[0.010]	[0.010]
Clearinghouse in county	0.092*	0.098**	0.273***	0.280***	0.236***	0.244***
	[0.049]	[0.049]	[0.048]	[0.049]	[0.045]	[0.046]
Had converted State bank		0.564***		0.504***		0.552***
		[0.058]		[0.045]		[0.045]
Decade fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,741	4,741	4,741	4,741	4,741	4,741
R-Squared	0.412	0.428	0.329	0.358	0.291	0.328

Notes: The table presents the results of an ordinary least squares regression. Each observation is a county-decade. The bank sample only contains counties that had a national bank, and did not experience large boundary changes. "Had a converted state bank" denotes counties that had at least one state bank during the 1860s convert to a national bank charter. Dollar values are deflated to 1870 using Officer (2008). Non-bank variables are taken from Haines (2004). Robust standard are provided in brackets. * denotes significance at 10%; ** at 5% level and *** at 1% level.