NBER WORKING PAPER SERIES

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Matthew S. Jaremski

Working Paper 23113
http://www.nber.org/papers/w23113

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
January 2017

The author would like to thank Charles Calomiris, Mark Carlson, Eric Hilt, Ellis Tallman, David Weiman, and David Wheelock as well as seminar participants at Barnard College, Vanderbilt University, University of Delaware, the Federal Reserve Board, and the Federal Reserve Bank of Atlanta for their valuable comments and suggestions. The views expressed herein are those of the author and do not necessarily reflect the views of the National Bureau of Economic Research.

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NBER Working Paper No. 23113
January 2017
JEL No. G21,G32,N21

ABSTRACT

Operating in individual cities, U.S. clearinghouses were the closest thing to a central bank before 1914, but they only assisted banks that chose to join the association. Using an annual bank-level database for seven states between 1880 and 1910, this paper shows that after the entry of a clearinghouse member banks were less likely and non-member banks in the same city were more likely to close. The results are driven by the fact that the presence of clearinghouses led all banks to become more exposed to systemic liquidity risk, yet only provided liquidity to member banks during panics.

Matthew S. Jaremski
Colgate University
Department of Economics
13 Oak Drive
Hamilton, NY 13346
and NBER
mjaremski@colgate.edu

1. Introduction

Modern financial systems are governed by a patchwork of laws and supervisors. In addition to increasing legal costs, the patchwork encourages the pursuit of regulatory arbitrage whereby institutions alter their composition and services to operate under the loosest laws. This arbitrage can also change the nature of the banking sector, bringing in new business and expanding its exposure to certain factors. Therefore, even a well-regarded central bank could cause negative spillovers when it does not cover the entire system. Leading up to the recent financial crisis, shadow banks in the U.S. used their loose supervision to capture larger market shares and increase their connection to depository institutions through the purchase of mortgage-backed securities and the sale of credit default swaps. The Fed's lack of direct oversight over the shadow banking system hampered their attempts to curb this risky behavior and quickly provide liquidity to the entire system.[1] At the same time, individual depositors trusted in the security of their FDIC covered institutions. Narratives about the crisis argue that the growth of shadow banking obscured the underlying market risk and left the nation vulnerable; however, it is difficult to test this narrative using modern data because of the organizational complexity of commercial and shadow banks.

The National Banking Era (1863-1914) offers a uniquely valuable testing ground for examining such spillovers. Private clearinghouse associations were the source of emergency funds of that time. Each operating in a single city, clearinghouses acted as quasi-central banks, monitoring bank behavior and providing short-term loan certificates backed by collateral during panics. However, the private clearinghouses only assisted those banks that chose to join the association. As many banks remained outside of the associations, the period allows for the

[1] Even with universal oversight, the Fed might not have prevented a downturn from occurring. For instance, some banks under the purview of the Fed (e.g., Citibank) still took on excess risk during the 2000s housing market boom.

identification of the effect of clearinghouses based on within-city variation, explicitly controlling for pre-existing factors that led to clearinghouse entry, local economic factors that influenced bank stability, and bank-specific characteristics. A comprehensive bank-level database from Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin from 1880 to 1910 allows this analysis for a large number of cities and years. In addition to having available annual balance sheet data for the period, these states contained over half of all commercial bank assets and had a wide range of urban, rural, manufacturing, and agricultural areas.

Created by groups of commercial banks, clearinghouse associations were established to facilitate the clearing of checks and bank notes, but quickly evolved to monitor banks, publish information, and provide emergency liquidity during financial panics (Timberlake, 1984; Gorton, 1985; Gorton and Mullineaux, 1987). Timberlake (1984, p. 2) describes their creation: “In the absence of a central banking institution, the commercial banks could not effectively cope with emergency conditions in financial centers. However, the circumstances of their existence prompted their defense; and the defense they developed in the United States was an extension of the functions of the clearinghouse associations”. Gorton (1985, p. 277) states that the "powers and functions that clearinghouses developed most resembled those of a central bank". Cannon (1910, p. 96) calls them "one of the finest examples the country has ever seen of the ability of the people when left to themselves to devise impromptu measures for their own relief". Clearinghouses were created in over 200 cities by 1914, yet membership requirements prevented many banks from joining and receiving the benefits.

The disparity between members and non-members was evident during the Panic of 1907. Banks that were part of the New York City Clearinghouse had few losses, whereas trust companies that were not members suffered widespread deposit losses. Moen and Tallman (2000)

argue that the difference between the two types of institutions was due to public perception of emergency liquidity as much as it was on the result of the liquidity itself. Depositors were much more likely to run on institutions that were not covered by the clearinghouse, even those many trust companies were found to be solvent when examined. As the clearinghouse refused to assist banks outside the association, JP Morgan had to coordinate a bailout of the trust companies by the U.S. Treasury and private individuals to provide liquidity to non-member banks.

To the extent that non-members believed the presence of a clearinghouse prevented panics through monitoring or emergency lending, the entry of a clearinghouse might have pushed them to take more liquidity risk and be more susceptible to panics when they did occur. The question of whether the entry of the clearinghouse influenced the closure rates and stability of non-member banks has proved difficult to answer. Moen and Tallman (1994, 2000) and Hoag (2011) examine clearinghouse members relative to non-members, but they restrict their analysis to Chicago and New York during the Panics of 1893 and 1907 and find conflicting results.[2]

Using a bank-level database stretching over seven states and 30 years, I confirm that the creation of a clearinghouse significantly decreased the probability of closure for member banks and significantly increased the probability for non-member banks. The result remains even after controlling for balance sheet risk, economic growth, and restricting the analysis to just cities that would establish a clearinghouse.

Interbank liquidity risk seems to have been behind the differential closure risk amongst members and non-members. Specifically, the creation of a clearinghouse allowed the location to become a hub on the interbank deposit network. Banks in other cities began to deposit funds in

[2] While Jaremski (2015) analyzes the effects of clearinghouses on national banks from 1865 through 1914, the study does not separate members from non-members. Since many national banks did not join the local clearinghouse, the analysis only captures the effect of the clearinghouses on the average bank rather than on the average member bank.

clearinghouse members to take advantage of their extended clearing networks and access to emergency funds, whereas non-member banks put more of their own funds on deposit in other banks mistakenly believing that the creation of a clearinghouse would have protected the city as a whole from liquidity shocks. As shown by Sprague (1910), Calomiris and Gorton (1991), and Wicker (2000), the interbank network afforded gains in the efficiency of payment systems, but during periods of seasonal stringency, it transmitted idiosyncratic shocks across the entire system and led to nation-wide financial panics. Clearinghouses, therefore, increased systemic liquidity risk for all banks, but only provided emergency liquidity to member banks when panics occurred.

Even though clearinghouses increased interbank balances and systemic liquidity risk, the data show that neither the decision to create a clearinghouse nor the decision to become a member is related to interbank funds or measures of bank risk. Clearinghouse entry was based on the population growth of a location, whereas the choice of clearinghouse membership was related to the number of other banks in the location. The creation of a clearinghouse was thus primarily a response to the demand for check clearing by local individuals and firms, and the growth of the interbank network was an added bonus. To put it another, a clearinghouse allowed banks to connect to the interbank network in a way that population or economic growth would not have been able to achieve in its absence.

In this way, the historical period also provides insight into the risks of central counterparties (CCPs). Just like clearinghouses, CCPs reduce the costs and liquidity risk of individual members, but at the same time, the resulting concentration of clearing could amplify systemic risk and transmit shocks across the entire network. The crisis prone nature of the historical interbank system, therefore, provides a cautionary tale of what could happen as the system becomes more concentrated and proper risk-control measures are not put into place.

2. The Development of Clearinghouses in the United States

The nation's historical payments systems were highly fragmented. The general adherence to unit banking meant that most banks could not open any branches. The lack of branching severely increased the costs of clearing, as checks had to be cleared externally rather than internally. A receiving bank would have had to either physically travel to the paying bank or mail the check to the paying bank. The first option was easy enough if the receiving and paying banks were located in the same city but costs rose as the distance between banks increased.

Two institutions developed to mitigate these costs. The first of these was the interbank correspondent system. In place of opening branches, banks created relationships with other banks in key cities instead. The respondent bank opened a deposit account at the correspondent bank, and the correspondent bank agreed to clear checks drawn on local banks at par (depositing the proceeds into the respondent's account). The respondent bank earned interest on its reserves and gained a way to cheaply clear non-local checks, while the correspondent benefited from having access to the respondent's funds. The Comptroller of the Currency and many state legislatures even codified the interbank network into bank requirements by allowing banks to hold reserves on deposit in a larger city. (James, 1978; James and Weiman, 2010; Bordo and Wheelock, 2013)

Interbank connections within the network served a secondary purpose: channeling interregional payments and interbank loans to fund seasonal peaks in local lending that exceeded local retail deposits. Therefore, even if a bank was not concerned about clearing checks, they still had an incentive to establish correspondent relationships to receive interest on their idle funds and receive seasonal liquidity loans. Systemic liquidity risk, however, was an unintended byproduct. Respondent banks suffered liquidity risk because their correspondent banks might suspend convertibility of deposits into cash, and leave them without access to their accounts. Correspondent banks suffered liquidity risk because they might be faced with sudden withdrawal

demands by respondent banks. Banks that were both receivers and providers of funds were the worst affected, suggesting that those banks in the middle of the interbank network had the most to lose (Calomiris and Carlson, 2016). Nearly all of the period's nation-wide panics were caused by idiosyncratic shocks that were transmitted and multiplied up through the interbank network. (Sprague, 1910; Calomiris and Gorton, 1991; Wicker, 2000)

Clearinghouse associations were the second type of institution that mitigated clearing costs. First started in New York City during 1853, clearinghouses were private organizations created by banks to reduce shoe leather costs by providing a central location and time to clear checks and bank notes every day rather than to each local bank individually. Clearinghouses also provided a central place to clear out-of-town checks and allowed member banks to quickly redeem the checks sent by its respondent banks through the interbank connections of the entire membership. This mechanism allowed clearinghouse cities to serve as the hubs on the interbank network, and granted banks in the city the ability to drawn in even more interbank deposits. To put it another way, the establishment of the clearinghouse gave a location a distinct institutional advantage that no amount of population or bank growth could have achieved.

Clearinghouse membership came with stipulations and requirements. To begin, banks generally had to pay a fee, submit to a balance sheet examination, and certify their capital stock. After becoming a member, banks had to submit financial statements, allow examinations, and were often subject to higher minimum capital requirements and reserve requirements relative to deposits than existing state regulations.[3] These additional requirements could have been an attempt to reduce the regulatory differences between national and state bank members as much as they were to protect against risk-taking.

[3] During the period, capital requirements were generally entry barriers rather than prudential regulation.

The requirements of clearinghouses often discouraged some banks from joining. For instance, no trust companies became members of the New York City's clearinghouse due to its high reserve requirements. As a result, only 56.3 percent of the 1,010 banks that operated in the sample's clearinghouse cities became members (Table 1). Due to their small size and low regulations, state banks were less likely to adopt membership than national banks, but many still became members.

The ability of clearinghouses to lower costs depended upon establishing relationships with member banks and keeping operations relatively local. Banks in other cities, therefore, formed their own associations. The structure and bylaws of associations were fairly homogenous, often following New York City's example, and deviations were often changes to reserve requirements or fees. Figure 1 provides a geographic view of the 59 clearinghouses created in the sample states by 1910.

Mutually owned by the member banks, clearinghouses were non-profit organizations and only charged enough to pay their administrative bills. The determinants of clearinghouse creation were thus based on the benefits that the clearinghouse offered to members: the cost of clearing and desire for emergency liquidity. First, because the number of checks that would need to be cleared in a given day was directly related to the number of people in that location, populated cities would have benefited most from a centralized clearing system. Indeed, 46 of the 63 cities in the sample states with more than 30,000 people established a clearinghouse by 1910, and only 2 of the 31 cities with more than 60,000 people did not create a clearinghouse by 1910. The early expansion of clearinghouses was particularly limited to the largest cities: Cincinnati, Cleveland, Columbus, Detroit, Indianapolis, Milwaukee, Minneapolis, New York City, Philadelphia,

Pittsburgh, St. Paul, and Syracuse. As several clearinghouses were formed with less than five banks in the city, the number of banks was a secondary factor to population.

Second, banks might have valued a safety net during panics. Most panics during the period were crises of systemic liquidity risk associated with moderate increases in insolvency risk and a small proportion of bank failures. Lacking a central bank to provide funds, solvent banks sometimes were forced to close their doors. As discussed in the next section, clearinghouses provided emergency liquidity to member banks during panics. These issues assisted the banking system and allowed member banks to withstand the panic. In fact, 16 clearinghouses were established within the three years after the Panics of 1893 and 1907, and most of these were established in small cities, suggesting less of a desire for clearing and more of a desire for emergency liquidity.

2.1 Clearinghouses as Lenders of Last Resort

The clearinghouse system evolved to do much more than clear bank debt. During the Panic of 1857, the policy committee of the New York City Clearinghouse authorized the issue of clearinghouse loan certificates to qualified member banks. The certificates were backed by collateral (typically commercial paper or government bonds) from the receiving bank, but they were drawn on the clearinghouse, making them a joint-liability of the members. Members thus could conserve their limited currency reserves by settling clearinghouse obligations with certificates rather than currency, and while member banks were required to accept the certificates during clearing, they gained interest on holding the certificates. When a member defaulted, the remaining members bore the loss in proportion to their capital stock.

Clearinghouse innovated in the subsequent panics. During the Panic of 1860, the New York City Clearinghouse pooled their members' reserves to create a fund for mutual aid, the

practice was quickly discontinued. The Panic of 1873 ushered in the use of certified checks which did not require collateral. The Panic of 1893 brought the use of lower denomination clearinghouse notes which could be given to non-members. Clearinghouses also protected their members from negative information releases during panics. This protection included replacing the weekly publication of individual bank statements with the publication of a single aggregate clearinghouse statement and guarding the names of banks that received loan certificates. (Gibbons, 1859; Calomiris and Schweikart, 1991)

The record shows that clearinghouses primarily protected their members from financial panics and that non-member banks could not rely on them for protection. First, it was not until the issue of clearinghouse notes in the 1890s that emergency liquidity could directly flow outside of the association. Even then, many clearinghouses chose not to issue notes at all. Second, given that interest rates were fixed for all borrowers and members were responsible for losses, the loan committee had a vested interest in providing good loans. They thoroughly checked the borrowing bank's collateral assets and often examined the bank itself. Third, clearinghouses did not authorize any emergency liquidity until a shock began to harm their members. For instance, the New York City Clearinghouse waited several months before authorizing loan certificates during the Panic of 1893 because its members were not directly affected by the agricultural shocks that started the panic.

While the clearinghouse undoubtedly brought some positive benefits to member banks during the panics, their public actions might also have caused some negative spillovers to non-member banks. Moen and Tallman (2000) provide many accounts from the *New York Times* and *Chicago Daily Tribune* on the actions of the clearinghouses. These accounts often highlighted the protective actions of the clearinghouse and discussed the concern amongst other banks. For

example, the *Times* reported in October of 1907 that the Knickerbocker Trust Company "had not been aided by the clearinghouse or JP Morgan and his associates because the company's capital and surplus was impaired" and that Morgan “did not care to assume the responsibilities of previous poor management” (p. 150). The reports likely decreased public distress over member banks, yet increased distress over non-member banks. To put it another way, the clearinghouse could have concentrated runs on non-member banks, regardless of their asset portfolio.

Table 1 illustrates the effect of clearinghouses by calculating the fraction of bank closures in the sample states from 1880 through 1910. The top panel shows that simple comparisons of banks can be misleading when they do not take account of geographic and economic characteristics. According to the panel, 35 percent of all member banks closed, yet only 25 percent of all non-member banks closed. However, clearinghouses (and thus members) were in financial centers that were highly exposed to interbank risk, whereas most non-members were in small towns that had much less interbank exposure and no clearinghouse. Indeed, the bottom panel of Table 1 shows that clearinghouse members were much less likely to close than non-members when restricting the sample to banks in cities with a clearinghouse before 1910. Compared to the 35 percent of member banks that closed over the thirty year period, almost 55 percent of non-member banks in clearinghouse locations closed. These values amount to annual probabilities of closure of about 1.2 percent and 1.9 percent respectively.

These differences across banks in similar locations are dramatic, but could be caused by endogenous selection into membership based on characteristics such as bank size, composition, or age. The rest of the paper, therefore, accounts for other factors to isolate the differential effect of clearinghouses on the closure rates of member and non-member banks.

3. Data

I combine annual national and state bank data to examine the effect of clearinghouses on members and non-members. The national bank data come from Jaremski (2013). Culled from the Comptroller of the Currency's *Annual Report,* the data contain the annual balance sheet of every national bank in operation each year. Data are missing for 1885 when balance sheets were not reported and for 1905 when certain balance sheet items were combined. The state bank balance sheet data come from the state reports of Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin.[4] Due mostly to states reporting information biennially during the early 1880s, state bank balance sheets are missing for Indiana in 1880, 1882, and 1884, Minnesota in 1883, Ohio in 1883 and 1893, and Wisconsin in 1883, 1885, and 1887.

To create consistent balance sheet measures, one must make some adjustments when combining the various reports. First, I aggregate unique balance sheet items listed in a few state reports into more common items. For instance, time deposits, checking deposits, demand deposits, savings deposits, and certificates of deposits are merged into a single individual deposits measure. I also avoid extreme outliers and data errors by dropping banks whose deposits, capital, or loans were equal to total assets. Second, I fill missing balance sheet observations to avoid years when only one type of bank was observed in a state. The interpolation begins with a simple linear interpolation of each individual bank's observations

[4] 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 State Treasurer of the State of Michigan* before 1889 and the *Annual Report of the Commissioner of the Banking Department of the State of Michigan* thereafter. Data for Minnesota are from the *Report of the Public Examiner of the State of Minnesota to the Governor* before 1910 and *the Annual Report of the Banking Department of the State of Minnesota* thereafter. Data for New York are from the *Annual Report of the Superintendent of Banks of the State of New York*. Data for Ohio are from *Annual Report of the Auditor of State to the Governor of Ohio*. 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* before 1895, the *Annual Report of the Bank Examiner* from 1896 to 1902, and the *Annual Report of the Commissioner of Banking* thereafter.

(i.e., the midpoint of the two surrounding years). Using the Comptroller of the Currency's state-level data in the *Annual Reports*, I adjust those interpolated values by uniformly shifting all of the values so that the average change for those imputed values is identical to the observed change that year in the aggregate value of that variable for banks in that state. Lastly, I define the year of bank closure as the year after the last balance sheet was published. While I account for reported or slight name changes, it is possible that a few of these "closures" might be substantial name changes or mergers. However, as these changes could also have been driven by distress and insolvency, the results should not be greatly biased. The final database contains 81,721 observations for 3,102 national banks and 4,100 state banks from 1880 through 1910, and covers over half of all bank assets in the United States.

Clearinghouse information comes from the *Merchants and Bankers Directory* (1880-1889), *Rand McNally Bankers Directory* (1890-1900), and the *Polks Bankers Directory* (1901-1910). The directories provide a list of banks in each year denoting which cities had a clearinghouse and which banks were members. Because the directories were generally published in January, I designate membership as the year before the clearinghouse notation first appeared. I verify or adjust clearinghouse entry dates with Cannon (1900) and the Comptroller's *Annual Report* whenever possible. Two clearinghouses cease operation in the sample. In the empirical analysis, observations after closure from the county are dropped to avoid identifying on the closure. Results are similar when the cities are dropped altogether.

While the bank balance sheets exist for every year, the county-level Census database assembled by Haines (2004) only contains information each decade. This limitation is restrictive because many clearinghouses were not created at the end of a decade, and a decennial regression model would pick up changes occurring before a clearinghouse entered. To obtain more precise

estimates of the effect of clearinghouses, I aggregate counties to their 1880 boundaries and assume that the county-level census variables grew linearly over time to create estimates for the years in-between each decennial observation.

4. Empirical Analysis

Before determining whether clearinghouses affected bank behavior, I explore what led to the creation of a clearinghouse and what led individual banks to become members. If either decision was endogenous to the local economic or financial conditions, then we must control for those conditions before testing for the effect of clearinghouses. I start in Section 4.1 by examining the decision to create a clearinghouse based on the characteristics of the location and the characteristics of the banks in that location. I also test whether clearinghouse locations had differential pre-trends prior to the establishment of a clearinghouse. In Section 4.2, I then examine the decision of individual banks to become a member based on the characteristics of their location and balance sheet composition.

I find that the factors associated with clearinghouse entry and membership are not related to the risk profile of individual banks, and therefore, after controlling for environmental factors as explanatory variables, the analysis can be confident of identifying the causal effect of clearinghouses on bank behavior. First, Section 4.3 examines whether banks altered their balance sheet composition after the establishment of a local clearinghouse. The analysis examines not only the behavior of member banks but also the behavior of non-member banks to determine whether there were differential responses to the creation of the clearinghouse. Second, Section 4.4 examines whether banks were less likely to close after becoming a member. Membership not only provided banks with the ability to receive emergency liquidity during panics, but it also

provided positive media coverage that mitigated public fears of insolvency. As in the balance sheet analysis, I separately test the behavior of member and non-member banks.

4.1 Determinants of Clearinghouse Entry

I model entry using a linear probability model where the dependent variable takes the value of "1" if a clearinghouse was created in the county during the following year and "0" otherwise. As the entry of a clearinghouse was likely to have quickly influenced a county's banking system but not its economic activity, the banking measures are lagged one year but the census variables are not. Moreover, observations after a clearinghouse entered are dropped to avoid any subsequent changes, and counties without banks are dropped to avoid locations that would not need a clearinghouse. The full specification is:

$$Entry_{i,t} = a + \beta_1 Banks_{i,t-1} + \beta_2 Assets_{i,t-1} + \beta_3 Interbank_{i,t-1} + \beta_4 X_{i,t} + t_t + s_s + e_{i,t}, \quad (1)$$

where $X_{i,t}$ is a vector of county-level variables including the logarithm of population, the logarithm of farm value per person, and the fraction of the population living in an area of 25,000 people or more. No manufacturing variable can be included in the regressions because none is available at the county-level for the 1910 Census. $Banks_{i,t-1}$, $Assets_{i,t-1}$, and $Interbank_{i,t-1}$ are respectively the logarithms of the number of banks, bank assets, due from banks and due to banks balances in the county in the previous year. When the balance sheet variables are included alongside the number of banks, their coefficients are identified from the average size of the balance sheet item, testing whether a few large banks rather than a few small banks were more likely to start a clearinghouse. Fixed effects for each year (t_t) control for nation-wide shocks such as financial panics and either state or county-fixed effects (s_s) control for local economic conditions. $e_{i,t}$ is the robust error term that is clustered by county. The

definitions and summary statistics of the explanatory variables are provided in Table 2.

Table 3 shows that clearinghouses were attracted to large cities. The coefficients on population and the fraction living in a place of 25,000 or more are always statistically significant and positive. The coefficients of both variables are largest when controlling for county-fixed effects suggesting population growth mattered, not just the level of population. On the other hand, the other variables suggest that the general size of the banking system matters, but not its growth or the composition of its banks. The coefficient on the number of banks is positive and statistically significant in the state-fixed effects regressions (columns (1), (5), and (8)), but economically small. The logarithm of total assets is only statistically significant when neither county-fixed effects nor the number of banks are included in the model (column (3)),[5] and the interbank variables are never statistically significant. Therefore, population growth rather than bank growth seems to have been the main determinant of clearinghouse creation.

Next, I test whether locations that would create clearinghouses were differentially growing from those that would not. The model is:

$$Y_{i,t} = a + \beta_1 CHNextDecade_i * Trend_t + \beta_2 X_{i,t} + t_t + u_i + e_{i,t}, \qquad (2)$$

where $Y_{i,t}$ is either the number of banks, total assets, individual deposits, due from banks, due to banks, population, or urbanization, $Trend_t$ is a linear time trend, $CHNextDecade_i$ is a dummy variable that takes a value of "1" if a clearinghouse was eventually established in the location, $e_{i,t}$ is the robust error term clustered by county, and the rest of the variables retain their prior definitions. The model is estimated using two different samples. The first sample consists of data from 1880 through 1890 and contains only those locations that had not established a

[5] The reduction in the effect of bank assets suggests that the overall size of the banking system mattered rather than the distribution amongst banks. Indeed, using a Gini Coefficient of assets to account for the size distribution of banks directly produces a negative but insignificant correlation with clearinghouse entry.

clearinghouse by 1890. The second sample consists of data from 1880 through 1900 and contains only those locations that had not established a clearinghouse before 1900.

Table 4 indicates that there were no differential trends in locations' balance sheets before they established a clearinghouse. The only bank variable that displays a differential pre-trend is the number of banks in the 1880 through 1900 sample. However, confirming the result of Table 3, the population and urbanization of clearinghouse locations were growing much faster than non-clearinghouse locations.

To be clear, these results do not imply that the banking systems of clearinghouse locations were stagnant, but rather imply that any differential bank growth was due to differential population growth. Indeed, the coefficients suggest that places with high population growth were also experiencing high bank growth, particularly for growth in the number of banks and due to banks balances. Population growth thus brought in more banks, interbank liabilities, *and* clearinghouses. As such, the models in the rest of the paper control for population as a separate variable to avoid confounding the effect of a clearinghouse with the effect of population.

4.2. Determinants of Clearinghouse Membership

The next potential source of endogeneity is the individual membership decision by banks. Finding a proper control group for examining the choice of membership is more complicated than controlling for location. Regardless of their composition, banks could not join a clearinghouse if one did not exist in their city. The presence of a clearinghouse also could have altered the decisions of entering banks. To mitigate these issues, I limit the sample to a cross-section of banks in the year before a clearinghouse opened in their city. Each bank's membership decision is then observed just prior to when it was first confronted with a clearinghouse. The

restriction drops potentially endogenous new banks and banks that did not have a choice to join a clearinghouse. The model is:

$$CH_i = a + \beta_1 NBanks_i + \beta_2 SBanks_i + \beta_3 X_i + \beta_4 Age_i + \beta_5 State_i + \beta_6 Z_i + s_s + e_i, \quad (3)$$

where CH_i is a dummy denoting whether the bank became a member of a clearinghouse in the following year, $NBanks_i$ and $SBanks_i$ are the logarithms of the number of national and state banks in the county respectively, Age_i is the logarithm of the bank's age, $State_i$ is a dummy variable for whether the bank was a state bank, $Z_{i,}$ is a vector of balance sheet items described below, and $e_{i,t}$ is the robust error term clustered by county. Due to the limited number of clearinghouses established each year and banks per location, year and county-fixed effects are not included in the model.

I have chosen several key balance sheet risk indicators based on historical studies of banking and the CAMELS measures used by modern bank regulators. *Ln(Assets)* measures bank size. The ratio of *Capital to Assets* (where capital contains paid-in capital as well as surplus and retained earnings) measures capital adequacy and insolvency risk. The ratio of *Cash to Deposits* measures the bank's capacity to meet bank runs in currency. The ratio of *Loans to Assets* measures the size of a bank's loan portfolio, and the ratio of *Real Estate Owned to Assets* is included as a proxy for loan risk. Used by studies such as Calomiris and Mason (1997, 2003), real estate owned contains foreclosed properties and is the best proxy of previous loan failures available because the reports of the Comptroller and state officials do not include information on income or asset quality. The ratios of *Due From Banks to Assets* and *Due to Banks to Liabilities* measure the size of interbank relationships and the bank's exposure to other market participants. The summary statistics of each variable are provided in Table 2.

Table 5 shows that state banks were not necessarily more or less likely to become clearinghouse members than national banks after controlling for age, location-specific factors, and composition. Instead, banks located in towns with few other banks were the most likely to adopt a membership. The results make intuitive sense given the sample captures founding members. Banks in a city with few banks would only have started a clearinghouse if they all agreed to join. Alternatively, the balance sheet characteristics are not significant determinants of membership. Appendix Table A.1 shows that the results are similar when adding observations from Illinois between 1889 and 1910 to the model, suggesting that the lack of statistical significance is not just due to the low number of observations.

The data indicate that the decision to become a clearinghouse member is based on a bank's environment rather than its balance sheet composition. However, the piecemeal approach might mask the overall risk of banks' portfolios. To examine overall risk, I estimate the determinants of bank closures for two samples. The first examines the determinants of closure for all locations without an active clearinghouse and the second examines the determinants of closure for only clearinghouse locations before they gained a clearinghouse. Both samples avoid any changes that the entry of a clearinghouse could have had on bank outcomes, and each provides a different comparison group by which to measure risk. The model is:

$$Closure_{i,t} = a + \beta_1 SBanks_{i,t} + \beta_2 NBanks_{i,t} + \beta_3 X_{i,t} + \beta_4 Age_{i,t} + \beta_5 State_i + t_t + s_s + e_{i,t}, \quad (4)$$

where $e_{i,t}$ is the robust error term clustered by bank and the rest of the variables retain their definitions. Using the coefficients in Appendix Table A.2, I calculate each bank's predicted portfolio risk in the year before a clearinghouse entered. I then estimate equation (3) using predicted portfolio risk as the only control variable. Seen in Table 6, the coefficient on both

predicted risk variables are negative but not statistically significant. As such, the results suggest that selection into clearinghouse membership was not determined by individual bank risk and I can proceed to analyze the effect of clearinghouses on bank outcomes.

4.3 Effect of Clearinghouses on Balance Sheets

The previous sections have indicated that clearinghouse entry was based on a location's population and that banks in locations with few surrounding banks were more likely to join an entering clearinghouse. While controlling for these factors that led to clearinghouse entry and membership, the next step is to examine the behavior of banks after the entry of a clearinghouse became members, starting with changes to their balance sheet composition.

A detailed model is needed to isolate the effect of clearinghouses on bank balance sheets. First, I control for the determinants of clearinghouse entry by including each county's population, urbanization, and farm value as well as the number of state and national banks. Second, I include the logarithm of the bank's age to capture growth trends that existed over the lifetime of the bank, year-fixed effects to capture effects that existed across the financial system in a given year, and bank-fixed effects to capture time invariant bank characteristics. Third, I drop banks that entered a county after a clearinghouse was established because their composition might have been endogeneous to the existing clearinghouse and drop banks in a city that established a clearinghouse before 1880 because the model would not be able to separate the bank-fixed effect and the clearinghouse dummy for those banks. Finally, to estimate the spillover effects on non-members, I create a separate indicator variable that denotes whether the bank was in a city with a clearinghouse *but* was not a member. The model takes the form of:

$$Z_{i,t} = a + \beta_1 NBanks_{i,t} + \beta_2 SBanks_{i,t} + \beta_3 X_{i,t} + \beta_4 Age_{i,t} + \beta_5 CH_{i,t} + \beta_6 CHCity_{i,t} + t_t + u_i + e_{i,t}, \quad (5)$$

where $CH_{i,t}$ is a dummy denoting whether the bank was in a clearinghouse city and was a member in the current year, $CHCity_{i,t}$ is a dummy denoting whether the bank was in a clearinghouse city but was not a member in the current year, u_i is a vector of bank-fixed effects, $e_{i,t}$ is the robust error term clustered by bank, and the other variables retain their definitions.

The first column of each set in Table 7 shows that banks changed their balance sheet composition after joining a clearinghouse. Member banks grew their total assets by 9 percent and increased their proportion of due to banks balances by 0.8 percentage points.[6] The second column of each set shows that banks that did not choose to become members increased their proportion of due from banks balances by 1.4 percentage points. The results also suggest that non-member banks received some additional interbank liabilities after the creation of a clearinghouse. The lack of statistical significance suggests that this effect was not universal. As many interbank relationships were long-lived, respondent banks might have chosen to deepen their relationship with a non-member bank rather than start a new relationship with a member bank.

While the effects on the interbank measures might seem small, they are over and above the rise in total assets (and liabilities) as well as the trend in population. Indeed, in Appendix Table A.4, the effect of a clearinghouse on the logarithms of due to banks and due from banks balances ranged from 20 to 42 percent even with population as a control. The arrival of a clearinghouse thus led to a large expansion of a location's interbank balances and its exposure to systemic liquidity risk. Most panics during the period were driven by seasonal stringency and bank suspensions in other locations. Respondent banks lost access to their deposits in

[6] The effects of a clearinghouse's entry had slightly different effects on state and national bank members. Table A.3 shows that state banks took on a little less risk and national banks took on a little more risk after becoming a member. However, there is no differential effect on state member bank stability in Table A.5.

correspondent banks, and correspondent banks experienced runs from their respondent banks. Even solvent banks might have been forced to close as a result of illiquidity.

The effect of clearinghouse entry on interbank balances is not surprising. The establishment of a clearinghouse provided the city with a central location to clear debt and connected the correspondent networks of member banks. It thus vaulted a city from the edge of the interbank network into the middle and allowed banks to become integrated in a way that neither economic nor bank growth could have achieved. The differential interbank changes at member and non-member banks likely reflect that: (1) banks in other locations saw increased value from the connection of the member banks' clearing networks and their access to emergency funds and (2) non-member banks believed that the clearinghouse would provide liquidity in times of panic and thus sought to receive interest on their reserves by placing them on deposit in other banks. Many of the clearinghouses established after 1900 had full membership amongst local banks, suggesting they learned from previous panics when clearinghouses did not provide funds to non-members. Moreover, the data suggest that some non-member banks placed funds in local clearinghouse member banks in order to have access to their clearing networks.

With some measures increasing and some decreasing, it is helpful to examine the overall effect of clearinghouses on pre-clearinghouse balance sheet risk. I therefore test whether total portfolio risk changed after the entry of a clearinghouse using the two predicted pre-clearinghouse risk measures calculated in the previous section. In Table 8, the coefficients show that member banks decreased their pre-clearinghouse predicted risk after the entry of a clearinghouse. The negative coefficients on non-member banks suggest an overall reduction in predicted risk, but it is not statistically significant. Therefore, the entry of a clearinghouse does

not seem to increase typical insolvency or loan risk, but rather increased systemic liquidity risk of all banks by making the city a hub on the interbank network.

4.4 Effect of Clearinghouses on Bank Closure

Similar to equation (4) except with the addition of clearinghouse member dummy, I model the probability of closure over the following year using the model:

$$Closure_{i,t} = a + \beta_1 SBanks_{i,t} + \beta_2 NBanks_{i,t} + \beta_3 X_{i,t} + \beta_4 Age_{i,t} + \beta_5 State_i + \beta_6 CH_{i,t} + t_t + s_s + e_{i,t}, \quad (6)$$

where the variables retain their previous definitions. In this case, I include either state or county-fixed effects because the use of bank-fixed effects would restrict the examination in two ways. First, the analysis could not include banks that survived the period as the fixed effects would completely determine the outcome of surviving banks. Second, the inclusion of bank-fixed effects (or demeaning the variables) would prevent the examination of any constant balance sheet differences between banks. As such, the model would not be able to compare big and small banks but rather would compare banks that were growing at different rates.

In Table 9, banks that became members of the local clearinghouse were 0.8 to 1.6 percentage points less likely to close even after controlling of balance sheet risk, population growth, and the size for the banking system.

Bank closures were also more prevalent in high population counties. A 10 percent increase in population increased the probability of closure by 0.08 to 0.3 percentage points. Population not only captures the number of watchful depositors and size of potential bank runs, but also captures interbank liquidity risk. The inclusion of population is thus important to control for factors that would make banks in large cities more likely to close than those in rural areas. In the following analysis, the model is also explicitly limited to clearinghouse locations to provide a

more homogenous comparison group. Appendix Table A.6 shows that the effects of interbank funds and population are larger but the other results are similar when dropping rural areas from the sample.

The coefficients on the balance sheet ratios show that small banks with high proportions of capital, real estate owned, and due to banks were more likely to close. When county fixed effects are included in column (4), the probability of closure decreases by 0.19 percentage points for every 10 percent increase in assets, increases by 0.54 percentage points for every 10 percentage point increase in capital to assets, and increases 0.51 percentage points for every 10 percentage point increase in due to banks to liabilities. Applying the balance sheet coefficients in column (3) of Table 9 to the balance sheet changes in the first column of each set in Table 7 indicates that member banks reduced their probability of closure by 0.169 percentage points after the entry of a clearinghouse.

The evidence suggests that clearinghouses made member banks less likely to close, but did they also affect surrounding non-members? Unlike the balance sheet regressions that examine only the time series variation of bank membership, the bank closure regressions also examine cross-sectional variation. The focus on both types of variation creates a problem when including both clearinghouse dummies because the model would compare member and non-member banks in populated cities that were subject to high interbank risk with banks in the surrounding rural areas that were not as exposed. To avoid this problem, I drop cities that never received a clearinghouse and focus only on cities that created a clearinghouse between 1880 and 1910, leaving the model to compare banks in similar locations before and after they created a clearinghouse. The model is now:

$$Closure_{i,t} = a + \beta_1 NBanks_{i,t} + \beta_2 SBanks_{i,t} + \beta_3 X_{i,t} + \beta_4 Age_{i,t} + \beta_5 State_i + \beta_6 CH_{i,t} + \beta_7 CHCity_{i,t} + t_t + s_s + e_{i,t}, \quad (7)$$

where the variables retain their previous definitions.

The regressions results in Table 10 indicate that members were less likely and non-members were more likely to close after the entry of a clearinghouse. In column (4), the entry of a clearinghouse increased the probability of closure by 3.2 percentage points for non-members and decreased the probability of closure by 1 percentage point for members. The coefficient for clearinghouse members falls just above the 10 percent cutoff when both state-fixed effects and balance sheet measures are included in column (3), but it still remains economically significant.

Comparing Tables 9 and 10, population becomes an even larger determinant of bank closure in the clearinghouse location sample. The coefficients on the proportions of due to banks and due from banks balances also significantly increase, confirming that interbank risk is more prevalent in clearinghouse locations than areas that did not have a clearinghouse. The comparison of tables also shows that positive and significant coefficient on the capital to assets ratio is mitigated when focusing on clearinghouse locations, suggesting that the result was driven by a comparison of banks in large financial centers that would have had higher failure rates and capital requirements with banks in rural areas that would not.

Again it is useful to calculate the size of a clearinghouse's effect on closure through balance sheet changes. Applying the balance sheet changes estimated in the second column of each set in Table 7 to the coefficients in column (4) of Table 10 indicates there were small reductions in risk for both types of banks. The probability of closure was reduced by 0.17 percentage points for the balance sheet changes of members and was reduced by 0.07 percentage points for the balance sheet changes of non-members. Indeed, other than the shift towards

interbank liabilities for members and interbank assets for non-members, the rest of the balance sheet changes generally lowered the loan and insolvency risk profile of banks.

The empirical evidence is clear: the entry of a clearinghouse helped banks that became members and hurt others. Even after comparing banks in the same city and controlling for balance sheet composition, a member bank was less likely to close and a non-member bank was more likely to close. The analysis suggests that the negative effect is not through increasing loan or insolvency risk, but rather through increasing systemic liquidity risk and hanging non-member banks out to dry during liquidity panics. Member banks could receive emergency liquidity to help them weather the panic and remain open, while non-member banks had to make due with whatever cash reserves they started with. The arrival of a clearinghouse also created a clear public separation between “protected” and “unprotected” banks during panics. Depositors would have been more likely to run on a bank that was not covered by a clearinghouse than one that was regardless of their composition. Indeed, clearinghouse banks published weekly balance sheet statistics compared to other banks that only provided them at most every quarter, leaving less uncertainty about member banks than others during the panics.

5. Conclusion

Kroszner (2000, p.158) writes "the 'lesson' learned from [the Panic of 1907] was that the clearinghouse mechanism appeared to be inadequate to serve the financial system of the U.S. and was used as a motivation for the creation of the Federal Reserve System.” This paper highlights the positive and negative impacts of clearinghouses and why a more inclusive institution was needed. For starters, the clearinghouse system audited its members’ balance sheets and provided emergency liquidity during panics. As a result, member banks were less likely to close over the highly cyclical period. However at the same time, the entry of a clearinghouse negatively

influenced the stability of surrounding banks that did not become members. Because less than 60% of banks in clearinghouse cities became members, the introduction of clearinghouses might have endangered the financial system as much as they stabilized it.

Interbank liquidity risk seems to be the mechanism behind the differential closure risk. The creation of a clearinghouse moved a location from the edge of the interbank network into the middle. Seeking to take advantage of the clearing network of members, respondent banks in other locations deposited funds into clearinghouse members. Banks that were not members of the clearinghouse, on the other hand, began to deposit significantly more of their money in correspondent banks, potentially under the mistaken belief that the location's clearinghouse would protect them from liquidity shocks. The growth introduced systemic liquidity risk to an area as both respondent and correspondent banks were influenced by shocks to other parts of the system. As clearinghouses only provided emergency liquidity to member banks, non-member banks would be left without needed funds when a panic occurred. Clearinghouses also mitigated depositors' fears of member banks by publically supporting member banks' solvency, while at the same time casting suspicion on non-member banks.

The exclusivity of the clearinghouses was a reason why the nation passed the Federal Reserve Act (1913) rather than encouraging the expansion of the clearinghouse system. As described by Wicker (2005), the establishment of a central bank was not just about emergency relief to illiquid banks during panics. If it was the goal, then the combined funds issued under the Aldrich-Vreeland Act (1908) and the clearinghouse system were likely sufficient (Jacobson and Tallman, 2013). Instead the adoption of a central bank was an attempt to provide stability to the entire banking system over time—something the exclusionary approaches of clearinghouses could not achieve. First, the Federal Reserve forced every national bank to become a member

and strongly encouraged state banks and trust companies to join. The pressure reduced the number of non-protected banks and made sure that a lender of last resort was available to banks in all cities. Second, it installed an active lender of last resort that was available to provide emergency and seasonal liquidity during all periods rather than just during financial panics. The accessibility of the discount window protected banks from all economic fluctuations and not just wide-scale problems (Miron, 1986). Third, the Fed attempted to take over the interbank network by forcing member banks to hold reserves at the Fed rather than in correspondent banks and offering to clear checks at par. By placing reserves at the Fed instead of large correspondent banks, the Fed sought to remove the systemic liquidity risk that led to the period's many panics.

While the Federal Reserve was intended to unify the banking system, it never stretched over the entire system, and inevitably, the connection between institutions inside and outside the system led to the depth of both the Great Depression and Great Recession. In 1929, only about 35 percent of state and national banks were members of the Fed. These non-member banks relied heavily on their interbank networks for liquidity, just as they had during the National Banking Period (Calomiris et al., 2015). However when the panic started, country banks withdrew their deposits from money center banks specifically when they were needed the most (Mitchener and Richardson, 2015). Leading up to the Great Recession, institutions moved outside the purview of the Fed to avoid regulations and oversight. Again these institutions created tight connections to the formal banking sector. Therefore, as their securitized assets took losses from the collapse of the housing sector, they pulled the rest of the system down with them. This study along with the historical narrative emphasizes policies that unify financial regulation and decrease the number of institutions outside the formal system. By making sure that most if not all financial institutions

are under the same regulator, aggregate risks will be able to be properly measured and actions taken by the regulator during panics would be more effective.

The results also offer a cautionary tale on the recent push towards CCPs. In late 2009, the G20 mandated that all standardized over-the-counter derivatives should be cleared through CCPs. Similar to historical clearinghouses, CCPs reduce risk amongst participants by multilaterally netting trades and imposing broader risk control measures, but the resulting concentration could transmit shocks across financial markets and increase systemic risk. While they fared well during the recent financial crisis as a small portion of the market (Cecchetti, Gyntelberg, and Hollanders, 2009), the recent regulatory push has greatly expanded the number and types of derivatives handled by CCPs (Domanski, Gambacorta, and Picillo, 2015; Rahman, 2015). Just as in the historical period (Calomiris and Carlson, 2016), the growing concentration will only increase the exposure to systemic risk and could lead to large-scale financial crises. The concern over systemic risk has been voiced by a number of recent studies including Duffie and Zhu (2011), CPSS-IOSCO (2012), Steigerwald (2013), Domanski, Gambacorta, and Picillo (2015), Wendt (2015), and Park and Abruzzo (2016), but there are few modern examples in which to study the dynamics.

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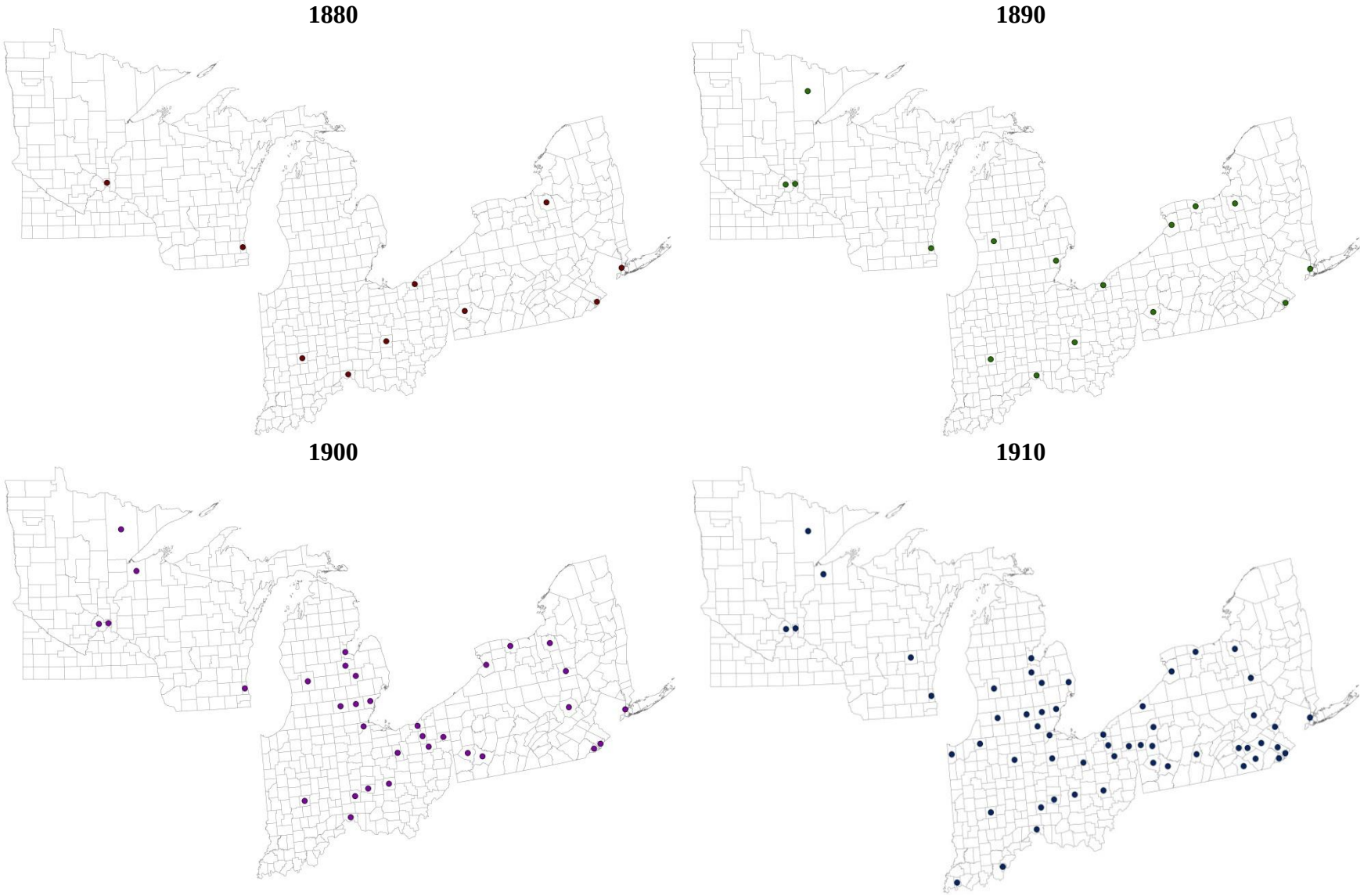
Figure 1: Clearinghouses By County (1880-1910)



Notes: Figures display the clearinghouses in each year in the sample states: Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin. County boundaries obtained from Minnesota Population Center (2004).

Table 1: Descriptive Statistics of Banks (1880-1910)

	All Banks	National Banks	State Banks
All Banks			
Number of Banks	7,202	3,102	4,100
% Members	9.1%	12.8%	6.4%
% Closed			
Clearinghouse Members	35.3%	30.4%	42.3%
Non-Clearinghouse Members	25.4%	21.2%	28.4%
All Banks	26.4%	22.8%	29.2%
Banks in Clearinghouse Cities			
Number of Banks	1,010	419	591
% Members	56.3%	80.0%	39.6%
% Closed			
Clearinghouse Members	35.3%	30.4%	42.3%
Non-Clearinghouse Members	54.9%	72.6%	50.7%
All Banks in Clearinghouse Cities	43.9%	38.9%	47.4%

Notes: Table presents the fraction of banks that became a member of their local clearinghouse and their closure rate over the period. The statistics are broken down for all banks, only national banks, and only state banks. Since clearinghouses could have been attracted to certain types of locations the table displays the result for the full sample as well as just those locations that gained a clearinghouse. Data span Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin.

Table 2: List of Included Variables and Descriptions

At County-Level

Variable Label	Description	Mean	Std. Dev.
Ln(# of National Banks)	Logarithm of the number of national banks in operation in the county	1.07	0.68
Ln(# of State Banks)	Logarithm of the number of state banks in operation in the county	0.89	0.76
Ln(Population)	Logarithm of the total population in the county	10.24	0.67
Fraction Living in Place With More than 25,000	Fraction of total population living in an area of 25,000 people or more in a county	0.04	0.15
Ln(Farm Value P.C.)	Logarithm of the value of crop output per person in county	15.80	0.86
L.Ln(Number of Banks)	Logarithm of total number of banks in the county in the previous year	1.54	0.64
L.Ln(Bank Assets)	Logarithm of total bank assets in the county in the previous year	13.82	1.25
L.Ln(Due from Bank Balances)	Logarithm of total due from banks balance in county in the previous year	11.76	1.39
L.Ln(Due to Bank Balances)	Logarithm of total due to banks balance in county in the previous year	7.08	4.47

At Bank-Level

Variable Label	Description	Mean	Std. Dev.
State Bank Dummy	Indicator for whether bank was chartered by the state government	44.3%	49.7%
Ln(Bank Age)	Logarithm of the number of years a bank had been in operation	2.27	1.12
Ln(Assets)	Logarithm of total bank assets	12.88	1.29
Capital/Assets	Ratio of paid in capital and surplus to total assets	26.7%	12.2%
Due to Banks/Liabilities	Ratio of due to banks to total liabilities	4.3%	9.6%
Loans/Assets	Ratio of total loans to total assets	61.1%	15.3%
Due from Banks/Assets	Ratio of due from banks to total assets	13.6%	8.6%
Real Estate Owned/Assets	Ratio of real estate owned to total assets	3.4%	3.9%
Cash/ Indiv. Deposits	Ratio of cash in vault and other cash items at bank to total individual deposits	11.8%	12.2%
Clearinghouse Member	Indicator for whether clearinghouse was in operation in location and bank was a member	9.0%	28.6%
Clearinghouse in City But Not Member	Indicator for whether clearinghouse was in operation in location and bank was not a member	4.2%	20.0%

Notes: Table presents the description and summary statistics of the paper's main variables for Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin. The top panel presents the county-level variables and the bottom panel displays the bank-level variables. For the county-level variables, the sample statistics are calculated for all counties that had at least one bank. For the bank-level variables, the sample statistics are calculated for all banks in the sample.

Table 3: County-Level Determinants of Clearinghouse Entry (1880-1910)

	Only Counties With At Least One Bank									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ln(Population)	0.004*	0.041***	0.005**	0.042***	0.004**	0.042***	0.006***	0.042***	0.004**	0.041***
	[0.002]	[0.012]	[0.002]	[0.012]	[0.002]	[0.012]	[0.002]	[0.012]	[0.002]	[0.012]
Fraction Living in Place	0.094***	0.169***	0.094***	0.169***	0.095***	0.168***	0.095***	0.169***	0.095***	0.169***
With More than 25,000	[0.020]	[0.048]	[0.020]	[0.048]	[0.020]	[0.048]	[0.020]	[0.048]	[0.020]	[0.048]
Ln(Farm Value P.C.)	-0.002*	-0.022***	-0.002	-0.021***	-0.002**	-0.021***	-0.001	-0.021***	-0.002**	-0.022***
	[0.001]	[0.005]	[0.001]	[0.005]	[0.001]	[0.005]	[0.001]	[0.005]	[0.001]	[0.005]
L.Ln(Number of Banks)	0.005***	0.003			0.007***	0.005			0.007***	0.003
	[0.002]	[0.003]			[0.002]	[0.004]			[0.002]	[0.003]
L.Ln(Bank Assets)			0.001*	0.001	-0.001	-0.002				
			[0.001]	[0.002]	[0.001]	[0.002]				
L.Ln(Due from Bank Balances)							0.001	0.001	-0.001	-0.001
							[0.001]	[0.001]	[0.001]	[0.001]
L.Ln(Due to Bank Balances)							-0.001	0.001	-0.001	0.001
							[0.001]	[0.001]	[0.001]	[0.001]
Location Fixed Effects	State	County	State	County	State	County	State	County	State	County
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,564	10,564	10,564	10,564	10,564	10,564	10,564	10,564	10,564	10,564
R-squared	0.042	0.114	0.0412	0.1139	0.0421	0.1141	0.0411	0.114	0.0422	0.1141

Notes: Table presents the results of an OLS regression. The dependent variable is whether or not a county gained a clearinghouse in that particular year. Each observation is a county-year and the sample spans Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin. Counties that had a clearinghouse before 1880 or did not have a bank are dropped. Counties are also dropped from the sample after a clearinghouse was established. Dollar values are deflated to 1900 using Officer (2008). Robust standard errors clustered by county are provided in brackets. * denotes significance at 10%; ** at 5% level and *** at 1% level.

Table 4: County-Level Trends Before The Establishment of Clearinghouse (1880-1900)

	Only Counties Without A Clearinghouse from 1880-1890						
	# of Banks	**Ln(Assets)**	**Ln(Deposits)**	**Ln(Due From Banks)**	**Ln(Due To Banks)**	**Ln(Population)**	**Fraction Urban**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Established Clearinghouse	0.014	0.010	0.006	0.007	0.152	0.011*	0.014*
in 1890s * Linear Trend	[0.057]	[0.010]	[0.012]	[0.016]	[0.133]	[0.006]	[0.007]
Ln(Population)	3.198***	1.312***	1.389***	1.299***	3.261**		0.143**
	[0.879]	[0.234]	[0.260]	[0.330]	[1.443]		[0.056]
Fraction Living in Place	-0.294	0.444***	0.390**	0.346*	0.180	0.450***	-0.075**
With More than 25,000	[0.478]	[0.149]	[0.164]	[0.198]	[0.829]	[0.062]	[0.034]
Ln(Farm Value P.C.)	1.470	-0.275	-0.415	-0.697**	-1.942	0.379***	
	[1.177]	[0.290]	[0.276]	[0.334]	[1.601]	[0.084]	
Location Fixed Effects	County	County	County	County	County	County	County
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,135	3,135	3,135	3,135	3,135	3,135	3,135
R-squared	0.265	0.530	0.491	0.177	0.047	0.635	0.197
	Only Counties Without A Clearinghouse from 1880-1900						
	# of Banks	**Ln(Assets)**	**Ln(Deposits)**	**Ln(Due From Banks)**	**Ln(Due To Banks)**	**Ln(Population)**	**Fraction Urban**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Established Clearinghouse	0.083*	-0.001	-0.001	0.001	0.015	0.008***	0.007***
in 1900s * Linear Trend	[0.047]	[0.009]	[0.008]	[0.011]	[0.046]	[0.002]	[0.002]
Ln(Population)	2.806***	0.942***	0.983***	0.972***	2.065**		0.075***
	[0.914]	[0.188]	[0.195]	[0.246]	[0.893]		[0.026]
Fraction Living in Place	-0.168	0.314***	0.367***	0.299***	0.355	0.345***	-0.028***
With More than 25,000	[0.312]	[0.077]	[0.084]	[0.110]	[0.445]	[0.029]	[0.011]
Ln(Farm Value P.C.)	0.014	-0.194	-0.441**	-0.698*	-0.692	0.421***	
	[1.309]	[0.294]	[0.218]	[0.387]	[1.536]	[0.117]	
Location Fixed Effects	County	County	County	County	County	County	County
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,564	6,564	6,564	6,564	6,564	6,564	6,564
R-squared	0.413	0.631	0.647	0.422	0.045	0.659	0.202

Notes: Table presents the results of an OLS regression. The dependent variable is provided in the column headings. Each observation is a county-year, and the sample spans Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin. Counties that did not have a bank are dropped. The top panel only examines counties that did not have clearinghouse between 1880 and 1890, and the bottom panel only examines countries that did not have a clearinghouse between 1880 and 1900. Dollar values are deflated to 1900 using Officer (2008). Robust standard errors clustered by county are provided in brackets. * denotes significance at 10%; ** at 5% level and *** at 1% level.

Table 5: Bank-Level Determinants of Clearinghouse Membership (1880-1910)

	Probability of Becoming A Member of Local Clearinghouse In Year It Started	
	(1)	(2)
State Bank Dummy	-0.065	-0.037
	[0.061]	[0.079]
Ln(Bank Age)	0.019	0.008
	[0.018]	[0.018]
Ln(# of National Banks)	-0.204**	-0.161*
	[0.079]	[0.081]
Ln(# of State Banks)	-0.127**	-0.136***
	[0.048]	[0.045]
Ln(Population)	0.086	0.074
	[0.066]	[0.075]
Fraction Living in Place	0.112	0.014
With More than 25,000	[0.145]	[0.136]
Ln(Farm Value P.C.)	-0.009	-0.005
	[0.038]	[0.045]
Ln(Assets)		0.063
		[0.046]
Capital/Assets		0.247
		[0.237]
Due to Banks/Liabilities		0.171
		[0.233]
Loans/Assets		0.240
		[0.182]
Due from Banks/Assets		0.588
		[0.408]
Real Estate Owned/Assets		0.193
		[0.682]
Cash/ Indiv. Deposits		-0.306
		[0.422]
Location Fixed Effects	State	State
Observations	284	284
R-squared	0.125	0.182

Notes: Table presents the results of an OLS regression. The dependent variable is whether the bank became a member of the local clearinghouse in the first year it started. The sample consists of banks in Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin in the year prior to when a clearinghouse entered their city. Dollar values are deflated to 1900 using Officer (2008). Robust standard errors clustered by county are provided in brackets. * denotes significance at 10%; ** at 5% level and *** at 1% level.

Table 6: Effect of Predicted Pre-Clearinghouse Risk on Clearinghouse Membership (1880-1910)

	Probability of Becoming A Member of Local Clearinghouse In Year It Started	
	(1)	(2)
Predicted Risk Measure Using All Locations Without Active Clearinghouses	-1.255	
	[0.897]	
Predicted Risk Measure Using Only Clearinghouse Counties Before A Clearinghouse Entered		-0.517
		[1.018]
Location Fixed Effects	Location	Location
Observations	282	282
R-squared	0.308	0.300

Notes: Table presents the results of an OLS regression. The dependent variable is whether the bank became a member of the local clearinghouse in the first year it opened. The sample consists of banks in Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin in the year prior to when a clearinghouse entered their city. The predicted portfolio risk measure is obtained by applying the regressions results of Table A.2 which examines the probability of bank failure in each period before a clearinghouse entered as a function of bank and locational characteristics to the portfolios of each bank. The two different risk measures come from estimating the bank failure regression using all banks without a clearinghouse or when restricting the sample to only clearinghouse counties before a clearinghouse entered. Dollar values are deflated to 1900 using Officer (2008). Robust standard errors clustered by county are provided in brackets. * denotes significance at 10%; ** at 5% level and *** at 1% level.

Table 7: Effect of Clearinghouses on Member and Non-Member Bank Balance Sheets (1880-1910)

	Dropping Banks that Entered After Clearinghouse							
	Ln(Assets)		Loans/Assets		Real Estate Owned/Assets		Cash/Indiv. Deposits	
Clearinghouse Member	0.090***	0.096***	0.006	0.006	-0.002	-0.001	0.088	0.095
	[0.026]	[0.026]	[0.006]	[0.006]	[0.002]	[0.002]	[0.101]	[0.108]
Clearinghouse in City		0.088		0.011		0.005		0.115
But Not A Member		[0.062]		[0.011]		[0.007]		[0.111]
Ln(Bank Age)	0.306***	0.306***	0.035***	0.035***	-0.001*	-0.001*	0.047	0.046
	[0.007]	[0.006]	[0.002]	[0.002]	[0.001]	[0.001]	[0.030]	[0.030]
Ln(# of National	-0.046***	-0.045***	0.021***	0.021***	-0.001	-0.001	-0.067	-0.066
Banks)	[0.016]	[0.016]	[0.004]	[0.004]	[0.001]	[0.001]	[0.078]	[0.077]
Ln(# of State	0.011	0.011	0.009***	0.009***	-0.001	-0.001	0.045*	0.045*
Banks)	[0.009]	[0.009]	[0.003]	[0.003]	[0.001]	[0.001]	[0.027]	[0.026]
Ln(Population)	0.562***	0.558***	-0.035***	-0.035***	0.010***	0.010***	0.155***	0.150***
	[0.049]	[0.049]	[0.012]	[0.012]	[0.004]	[0.004]	[0.042]	[0.040]
Fraction Living in Place	0.036**	0.036**	0.027***	0.027***	-0.005***	-0.004***	-0.220***	-0.219***
With More than 25,000	[0.016]	[0.016]	[0.004]	[0.004]	[0.001]	[0.001]	[0.068]	[0.068]
Ln(Farm Value P.C.)	-0.153**	-0.159**	-0.028	-0.028	0.001	0.001	-0.803	-0.811
	[0.066]	[0.065]	[0.018]	[0.018]	[0.004]	[0.004]	[0.768]	[0.775]
Location Fixed Effects	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	73,818	73,818	73,818	73,818	73,818	73,818	73,818	73,818
R-squared	0.603	0.603	0.109	0.109	0.060	0.061	0.001	0.001

	Due from Banks/ Assets		Capital/Assets		Due to Banks/ Liabilities	
Clearinghouse Member	0.004	0.005	0.003	0.003	0.008**	0.009**
	[0.003]	[0.003]	[0.005]	[0.005]	[0.003]	[0.003]
Clearinghouse in City		0.014*		-0.003		0.012
But Not A Member		[0.008]		[0.011]		[0.008]
Ln(Bank Age)	-0.021***	-0.021***	-0.053***	-0.053***	-0.002**	-0.002**
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Ln(# of National	-0.017***	-0.017***	0.007**	0.007**	-0.009***	-0.009***
Banks)	[0.003]	[0.003]	[0.003]	[0.003]	[0.002]	[0.002]
Ln(# of State	-0.001	-0.001	-0.008***	-0.008***	0.005***	0.005***
Banks)	[0.002]	[0.002]	[0.002]	[0.002]	[0.001]	[0.001]
Ln(Population)	-0.011	-0.012	0.041***	0.041***	0.020***	0.020***
	[0.007]	[0.007]	[0.009]	[0.009]	[0.007]	[0.007]
Fraction Living in Place	0.008***	0.008***	-0.021***	-0.021***	0.006**	0.006**
With More than 25,000	[0.002]	[0.002]	[0.003]	[0.003]	[0.003]	[0.003]
Ln(Farm Value P.C.)	0.020**	0.019**	-0.022	-0.022	-0.018**	-0.019**
	[0.009]	[0.009]	[0.014]	[0.014]	[0.009]	[0.009]
Location Fixed Effects	Bank	Bank	Bank	Bank	Bank	Bank
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	73,818	73,818	73,818	73,818	73,818	73,818
R-squared	0.075	0.075	0.431	0.431	0.020	0.020

Notes: Table presents the results of an OLS regression. The dependent variable is described in the column heading. Each observation is a bank-year and the sample spans Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin. Banks that entered after a clearinghouse was established and locations that established a clearinghouse before 1880 are dropped. Dollar values are deflated to 1900 using Officer (2008). Robust standard errors clustered by bank are provided in brackets. * denotes significance at 10%; ** at 5% level and *** at 1% level.

Table 8: Effect of Clearinghouses on Member and Non-Member Bank Balance Sheet Risk (1880-1910)

	Dropping Banks that Entered After Clearinghouse			
	Predicted Risk Measure Using All Locations Without Active Clearinghouse		Predicted Risk Measure Using Only Clearinghouse Locations Before a Clearinghouse Entered	
Clearinghouse Member	-0.002***	-0.001	-0.002**	-0.001
	[0.001]	[0.002]	[0.001]	[0.002]
Clearinghouse in City But Not Member		-0.002		-0.002
		[0.002]		[0.002]
Ln(Bank Age)	0.015***	0.015***	0.010***	0.010***
	[0.001]	[0.001]	[0.001]	[0.001]
Ln(# of National Banks)	0.001***	0.001***	-0.002**	-0.002**
	[0.001]	[0.001]	[0.001]	[0.001]
Ln(# of State Banks)	-0.001***	-0.001**	-0.001***	-0.001***
	[0.001]	[0.001]	[0.001]	[0.001]
Ln(Population)	-0.010***	-0.010***	-0.011***	-0.011***
	[0.001]	[0.001]	[0.002]	[0.002]
Fraction Living in Place With More than 25,000	-0.002***	-0.002***	-0.004***	-0.004***
	[0.001]	[0.001]	[0.001]	[0.001]
Ln(Farm Value P.C.)	0.004*	0.004*	0.005*	0.005*
	[0.002]	[0.002]	[0.003]	[0.003]
Location Fixed Effects	Bank	Bank	Bank	Bank
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	73,818	73,818	73,818	73,818
R-squared	0.406	0.406	0.167	0.167

Notes: Table presents the results of an OLS regression. The dependent variable is described in the column heading. Each observation is a bank-year and the sample spans Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin. Banks that entered after a clearinghouse was established and locations that created a clearinghouse before 1880 are dropped. The predicted portfolio risk measure is obtained by applying the regression results of Table A.2 which examines the probability of bank failure in each period as a function of bank and locational characteristics to the portfolios of each bank. The two different risk measures come from estimating the bank failure regression using a sample of all banks without a clearinghouse or when restricting the sample to only clearinghouse counties before a clearinghouse entered. Dollar values are deflated to 1900 using Officer (2008). Robust standard errors clustered by bank are provided in brackets. * denotes significance at 10%; ** at 5% level and *** at 1% level.

Table 9: Determinants of Bank Closure (1880-1910)

	Probability of Closing			
	(1)	(2)	(3)	(4)
Clearinghouse Member	-0.012***	-0.012***	-0.008**	-0.011**
	[0.003]	[0.004]	[0.003]	[0.004]
State Bank Dummy	0.029***	0.029***	0.019***	0.019***
	[0.004]	[0.004]	[0.004]	[0.004]
Ln(Bank Age)	0.014***	0.014***	0.023***	0.023***
	[0.001]	[0.001]	[0.001]	[0.001]
Ln(# of National Banks)	-0.003	-0.003	0.003	0.003
	[0.003]	[0.003]	[0.003]	[0.003]
Ln(# of State Banks)	0.013***	0.013***	0.017***	0.017***
	[0.002]	[0.002]	[0.002]	[0.002]
Ln(Population)	0.007***	0.007***	0.010***	0.010***
	[0.003]	[0.003]	[0.003]	[0.003]
Fraction Living in Place	-0.001	-0.001	0.003	0.003
With More than 25,000	[0.008]	[0.008]	[0.008]	[0.008]
Ln(Farm Value P.C.)	-0.003*	-0.003*	-0.002	-0.002
	[0.002]	[0.002]	[0.002]	[0.002]
Ln(Assets)			-0.019***	-0.019***
			[0.002]	[0.002]
Capital/Assets			0.054***	0.054***
			[0.012]	[0.012]
Due to Banks/Liabilities			0.051***	0.051***
			[0.014]	[0.014]
Loans/Assets			-0.001	-0.001
			[0.006]	[0.006]
Due from Banks/Assets			0.009	0.009
			[0.011]	[0.011]
Real Estate Owned/Assets			0.154***	0.154***
			[0.034]	[0.034]
Cash/ Indiv. Deposits			-0.004	-0.004
			[0.008]	[0.008]
Location Fixed Effects	State	County	State	County
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	81,665	81,665	81,665	81,665
R-squared	0.0052	0.0134	0.009	0.0185

Notes: Table presents the results of an OLS regression. The dependent variable is whether or not the bank closed in the following year. Each observation is a bank-year and the sample spans Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin. Dollar values are deflated to 1900 using Officer (2008). Robust standard errors clustered by bank are provided in brackets. * denotes significance at 10%; ** at 5% level and *** at 1% level.

Table 10: Determinants of Bank Closure - Breaking out Members and Non-Members (1880-1910)

	Only Cities That Established a Clearinghouse Between 1880 and 1910			
	(1)	(2)	(3)	(4)
Clearinghouse Member	-0.012**	-0.013**	-0.008	-0.010*
	[0.006]	[0.006]	[0.006]	[0.006]
Clearinghouse in City	0.042***	0.040***	0.035**	0.032**
But Not Member	[0.015]	[0.015]	[0.015]	[0.015]
State Bank Dummy	0.003	0.004	-0.006	-0.005
	[0.010]	[0.010]	[0.011]	[0.011]
Ln(Bank Age)	0.016***	0.017***	0.025***	0.027***
	[0.003]	[0.003]	[0.004]	[0.004]
Ln(# of National Banks)	-0.010	-0.007	-0.011	-0.007
	[0.009]	[0.012]	[0.010]	[0.013]
Ln(# of State Banks)	0.011**	0.013**	0.010*	0.011*
	[0.005]	[0.006]	[0.005]	[0.006]
Ln(Population)	0.014	0.045**	0.022**	0.055**
	[0.011]	[0.022]	[0.011]	[0.023]
Fraction Living in Place	0.019	-0.001	0.030*	0.004
With More than 25,000	[0.017]	[0.024]	[0.017]	[0.024]
Ln(Farm Value P.C.)	-0.018***	-0.015	-0.016**	-0.017
	[0.006]	[0.013]	[0.007]	[0.013]
Ln(Assets)			-0.028***	-0.029***
			[0.006]	[0.006]
Capital/Assets			0.025	0.029
			[0.039]	[0.040]
Due to Banks/Liabilities			0.117**	0.125**
			[0.048]	[0.050]
Loans/Assets			-0.006	-0.009
			[0.021]	[0.022]
Due from Banks/Assets			0.062	0.065
			[0.046]	[0.046]
Real Estate			0.258***	0.252***
Owned/Assets			[0.091]	[0.089]
Cash/ Indiv. Deposits			0.001	-0.002
			[0.030]	[0.030]
Location Fixed Effects	State	County	State	County
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	8,769	8,769	8,769	8,769
R-squared	0.0198	0.0249	0.0283	0.034

Notes: Table presents the results of an OLS regression. The dependent variable is whether or not the bank closed in the following year. Each observation is a bank-year and the sample spans Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin. Banks in locations that did not establish a clearinghouse between 1880 and 1910 are dropped from the sample. Dollar values are deflated to 1900 using Officer (2008). Robust standard errors clustered by bank are provided in brackets. * denotes significance at 10%; ** at 5% level and *** at 1% level.

Table A.1: Bank-Level Determinants of Clearinghouse Membership - Adding Illinois Banks

	Probability of Becoming A Member of Local Clearinghouse In Year It Started			
	(1)	(2)	(3)	(4)
State Bank Dummy	-0.056	-0.037		
	[0.053]	[0.069]		
Ln(Bank Age)	0.022	0.011		
	[0.018]	[0.017]		
Ln(# of National Banks)	-0.163**	-0.128*		
	[0.066]	[0.071]		
Ln(# of State Banks)	-0.112***	-0.118***		
	[0.040]	[0.038]		
Ln(Population)	0.086	0.077		
	[0.061]	[0.067]		
Fraction Living in Place	0.052	-0.037		
With More than 25,000	[0.126]	[0.114]		
Ln(Farm Value P.C.)	-0.006	-0.004		
	[0.036]	[0.040]		
Ln(Assets)		0.060		
		[0.042]		
Capital/Assets		0.226		
		[0.224]		
Due to Banks/Liabilities		0.114		
		[0.195]		
Loans/Assets		0.248		
		[0.157]		
Due from Banks/Assets		0.576		
		[0.388]		
Real Estate Owned/Assets		0.159		
		[0.666]		
Cash/ Indiv. Deposits		-0.236		
		[0.390]		
Predicted Risk Measure Using All Locations Without Active Clearinghouses			-0.852	
			[0.723]	
Predicted Risk Measure Using Only Clearinghouse Counties Before A Clearinghouse				-0.048
				[0.949]
Location Fixed Effects	State	State	State	State
Observations	316	316	316	316
R-squared	0.129	0.151	0.069	0.063

Notes: Table presents the results of an OLS regression. The dependent variable is whether the bank became a member of the local clearinghouse in the first year it started. The sample consists of banks in the year prior to when a clearinghouse entered their city. In addition to Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin, this sample also contains Illinois banks in the year before a clearinghouse was established in their city from 1889 to 1910 to determine whether the results are driven by small sample sizes. Dollar values are deflated to 1900 using Officer (2008). Robust standard clustered by county are provided in brackets. * denotes significance at 10%; ** at 5% level and *** at 1% level.

Table A.2: Determinants of Bank Closure Before Clearinghouse Entry (1880-1910)

	Probability of Closing In Years Before City Gained a Clearinghouse	
	All Locations Without Active Clearinghouse	**Only Locations that Would Eventually Create A Clearinghouse**
	(1)	(2)
State Bank Dummy	0.034***	0.005
	[0.005]	[0.014]
Ln(Bank Age)	0.024***	0.025***
	[0.001]	[0.004]
Ln(# of National Banks)	0.015***	-0.008
	[0.004]	[0.023]
Ln(# of State Banks)	0.023***	0.003
	[0.003]	[0.008]
Ln(Population)	0.026***	-0.015
	[0.008]	[0.036]
Fraction Living in Place	0.001	0.006
With More than 25,000	[0.013]	[0.031]
Ln(Farm Value P.C.)	-0.003	0.002
	[0.003]	[0.024]
Ln(Assets)	-0.023***	-0.028**
	[0.003]	[0.011]
Capital/Assets	0.034***	0.050
	[0.013]	[0.058]
Due to Banks/Liabilities	-0.002	0.042
	[0.015]	[0.057]
Loans/Assets	-0.008	-0.077**
	[0.007]	[0.032]
Due from Banks/Assets	-0.006	0.069
	[0.011]	[0.066]
Real Estate Owned/Assets	0.144***	0.011
	[0.037]	[0.093]
Cash/ Indiv. Deposits	-0.001	0.001
	[0.001]	[0.001]
Location Fixed Effects	County	County
Year Fixed Effects	Yes	Yes
Observations	63,317	4,023
R-squared	0.0178	0.0324

Notes: Table presents the results of an OLS regression. The dependent variable is whether or not the bank closed in the following year. Each observation is a bank-year and the sample spans Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin. As denoted by the column headings, the results are estimated using all locations without a clearinghouse as well as for restricting the sample to only cities that would establish a clearinghouse. Dollar values are deflated to 1900 using Officer (2008). Robust standard errors clustered by bank are provided in brackets. * denotes significance at 10%; ** at 5% level and *** at 1% level.

Table A.3: Effect of Clearinghouse Membership on Balance Sheets - Breaking Out State Banks From National Banks (1880-1910)

	Dropping Banks that Entered After Clearinghouse							
	Ln(Assets)		Loans/Assets		Real Estate Owned/Assets		Cash/Indiv. Deposits	
Clearinghouse Member	0.090***	0.028	0.006	0.017**	-0.002	-0.004**	0.088	0.101
	[0.026]	[0.031]	[0.006]	[0.008]	[0.002]	[0.002]	[0.101]	[0.116]
Clearinghouse Member		0.159***		-0.030**		0.007*		-0.034
*State Bank Dummy		[0.051]		[0.012]		[0.004]		[0.051]
Ln(Bank Age)	0.306***	0.304***	0.035***	0.035***	-0.001*	-0.001*	0.047	0.047
	[0.007]	[0.006]	[0.002]	[0.002]	[0.001]	[0.001]	[0.030]	[0.031]
Ln(# of National	-0.046***	-0.045***	0.021***	0.021***	-0.001	-0.001	-0.067	-0.067
Banks)	[0.016]	[0.016]	[0.004]	[0.004]	[0.001]	[0.001]	[0.078]	[0.078]
Ln(# of State	0.011	0.012	0.009***	0.009***	-0.001	-0.001	0.045*	0.045*
Banks)	[0.009]	[0.009]	[0.003]	[0.003]	[0.001]	[0.001]	[0.027]	[0.027]
Ln(Population)	0.562***	0.563***	-0.035***	-0.035***	0.010***	0.010***	0.155***	0.155***
	[0.049]	[0.049]	[0.012]	[0.012]	[0.004]	[0.004]	[0.042]	[0.041]
Fraction Living in Place	0.036**	0.035**	0.027***	0.027***	-0.005***	-0.005***	-0.220***	-0.220***
With More than 25,000	[0.016]	[0.016]	[0.004]	[0.004]	[0.001]	[0.001]	[0.068]	[0.068]
Ln(Farm Value P.C.)	-0.153**	-0.146**	-0.028	-0.029*	0.001	0.001	-0.803	-0.804
	[0.066]	[0.066]	[0.018]	[0.018]	[0.004]	[0.004]	[0.768]	[0.769]
Location Fixed Effects	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	73,818	73,818	73,818	73,818	73,818	73,818	73,818	73,818
R-squared	0.603	0.604	0.109	0.110	0.060	0.061	0.001	0.001
	Due from Banks/Assets		Capital/Assets		Due to Banks/Liabilities			
Clearinghouse Member	0.004	0.001	0.003	-0.003	0.008**	0.010**		
	[0.003]	[0.004]	[0.005]	[0.006]	[0.003]	[0.005]		
Clearinghouse Member		0.007		0.017*		-0.006		
*State Bank Dummy		[0.006]		[0.009]		[0.007]		
Ln(Bank Age)	-0.021***	-0.021***	-0.053***	-0.053***	-0.002**	-0.002**		
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]		
Ln(# of National	-0.017***	-0.017***	0.007**	0.008**	-0.009***	-0.009***		
Banks)	[0.003]	[0.003]	[0.003]	[0.003]	[0.002]	[0.002]		
Ln(# of State	-0.001	-0.001	-0.008***	-0.008***	0.005***	0.005***		
Banks)	[0.002]	[0.002]	[0.002]	[0.002]	[0.001]	[0.001]		
Ln(Population)	-0.011	-0.011	0.041***	0.041***	0.020***	0.020***		
	[0.007]	[0.007]	[0.009]	[0.009]	[0.007]	[0.007]		
Fraction Living in Place	0.008***	0.008***	-0.021***	-0.021***	0.006**	0.006**		
With More than 25,000	[0.002]	[0.002]	[0.003]	[0.003]	[0.003]	[0.003]		
Ln(Farm Value P.C.)	0.020**	0.021**	-0.022	-0.021	-0.018**	-0.018**		
	[0.009]	[0.009]	[0.014]	[0.014]	[0.009]	[0.009]		
Location Fixed Effects	Bank	Bank	Bank	Bank	Bank	Bank		
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes		
Observations	73,818	73,818	73,818	73,818	73,818	73,818		
R-squared	0.075	0.075	0.431	0.431	0.020	0.020		

Notes: Table presents the results of an OLS regression. The dependent variable is described in the column heading. Each observation is a bank-year and the sample spans Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin. Banks that entered after a clearinghouse was established and locations that established a clearinghouse before 1880 are dropped. Dollar values are deflated to 1900 using Officer (2008). Robust standard errors clustered by bank are provided in brackets. * denotes significance at 10%; ** at 5% level and *** at 1% level.

Table A.4: Effect of Clearinghouses on the Levels of Member and Non-Member Bank Balance Sheets (1880-1910)

	Dropping Banks that Entered After Clearinghouse							
	Ln(Assets)		Ln(Loans)		Ln(Real Estate Owned)		Ln(Cash)	
Clearinghouse Member	0.090***	0.096***	0.107***	0.115***	-0.182	-0.153	0.013	0.008
	[0.026]	[0.026]	[0.029]	[0.030]	[0.159]	[0.160]	[0.039]	[0.040]
Clearinghouse in City		0.088		0.118*		0.461*		-0.089
But Not A Member		[0.062]		[0.063]		[0.280]		[0.125]
Ln(Bank Age)	0.306***	0.306***	0.391***	0.391***	0.505***	0.504***	0.227***	0.227***
	[0.007]	[0.006]	[0.009]	[0.009]	[0.037]	[0.037]	[0.010]	[0.010]
Ln(# of National	-0.046***	-0.045***	-0.004	-0.003	-0.064	-0.062	-0.231***	-0.232***
Banks)	[0.016]	[0.016]	[0.020]	[0.020]	[0.082]	[0.083]	[0.029]	[0.029]
Ln(# of State	0.011	0.011	0.032***	0.032***	-0.180***	-0.182***	-0.107***	-0.107***
Banks)	[0.009]	[0.009]	[0.012]	[0.012]	[0.057]	[0.057]	[0.014]	[0.014]
Ln(Population)	0.562***	0.558***	0.524***	0.519***	1.341***	1.321***	1.036***	1.040***
	[0.049]	[0.049]	[0.056]	[0.056]	[0.258]	[0.259]	[0.087]	[0.086]
Fraction Living in Place	0.036**	0.036**	0.087***	0.088***	-0.162	-0.160	-0.059**	-0.060**
With More than 25,000	[0.016]	[0.016]	[0.019]	[0.019]	[0.115]	[0.115]	[0.028]	[0.028]
Ln(Farm Value P.C.)	-0.153**	-0.159**	-0.216***	-0.224***	-0.125	-0.156	-0.506***	-0.500***
	[0.066]	[0.065]	[0.078]	[0.077]	[0.390]	[0.390]	[0.101]	[0.100]
Location Fixed Effects	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	73,818	73,818	73,818	73,818	73,818	73,818	73,818	73,818
R-squared	0.603	0.603	0.382	0.382	0.058	0.058	0.161	0.161
	Ln(Due from Banks)		Ln(Capital)		Ln(Due to Banks)			
Clearinghouse Member	0.178***	0.202***	0.095***	0.099***	0.275*	0.302*		
	[0.066]	[0.066]	[0.023]	[0.024]	[0.164]	[0.168]		
Clearinghouse in City		0.389		0.062		0.420		
But Not A Member		[0.258]		[0.051]		[0.365]		
Ln(Bank Age)	0.224***	0.224***	0.126***	0.126***	0.297***	0.297***		
	[0.013]	[0.013]	[0.006]	[0.006]	[0.044]	[0.044]		
Ln(# of National	-0.171***	-0.169***	-0.001	-0.001	-0.129	-0.126		
Banks)	[0.034]	[0.033]	[0.017]	[0.017]	[0.112]	[0.112]		
Ln(# of State	0.028	0.026	-0.027***	-0.028***	0.362***	0.360***		
Banks)	[0.017]	[0.017]	[0.009]	[0.009]	[0.074]	[0.074]		
Ln(Population)	0.542***	0.525***	0.707***	0.704***	1.195***	1.177***		
	[0.107]	[0.100]	[0.052]	[0.053]	[0.316]	[0.317]		
Fraction Living in Place	0.070**	0.072**	-0.059***	-0.059***	0.567***	0.569***		
With More than 25,000	[0.029]	[0.029]	[0.015]	[0.015]	[0.103]	[0.103]		
Ln(Farm Value P.C.)	0.036	0.009	-0.222***	-0.227***	0.089	0.060		
	[0.111]	[0.112]	[0.066]	[0.066]	[0.443]	[0.444]		
Location Fixed Effects	Bank	Bank	Bank	Bank	Bank	Bank		
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes		
Observations	73,818	73,818	73,818	73,818	73,818	73,818		
R-squared	0.194	0.195	0.280	0.280	0.049	0.049		

Notes: Table presents the results of an OLS regression. The dependent variable is described in the column heading. Each observation is a bank-year and the sample spans Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin. Banks that entered after a clearinghouse was established and locations that established a clearinghouse before 1880 are dropped. Dollar values are deflated to 1900 using Officer (2008). Robust standard errors clustered by bank are provided in brackets. * denotes significance at 10%; ** at 5% level and *** at 1% level.

Table A.5: Determinants of Bank Closure - Breaking Out State Banks From National Banks (1880-1910)

	Probability of Closing			
	(1)	(2)	(3)	(4)
Clearinghouse Member	-0.012***	-0.014***	-0.011**	-0.010**
	[0.004]	[0.004]	[0.004]	[0.004]
Clearinghouse Member*State Bank	0.001	-0.002	0.007	0.003
	[0.006]	[0.007]	[0.006]	[0.007]
State Bank Dummy	0.029***	0.036***	0.019***	0.024***
	[0.004]	[0.004]	[0.004]	[0.004]
Ln(Bank Age)	0.014***	0.015***	0.023***	0.025***
	[0.001]	[0.001]	[0.001]	[0.001]
Ln(# of National Banks)	-0.003	-0.001	0.003	0.007**
	[0.003]	[0.003]	[0.003]	[0.003]
Ln(# of State Banks)	0.013***	0.014***	0.017***	0.018***
	[0.002]	[0.002]	[0.002]	[0.002]
Ln(Population)	0.007***	0.044***	0.010***	0.048***
	[0.003]	[0.006]	[0.003]	[0.006]
Fraction Living in Place With More than 25,000	-0.001	-0.001	0.003	-0.002
	[0.008]	[0.011]	[0.008]	[0.011]
Ln(Farm Value P.C.)	-0.003*	-0.004	-0.002	-0.002
	[0.002]	[0.002]	[0.002]	[0.002]
Ln(Assets)			-0.019***	-0.023***
			[0.002]	[0.002]
Capital/Assets			0.054***	0.048***
			[0.012]	[0.012]
Due to Banks/Liabilities			0.051***	0.053***
			[0.014]	[0.014]
Loans/Assets			-0.001	-0.004
			[0.006]	[0.007]
Due from Banks/Assets			0.009	0.005
			[0.011]	[0.011]
Real Estate Owned/Assets			0.154***	0.144***
			[0.034]	[0.034]
Cash/ Indiv. Deposits			-0.004	-0.004
			[0.008]	[0.008]
Location Fixed Effects	State	County	State	County
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	81,665	81,665	81,665	81,665
R-squared	0.0052	0.0134	0.009	0.0185

Notes: Table presents the results of an OLS regression. The dependent variable is whether or not the bank closed in the following year. Each observation is a bank-year and the sample spans Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin. Dollar values are deflated to 1900 using Officer (2008). Robust standard errors clustered by bank are provided in brackets. * denotes significance at 10%; ** at 5% level and *** at 1% level.

Table A.6: Determinants of Bank Closure - Dropping Non-Urban Locations (1880-1910)

	All Banks				Cities That Established a Clearinghouse Between 1880 and 1910			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Clearinghouse Member	-0.016***	-0.017***	-0.011***	-0.011***	-0.014***	-0.011**	-0.010*	-0.008
	[0.004]	[0.004]	[0.004]	[0.004]	[0.005]	[0.005]	[0.005]	[0.005]
Clearinghouse in City But Not Member					0.028***	0.027***	0.020*	0.019*
					[0.010]	[0.011]	[0.010]	[0.011]
State Bank Dummy	0.018***	0.019***	0.012*	0.010	0.013	0.013	-0.003	-0.005
	[0.006]	[0.006]	[0.006]	[0.007]	[0.010]	[0.010]	[0.010]	[0.010]
Ln(Bank Age)	0.014***	0.014***	0.026***	0.027***	0.018***	0.018***	0.029***	0.030***
	[0.002]	[0.002]	[0.002]	[0.002]	[0.003]	[0.003]	[0.003]	[0.003]
Ln(# of National Banks)	-0.002	-0.001	0.003	0.009*	-0.004	-0.001	-0.007	-0.002
	[0.004]	[0.005]	[0.004]	[0.005]	[0.008]	[0.011]	[0.008]	[0.011]
Ln(# of State Banks)	0.011***	0.009***	0.015***	0.013***	0.006	0.001	0.007*	0.002
	[0.003]	[0.003]	[0.003]	[0.003]	[0.004]	[0.004]	[0.004]	[0.004]
Ln(Population)	0.011**	0.066***	0.014***	0.073***	0.019**	0.058***	0.034***	0.079***
	[0.004]	[0.012]	[0.004]	[0.012]	[0.009]	[0.021]	[0.009]	[0.022]
Fraction Living in Place With More than 25,000	0.020**	0.017	0.021**	0.017	0.015	0.019	0.018	0.025
	[0.009]	[0.012]	[0.009]	[0.013]	[0.016]	[0.021]	[0.016]	[0.021]
Ln(Farm Value P.C.)	0.001	-0.001	0.001	0.001	-0.012**	-0.003	-0.011*	-0.007
	[0.002]	[0.003]	[0.002]	[0.003]	[0.006]	[0.010]	[0.006]	[0.010]
Ln(Assets)			-0.023***	-0.026***			-0.028***	-0.031***
			[0.003]	[0.003]			[0.005]	[0.005]
Capital/Assets			0.076***	0.069***			0.062**	0.058*
			[0.020]	[0.021]			[0.031]	[0.032]
Due to Banks/Liabilities			0.079***	0.081***			0.080***	0.087***
			[0.019]	[0.019]			[0.028]	[0.029]
Loans/Assets			0.001	-0.001			-0.008	-0.010
			[0.011]	[0.011]			[0.020]	[0.020]
Due from Banks/Assets			0.060***	0.057**			0.051	0.050
			[0.022]	[0.022]			[0.042]	[0.043]
Real Estate Owned/Assets			0.103**	0.105**			0.242***	0.239***
			[0.052]	[0.053]			[0.082]	[0.081]
Cash/ Indiv. Deposits			-0.015	-0.015			-0.018	-0.017
			[0.011]	[0.011]			[0.020]	[0.020]
Location Fixed Effects	State	County	State	County	State	County	State	County
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	30,962	30,962	30,962	30,962	13,774	13,774	13,774	13,774
R-squared	0.0106	0.0153	0.0166	0.0227	0.0129	0.0169	0.0201	0.025

Notes: Table presents the results of an OLS regression. The dependent variable is whether or not the bank closed in the following year. Each observation is a bank-year and the sample spans Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin. All banks in rural counties (denoted as those without a place of 2,500 people) are dropped. Column headings provide the sample of banks used. Dollar values are deflated to 1900 using Officer (2008). Robust standard errors clustered by bank are provided in brackets. * denotes significance at 10%; ** at 5% level and *** at 1% level.