Preliminary Draft: Comments Welcome

Banks, Insider Connections, and Industry in New England: Evidence from the Panic of 1873

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Abstract: Economic historians have argued that ties to commercial banks played a critical role in the industrialization of New England, but little systematic information is known about the nature of the region's bank's relationships with manufacturing firms. Using newly collected data from Massachusetts in the 1870's, this paper analyzes the extent of bank director representation non-financial firms' boards, and investigates whether bank-affiliated companies fared better during the years that followed the Panic of 1873, which disrupted financial markets and industrial production. Around 55 percent of all non-financial corporations had at least one bank director on their boards; for the publicly traded companies, this was closer to 80 percent. The individuals who created these interlocks are best characterized as entrepreneurs who held bank directorships, rather than bankers who held corporate board seats: their investments in their nonfinancial corporations were much larger. The results of the empirical analysis indicate that the growth rates of firms with bank affiliations fell by less than the growth rates of firms without bank affiliations following the panic. These findings suggest that ties to banks helped address problems of asymmetric information, which become particularly acute during a crisis. Falsification tests based on ties to insurance corporations, which did not engage in lending on a large scale, show no effect on firm growth.

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1. Introduction

During the nineteenth century, the banking and financial markets of the United States were highly fragmented, and ill-suited to supporting industrialization.[1] Some research by economic historians has indicated that affiliations between banks and nonfinancial enterprises were an important means by which the limitations of the banking system were overcome, particularly in New England. This analysis, due principally to Lamoreaux (1986; 1994), holds that New England's banks functioned somewhat like investment clubs, channeling capital to the industrial firms founded by their directors. Although this view has gained wide adherence, some scholars have expressed skepticism, and argued that the lending records of individual institutions often do not show high levels of lending to insiders.[2] However, both the advocates of this view and its critics have been forced to rely on records of a small handful of banks, whose representativeness or importance is difficult to assess. And perhaps more importantly, the consequences of any such ties for industrial development in the region have never been analyzed quantitatively.

This paper presents newly collected data on the corporations of Massachusetts in the 1870s and their ties to financial institutions, and analyzes the role of bank-firm affiliations in promoting industrial growth. Using comprehensive data on the composition of boards of directors and on firms' balance sheets, the paper documents the extent of the affiliations between industrial firms and banks, as measured by board interlocks, and estimates the effect of these affiliations on the growth rates of individual firms. The effects of bank-firm affiliations on growth rates are estimated by analyzing changes in firms' growth in response to a major economic crisis: the Panic of 1873, and the ensuing economic downturn. This shock, which originated in New York, disrupted financial markets and reduced demand, and arguably made an affiliation with a bank much more valuable, by creating substantial adverse selection problems in

[1] See, for example, Davis (1966). Calomiris (1995) presents a detailed exploration of the causes and consequences of this fragmentation.

[2] Wright (1999) and Lockard (2000) offer analyses of individual bank lending records that do not show high levels of lending to insiders. However, the data in Wang (2008) do show significant levels of insider lending.

credit markets.[3] The empirical analysis tests whether firms with ties to banks experienced less of a decline in their growth rates during the downturn, in a framework with firm fixed effects.

The results indicate that affiliations between banks and nonfinancial corporations were quite extensive in 1870s Massachusetts, and that the firms with bank affiliations did indeed suffer less as a result of the crisis. Around 55% of all nonfinancial corporations had a bank director on their board, and among the publicly traded corporations, the rate was even higher (81%). All firms suffered in the years following the 1873 panic, but the decline in the growth rates of firms with bank affiliations was about five percentage points smaller. This effect is equivalent to about 19 percent of a standard deviation in firms' 1872 growth rates. Moreover, firms with bank directors on their board were about eight percentage points less likely to shut down prior to 1881, an effect that is equivalent to around 21 percent of the overall closure rate. These results present unambiguous support for the view that affiliations with banks benefitted Massachusetts firms.

The original sources from which the data was collected provide further insights into the reasons behind this effect. The "certificates of condition" from which the board composition and accounting data were collected also list the names of every shareholder and the number of shares they held. The directors who held board seats with banks typically held large ownership stakes in their firms—on average, this was around eight percent. However, their average ownership stakes in the banks where they held board seats was less than one percent. Given that most of these individuals held directorships (and large ownership stakes) with multiple nonfinancial corporations, they are best regarded as industrialists, not bankers. They had every incentive to use their influence with their banks to aid their other companies, which would have been particularly important during a credit contraction.

A potential source of concern regarding the empirical results is that they may reflect the selection of particular types of firms into relationships with banks. The estimation framework controls for time-invariant unobserved characteristics such as the quality of a firm's assets or management, but if firms that

[3] The adverse selection problems produced by a financial crisis are described in Bernanke (1983). Of course, a shock that originated with an affiliated bank could have the opposite effect, and transmit the effects of the contraction to its client firms—see Frydman, Hilt and Zhou (2015).

were somehow more resilient to a shock were more likely to be affiliated with banks, then this could potentially explain the results. Indeed, firms with and without bank affiliations differed in several respects that might be associated with resiliency, such as size, leverage, and age. Yet when inverse propensity scores are used to give more weight to the corporations without bank ties that look more like those with bank ties, and re-estimate the regressions, the estimate effect is reduced in magnitude but remains. Moreover, ties to insurance companies, which were also more likely to be held by stronger corporations and facilitated by elite merchants, had no effect on firm growth rates following 1873. This is consistent with privileged access to the lending capacity of banks providing unique benefits to affiliated firms.

The findings of this paper contribute to several areas of research. A large literature has investigated the operations of nineteenth-century American banks (for example, Bodenhorn 2003; 2007; Meissner 2005) and their importance for American economic development (Lamoreaux, 1994; Calomiris 1995; Jaremski 2014). This paper adds to the literature by presenting detailed new firm-level evidence on the extent of relationships between banks and nonfinancial companies in an important state, and, more importantly, on the value of those relationships during a major economic downturn. The data on the changes in firm growth rates following the panic also contribute to a closely related literature on the consequences of financial crises (Calomiris and Gorton, 2000; Bordo and Haubrich, 2010).

Secondly, research on bank-firm affiliations in the context of countries such as Germany (Gorton and Schmid 2000; Fohlin, 1998), Japan (Hoshi et al., 1990; Weinstein and Yafeh, 1998), Mexico (Maurer and Haber, 2007; La Porta et al., 2003), Russia (Laeven, 2001), China (Keister 1998), Thailand (Charumilind et al., 2006) and the Czech Republic (Cull et al., 2002) has produced mixed evidence regarding the value of such relationships for firms. This paper adds to the literature by focusing on a context in which bank-firm ties are likely to be uniquely important: the period following a significant financial contraction.

Finally, recent scholarship has noted that ties between modern American firms and banks are relatively rare (Güner, Malmendier, and Tate, 2008; Kroszner and Strahan, 2001). This paper presents

comparable data for the 1870s, and demonstrates that affiliations with commercial banks were once quite common in the United States, at least in the Northeast. It therefore complements other works that have emphasized the importance of ties to investment banks in American financial markets historically (Delong, 1991; Ramirez, 1995; Cantillo Simon, 1998; Frydman and Hilt, 2014) by highlighting the importance of commercial bank ties in an even earlier era.

2. Historical Background

The rise of large-scale manufacturing enterprises in the United States began in New England, in particular with the development of the integrated cotton textile mill in Massachusetts.[4] The very first such enterprise, Francis Lowell and Nathan Appleton's Boston Manufacturing Company, incorporated 1813, was financed by merchants who had accumulated large fortunes in international trade, and who drew on their connections with other prominent merchant families to raise capital for their venture. These men and their associates have been called an "enterprising elite," and went on to found a number of other companies that followed the same model but on a much greater scale, channeling the capital they accumulated in commerce into manufacturing.[5]

Many of these entrepreneurs also held directorships with Boston banks. The founders and principal stockholders of the Boston Manufacturing Company included at least three bank directors, including two from the Boston Bank, from which the company borrowed regularly.[6] This pattern would continue with the companies that were founded in the years that followed to emulate the Boston Company

[4] An 'integrated' mill both spun thread from raw cotton and wove it into fabric, using machines driven by water power (or later, steam power). For a history of the early years of the industry, see Ware (1931). See also McGouldrick (1968) and Handlin and Handlin (1974).
[5] The term "enterprising elite" is due to Dalzell (1987), who tells this history well.
[6] Nathan Appleton and Israel Thorndike, Jr., founders of the Boston Company, were directors of the Boston Bank (see the Appendix). Rosenberg (2011) documents the company's early borrowing from the bank.

in Lowell, often by many of the same individuals.[7] These firms maintained close ties to major banks, and benefitted from those ties.

Lamoreaux (1994) has argued that over the following decades, the proliferation of manufacturing enterprises in New England was made possible by close ties between those firms and the region's banks. The directors of early New England banks often founded them specifically for the benefit of the industrial firms they controlled, and channeled capital from the banks to their other enterprises through insider lending. Such transactions were not hidden from the banks' shareholders, who knew that investing in bank stock was really investing in a portfolio of loans to the directors and their firms. Close relationships between industrial firms and financial institutions helped resolve many of the information problems inherent in financial markets in a relatively early stage of development. Before the emergence of credit rating agencies and formal financial reporting requirements, personal connections between banks and their borrowers helped ensure that credit flowed to good borrowers.

Although manufacturing firms borrowed primarily from banks to finance their working capital (Davis, 1966), much of their fixed capital was financed through equity. Banks did not purchase equity directly, but they often provided credit to entrepreneurs—so-called accommodation loans—that were partly collateralized by shares of stock (Lamoreaux 1986). These loans were short-term but renewable, and the liquidity they provided to entrepreneurs was likely quite important.

Many of the region's industrial enterprises achieved enormous scale by attracting equity investments from large numbers of investors. Although the shares of some of these firms were traded on the Boston Stock Exchange, trading in industrial enterprises was neither liquid nor anonymous, and indeed personal or business connections often formed the basis of many investors' portfolio decisions (see Martin, 1886, Davis, 1957, and Atack and Rousseau, 1999). Nonetheless, relatively small investors did participate in this market, and some of the largest manufacturing corporations had hundreds of shareholders. As Berle and Means (1932) noted, these enterprises exhibited what they termed the

[7] All of the textile firms of Lowell incorporated prior to 1830 included at least three Boston bank directors. See the Appendix.

"separation of ownership from control" to a substantial degree—with diffuse ownership by many small investors, control over some of these enterprises resided with their managers, who often held only a relatively small portion of their firms' equity.[8] The governance of at least some of these enterprises suffered as a result, and Erastus Bigelow, a prominent textile manufacturer, complained that the passive investors in manufacturing corporations created highly inefficient enterprises.[9]

Close ties between financial institutions and industrial corporations create conflicts of interest, but when the manufacturing corporations are controlled by directors who are unaccountable to the other stockholders, and who also control the financial institution, these conflicts become particularly acute. In a pamphlet filled with polemical attacks against the management of many public corporations in Massachusetts ("Some of the Usages and Abuses in the Management of our Manufacturing Corporations," 1863) J.C. Ayer claimed that the managers of some of these enterprises engaged in rampant self-dealing, and in particular argued that a prominent trust company connected to several major textile corporations had lent excessively to those firms, contributing to their insolvency. Thus at least some contemporaries felt that these relationships were harmful, rather than helpful, to manufacturing corporations.

3. Data

Beginning in 1870, the state of Massachusetts required all business corporations (except railroads and financial corporations, which were subject to different legislation) to submit an annual "certificate of condition" to the state. Microfilm copies of the original certificates were found within the collection of the Massachusetts Archives, and transcribed. These data open a new window into the financing and governance of mid-nineteenth century corporations—but a highly imperfect one. An example of one of

[8] Berle and Means (1932) claim that New England's largest manufacturing enterprises of the mid-19th century were an exception to the rule that the separation of ownership from control occurred in the late nineteenth century with liberal corporation laws and the rise of big business. However, Hilt (2008) argues that in fact this problem was quite common in very early American corporations.

[9] Bigelow is quoted at length in Harris-Gastrell (1873). Hilt (2015) presents a detailed analysis of the governance of these enterprises.

these forms, that submitted by the Wason Manufacturing Company of Springfield Massachusetts for 1872, is presented as Figure 1. At the top of the certificate the names of the officers and directors are listed. In the questions that follow, the corporation is asked to report the date of its most recent annual meeting, and some fairly rudimentary accounting information. As the required disclosures were intended to protect the interests of the firms' creditors, rather than stockholders, the form did not solicit any information about revenues, profits or dividends. Instead, firms were required to report only total real estate, total assets, paid-in capital, and total debt.

On the lower half of the form, the name of every shareholder, along with the number of shares they held, is listed. From these data, the ownership stakes of the directors was calculated. In the example of the Wason Manufacturing company, all of the corporation's officers and directors were substantial shareholders, which was quite typical. Although the list of shareholders is difficult to read, it includes another entry worth noting: that of the Agawam National Bank, which is listed as an owner of 60 shares. These shares were likely held as collateral for a loan to one of the stockholders. It is also worth noting that H.S. Hyde, who is the company's treasurer, was a director of that bank.

For 1872, certificates of condition for 603 corporations were located, although with some of these the corporation reported having no assets, and a few others reported accounting information that was too contradictory or incomplete to use.[10] After eliminating those firms, a sample of 573 remained. The names of all directors and officers, along with the number of shares held by each, and the firms' financial data was recorded for each firm for 1872. The location of the firms, and the year in which they were incorporated, was then obtained from various published reports of the Massachusetts Tax Commissioner. The industries in which the firms operated were then collected from various issues of the *New England Business Directory*, which includes detailed tabulations of manufacturing corporations and their products. Finally, the corporations whose shares were traded on the Boston Stock Market were identified in Martin (1886).

[10] Many of the firms that reported no assets or no capital appeared to be in the hands of receivers. A full discussion of the firms that were excluded from the sample is presented in the Appendix.

In order to identify ties between manufacturing corporations and financial institutions, the names of all directors of all of the state's banks and insurance corporations were recorded from the 1872 *Massachusetts Register and Directory*. This volume listed the directors for 203 banks and trust companies, and 97 insurance companies. These names were then cross-referenced to the names of the directors of the nonfinancial corporations, in order to identify interlocks.

Finally, the federal census of 1870 included information about real and personal wealth. The manuscripts were searched for all of the names of directors of Massachusetts corporations to obtain this information. There were 2,403 unique individuals who held directorships with the corporations, and of those, 1,388 could be uniquely identified in the census, a match rate of around 58%. For 182 of those individuals, however, no wealth information was provided.[11] With the 1,206 individuals with reported wealth data, we calculated average director wealth for each corporation for which data was available.

Financial and ownership data

Table 1 presents summary statistics for the financial position and ownership of all 573 corporations in the sample for 1872. On average, the firms had about $300,000 in total assets, and about $200,000 of paid-in capital. The debt-to-asset ratio was about 32% on average, which is relatively similar to that of modern U.S. firms, and contrasts sharply with the conjecture offered by Baskin (1988) that early corporations were financed almost exclusively with equity. The certificates of condition do not identify the nature of the debts, but a striking similarity can be found between the debt-to-asset ratio and the percentage of the firms' assets represented by real estate (31% on average). This is consistent with the notion that much of the firms' debt may have been mortgages on their real estate. The average year of incorporation of the firms was 1860, implying an age of 12 years in 1872, and the shares of 7 percent of the firms were traded on the Boston Stock Exchange. The average growth rate of the firms, measured as

[11] The individuals with no wealth reported included noted figures such as Congressman Oakes Ames and his son Oliver Ames, who were major investors in the Union Pacific Railroad, and owners of several manufacturing enterprises. This suggests that some wealthy individuals, perhaps those with ties to politics, may have refused to answer enumerators questions about their wealth, and that the data on director wealth obtained from the census will be measured with error.

the change in total assets between 1871 and 1872 as a fraction of 1871 total assets, was 6.2%. And about 39% of the firms were shut down prior to 1881.

Turning to the lower panel of the table, the firms had boards of directors consisting of about 4.8 members: a President, a Treasurer, and about three additional directors. These directors typically held about 43% of the company's shares. This is far higher than the average levels of director ownership among modern publicly traded corporations, whose directors typically hold about 21% of their fims' shares (Holderness, Kroszner, and Sheehan 1999). The average level of assessed wealth of the directors was about $115,000, which is equivalent to about $2.1 million in 2013 Dollars. On average, the corporations had a total of 49 owners, but there was enormous variation across firms. Large numbers of these firms had highly concentrated ownership, with virtually no "small investors," and more than 200 had fewer than 10 shareholders total. In contrast, many of the largest publicly traded enterprises had hundreds of shareholders, with 20 having more than 300 shareholders, and one with more than 700.

Table 2 proves a summary of the industries in which the firms were engaged, along with industry-level information about their finances and ownership. Most of the corporations were engaged in manufacturing, although there were 59 utilities, 17 firms engaged in providing transportation infrastructure, 23 firms organized as cooperatives, and 25 companies founded in other sectors.[12] In terms of average size, the textile manufacturers were by far the largest, with average total assets of more than $600,000, and the cooperatives were the smallest, with only about $14,500 in total assets. The corporations in all of the other categories had total assets between $60,000 and $300,000. The textile firms were also quite widely held, with 74 shareholders on average, and their directors had the highest levels of assessed wealth by far. However, the cooperatives has the largest average numbers of shareholders (117), and the assessed wealth of their directors was radically lower than that all of the other categories of firms—only $5,200. The corporations in all of the other categories had, on average, less

[12] The utilities consisted mainly of gas companies, along with a small handful of water companies. The transportation infrastructure companies consisted mainly of steamboat, wharf, and related companies. The cooperatives were mostly engaged in retailing. The companies in the category "Other" included some publishers and newspapers, along with hotels, real estate developers, and music halls.

than 50 shareholders, with most having 30 or fewer. The degree of managerial ownership was generally consistent across categories, with nearly all having between 30% and 50% of their shares owned by their directors.

Board Interlocks with Banks and Other Firms

How common were ties between these companies and banks? Table 3 provides the beginnings of an answer, with summary statistics for board interlocks with banks, and, for comparison, board interlocks with insurance companies and with nonfinancial corporations. The data at the bottom of the table reveal that ties between banks and nonfinancial corporations were quite common, with a majority (55%) of such enterprises having at least one banker on their boards. On average, there was just slightly more than one bank director on each firm's board (so that about 23% of each company's board seats were occupied by bank directors), who represented one bank, although many corporations had several bank directors, often representing more than one bank. In contrast, column (4) reveals that 32% of the corporations had a board interlock with an insurance company, and column (5) indicates that 63.5% had a board interlock with another nonfinancial company.

The upper rows of the table present the rate at which these board interlocks occurred among different categories of corporations. In general, bank directors were present on the firms' boards from 30% to 60% of the time, with textile manufacturers and utilities having bank directors at unusually high rates (68% and 70%, respectively), and cooperatives having bank directors on their boards at unusually low rates (only 4.3% of the time). The industries in which banks were heavily represented on firms' boards tended to be the same as the industries in which both insurance companies and other nonfinancial companies were represented on firms' boards at high rates as well. Some categories of corporations appeared to have boards that were quite interconnected with both financial firms and other corporations.

The picture that develops from these data is one of extensive ties between banks and nonfinancial corporations. However, the data also reveal that there was substantial heterogeneity in the extent and nature of these relationships across firms, even among those with ties to the same bank. Consider the

example of the National Bank of Northampton, illustrated in Figure 2. The bank had nine directors, of which six held directorships on at least one nonfinancial corporation. In total the bank's directors held board seats with thirteen other corporations—twelve manufacturing firms and one utility—all of which were located in nearby towns. Several of the bank's directors owned substantial equity states in the non-financial corporations where they held board seats, and were probably founders of those enterprises. In other cases, the bank directors held very little of the stock of the other companies, or even none of the stock at all. Perhaps those latter directors were primarily bankers, whereas the former are best thought of as entrepreneurs.

As the lower rows of Table 3 reveal, on average, bank directors owned 11% of the sample corporations' shares, which suggests that many of the bank directors who held seats on their boards were entrepreneurs, rather than bankers. For a subset of the banks, those located in Boston, ownership lists are available, so the stakes those men held in their banks can be systematically compared to the stakes they held in the nonfinancial companies where they held directorships.[13] These comparisons are presented in Table 4. For the 87 different individuals who held directorships both with Boston banks and with sample corporations, the average fraction of the total stock of the banks they held was less than 1%, whereas their average stake in the nonfinancial companies where they held directorships was more than 8%. Since they often held board seats with multiple nonfinancial companies, the (par) value of their holdings in those firms was far greater than their holdings in banks—nearly $37,000 more. The financial fortunes of these men were clearly much more closely tied to their nonfinancial firms than to their banks. On average, these men were entrepreneurs who held seats on bank boards, not bankers who held seats on nonfinancial companies' boards.

In contrast, among modern firms, board interlocks with banks are usually created to bring a banker onto the nonfinancial company's board. Whereas bankers on American firms' boards today are often regarded as independent or "outside" directors (see Kroszner and Strahan, 2001) and only rarely

[13] These data are from the volume, *A List of Stockholders in the National Banks of Boston, May 1 1866.* They were therefore six years old in 1872, when the ownership of the other corporations is measured. Thus there is likely some measurement error in the ownership stakes in the banks presented in the figure.

represent banks that lend to the firms (see Güner, Malmendier, and Tate, 2008), the bank directors on the boards of Massachusetts firms in the 1870s boards were insiders—they were typically large equity holders, and very likely the founders of the firms in many cases.

Selection into relationships with banks

Table 5 presents comparisons of firms' 1872 characteristics between corporations with and without ties to banks. The data consistently indicate that firms with bank directors on their boards were much larger and better established than those without such ties. Firms with bank directors on their boards had total assets that were greater by $250,000, were three years older, and were slightly less levered, relative to those without such directors. However, the composition of firms' balance sheets, as measured by the fraction of their assets represented by real estate, and the firms' growth rates, were not significantly different among those with banker-directors. In column (3) the differences between firms with and without insurance company directors on their boards is presented for comparison, and those differences are quite similar. The characteristics of firms that had bank directors on their boards were relatively similar to those that had insurance company directors.

Together, these data indicate that the firms with bank directors on their board were larger, older, and more financially sound than those that did not. This raises a particular challenge for empirical analysis, since the selection of stronger or more 'well-established' firms could easily be responsible for any observed differences in performance between the two groups of firms. Although the growth rates of firms with and without bank directors did not differ significantly in 1872, one might imagine that any change in performance observed over subsequent years could be due the greater resiliency of the firms with bank directors on their boards. In the empirical analysis that follows, this challenge will be addressed carefully.

4. The Panic of 1873 and Its Aftermath

The empirical analysis of this paper focuses on the change in firms' growth rates in the years following the Panic of 1873. This section presents a brief description of the effects of that panic and the ensuing depression on Massachusetts firms.

In September of 1873, a panic broke out on Wall Street, plunging financial markets into turmoil. The New York Stock Exchange closed for 10 days. The subsequent economic contraction produced substantially elevated unemployment, and a long slump (see Rezneck 1950). As illustrated in Figure 3, the growth of industrial production fell substantially during the years 1874-78, with a very significant contraction of nearly -6% in 1875. Among the consequences of the disruption of financial markets and fall in spending was a rise in bankruptcies among firms. The lower panel of Figure 3 shows that the current liabilities of failing businesses nearly doubled in 1873 and remained elevated through 1878.

The banks of Massachusetts, however, were not directly affected by the events that led to the onset of the panic, and were in a relatively strong position at its outset. Although they initially continued payments after the suspension in New York, the strong demand for reserves from New York led the Boston banks to enact a partial suspension September 27.[14] Over the following years there were no bank failures in Massachusetts, and indeed 21 new banks opened in Massachusetts between 1873 and 1880. However, the state's banks saw a significant decline in their returns on equity, and wrote off substantial losses (Comptroller of the Currency, 1872-1880).

Following the outbreak of the panic, a number of Massachusetts manufacturing firms moved to dismiss parts of their workforce and reduce output.[15] The business environment over the subsequent years was regarded as quite difficult, and many firms either shut down or came close to shutting down.[16]

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[14] Sprague (1910: 66-67) documents the response of Boston and Worcester banks to the onset of the panic. Sprague notes that at the outset of the panic, Boston banks had $10 million in cash reserves against $61 million in deposits.
[15] *Boston Daily Advertiser*, 30 September 1873.
[16] For example, in 1875 the *Boston Daily Advertiser* noted that "many large manufacturing companies during the year past have had their profits so largely reduced, or wholly swept away, that they were confronted with the option of suspension of business…" (7 September).

The profit rates and investment rates of the sample of large textile manufacturers analyzed by McGouldrick (1968) showed substantial declines between 1874 and 1878.[17] One contemporary journalist offered an assessment of the causes of the firms' poor performance:

> "Most of our manufacturing cities and towns feel the effect of the dullness and financial stringency of the times. The Atlantic Mills, Lawrence, have reduced their product, and will run on short time for the present; the Blackstone is rumored to have decided on a temporary suspension…The Fall River owners are taking steps to ensure concert of action in the matter of running cotton mills on shorter time. This is considered necessary because of the *falling off in the amount of sales* and the *high price of money* [italics added]."[18]

The fall in demand, and the contraction in the supply of available credit, were both seen as contributing to the problems firms faced. The disruption of New York's banking markets likely contributed to the credit stringency, but there was another factor as well. Early in the panic, several prominent "jobbers"—mercantile firms involved in the distribution of goods—failed (Sprague, 1910: 77-80). These failures created significant losses for any manufacturers that had extended them credit, and likely disrupted mercantile credit networks.

In such an environment, an affiliation with a bank would likely become quite valuable. The wave of insolvencies created by the downturn would likely create adverse selection problems in credit markets (Bernanke, 1983). But if a firm and a bank had a longstanding relationship, in which the bank was able to learn about the firm's assets and operations, and its record of repayment of loans, the bank would likely be much more willing to lend to the firm at a time of greater uncertainty or greater pressure on the firm's resources. Although no systematic data on bank lending survives from this era, the account of bank lending procedures presented in Gibbons (1859) suggests that in times of stringency, the privileged position of bank directors in the allocation of credit were quite valuable. And the loan data from a New York bank presented in Bodenhorn (2003) indicate that during a credit crunch, banks did indeed provide greater access to credit to their longstanding customers.

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[17] McGouldrick's sample was obtained from the manuscript holdings of Baker Library at Harvard University, and includes eleven of the largest and most prominent textile manufacturers from Massachusetts and the surrounding states. These firms are therefore not representative, but the fact that their results were so poor over this period suggests that smaller and less prominent firms likely suffered to an even greater extent.

[18] *Salem Register*, 23 October 1873.

5. Analysis of Firm Performance

The accounting data from the certificates of condition for all Massachusetts corporations that existed in 1872 were collected and coded for 1873-1881, in order to follow these firms over time and analyze their performance.[19] These certificates do not provide any information about profits or cash flows, so the most obvious measures of rates of return cannot be computed. However, the annual growth rates of firms can be computed, and those of firms with and without ties to banks prior to the panic can be compared.

A clear indication of the effects of the panic on Massachusetts' corporations is presented in Figure 4, which plots the annual growth rates of the firms between 1872 and 1881. The firm's growth rates plummet in 1874 and remain depressed through 1879. Clearly, these were difficult years. The figure distinguishes between corporations with and without bank directors on their boards, and the differences between the two groups are quite significant, particularly in the years 1874-77. Corporations with ties to banks enjoyed a substantial advantage during the downturn, and their growth rates did not fall to the same extent as those of other firms. However, those firms do not seem to have grown at higher rates outside of the downturn.

In order to investigate these differences more carefully, and account for the characteristics of different firms, the determinants of the growth rates of the corporations will be estimated in the following empirical framework:

$$(1) \qquad y_{it} = \beta_0 + \beta_1 \textit{banker-director}_i \times \textit{post-1873}_t + \mathbf{z}_{it}\beta_2 + \alpha_i + \delta_t + \varepsilon_{it}$$

where y_{it} is the growth rate of company i in year t; $\textit{banker-director}_i$ is an indicator for the presence of one or more bank directors on the board of company i; $\textit{post-1873}_t$ is an indicator for the years following 1873;

[19] The forms became more detailed over time, and after 1875 included much more information about firms' balance sheets (although still no income information.) But as the empirical analyses focuses on comparisons between firm performance before and after the shock, these additional details cannot be used, because there is no data from the earlier period to compare them to.

$\boldsymbol{z}_{it}$ is a vector of different firm characteristics, and may include industry trends and county trends; and δ_t and α_i are year and firm fixed effects. The firm fixed effects address any unchanging firm characteristics such as the quality of its management or its reputation. The year fixed effects account for the different macroeconomic conditions across years. The main parameter of interest is β_1, which captures the difference-in-differences between firms with and without bank directors on their boards in the years following 1873, relative to the years up to 1873.

Table 6 presents results for regressions based on different versions of equation (1). In column (1), the model is estimated with firm and year fixed effects only; in columns (2) and (3) additional firm characteristics are included in the regression and interacted with a post-1873 indicator, and industry and county trends are included. The results provide clear evidence that firms with bank directors on their boards experienced less of a decline in their growth rates in the years following 1873. Depending on the specification, the difference-in-differences was 4.7 to 6.1 percentage points, which is equivalent to about 18% to 23% of a standard deviation in firms' 1872 growth rates. These differences were quite substantial.

One concern regarding these results, however, could be that the firms with and without bank directors were quite different, and in particular the firms without bank directors were in fact so different they do not constitute an appropriate comparison group. The firms with bank directors on their boards were larger, older, and less levered—to the extent that these observable differences contributed to the resiliency of firms or success during the downturn, this could bias the results. In order to address this concern, we use estimated propensity scores to restrict the sample to the common support in the propensity to have an affiliation with a bank, and also weight the observations by their inverse propensity scores.[20] The results of these regressions are presented in columns (4) and (5) of Table 6. The estimated

[20] Specifically, we estimate a firm-level probit regression of an indicator for an affiliation with a bank with 1872 measures of log assets, leverage, firm age, and industry indicators. We then restrict the sample to the common support in the propensity to have such an affiliation; that is, we eliminate firms without an affiliation with a propensity score below the minimum for the firms with an affiliation (and above the maximum for those with an affiliation). We weight the remaining observations by the inverse of the propensity score, which eliminates all significant differences in the chosen firm characteristics.

effect of an affiliation with a bank is reduced in magnitude slightly, but remains large and statistically significant. Selection on observable characteristics does not appear to account for the estimated effect.

Another natural concern is selection on unobserved characteristics. Perhaps the most sophisticated or best-informed merchants were both able to obtain board seats in banks and make investments in companies that were superior to the others, in ways that cannot be observed in the surviving data. This would imply that the estimated effects were simply due to this selection process—the entrepreneurs with bank ties chose the (unobservably) more robust or resilient firms. The unobserved nature of the characteristics determining both the entrepreneurs' choice of firms and the firms' success following 1873 makes this form of selection particularly difficult to address directly.

However, if those unobserved characteristics were sought in the choices of other elite entrepreneurs who were not affiliated with banks, we can perform a falsification test. If the estimated effects are truly due to an affiliation with a bank, and its capacity to extend credit to its favored clients during a period of financial upheaval, then affiliations with other institutions that cannot extend credit to firms should not have the same effect. If affiliations with those other institutions are determined by selection on the same or similar unobserved characteristics as affiliations with banks, then they can be used in a falsification test. Around 32% of the sample corporations had an affiliation with a Massachusetts insurance corporation. Many of the state's insurance firms were quite large and prestigious institutions, and were operated by elite merchants. However, they did not have the same capacity to extend credit to firms as banks did.[21] If entrepreneurs with ties to insurance companies formed affiliations with firms with similar unobserved characteristics as entrepreneurs with ties to banks, then ties to insurance companies constitute a valid falsification test.

Table 7 presents the results of regressions of the same specification as column (3) of Table 6, but with the $\textit{banker-director}_i \times \textit{post-1873}_t$ term replaced by a $\textit{insurance-director}_i \times \textit{post-1873}_t$ term. The effect is extremely small, and statistically indistinguishable from zero. Corporations affiliated with insurance

[21]Davis' (1966) study of the borrowing of a sample of large textile firms notes that they did in fact obtain some credit from insurance corporations. However, the scale of their borrowing from banks was much larger.

companies did not benefit in the years following the Panic of 1873, relative to other firms. Of course one cannot completely rule out the possibility that bank directors were somehow even more sophisticated and even better at founding or choosing resilient firms than insurance company directors. But this extreme degree of sophistication sounds less plausible than the notion that ties to a bank were particularly helpful during a contraction.

Column (2) of the table presents a further falsification test, based on the notion that firms with interlocks with other nonfinancial corporations might also be more resilient due to unobserved characteristics. Such firms were, by definition, managed by directors who held other directorships, and were therefore likely to be better connected and better informed. And yet this also shows no effect. In column (3) the three different terms are included in the same regression, and the effect of an affiliation with a bank becomes even stronger.

One consequence of the more rapid growth and superior performance of the firms with bank ties during the post-1873 period, relative to the earlier period, might be that those firms were more likely to survive the decade. The records created by the certificates of condition generally do not provide information about the circumstances in which firms were shut down; most such firms simply ceased submitting certificates. It is therefore generally not known whether the firm entered financial distress, or whether the owners of the firm simply decided to wind it up. The latter possibility makes interpreting the data on firm shut-downs difficult, since different entrepreneurs may have had different outside opportunities for their wealth, or may have faced more pressing needs for capital that could be satisfied by liquidating their firms. The decision to close a firm is endogenous, and depends on a range of factors. Nonetheless, at least some of the sample firms were indeed shut down in the years following 1873 because they entered bankruptcy and were liquidated, and if affiliations with commercial banks helped firms avoid such an outcome, then this should have translated into a higher survival rate.

Approximately 39% of the sample firms that existed in 1872 were shut down prior to 1881. The survival rates of the sample firms are illustrated in Figure 5, which presents Kaplan-Meier survival curves for firms with and without affiliations with banks. In the left panel, the raw data are used, and in the right

panel, the same propensity score approach taken in column (5) of Table 6 is utilized: firms outside the common support in the propensity to have an affiliation with a bank are eliminated, and the remaining firms are weighted by their inverse propensity scores. The right panel shows a considerably smaller effect than the left, indicating that the adjustment for selection on observables has a substantial effect. Nonetheless, the differences between the curves in both panels are statistically significant.[22]

To explore the differences between the survival rates of the two groups in more depth, Table 8 presents linear probability models of regressions similar to those of equation (1), with the dependent variable an indicator for failure. The results from column (3), with the full set of controls, indicate that firms with ties to banks were 12.5 percentage points less likely to be shut down prior to 1881, an effect equivalent to 32% of the mean failure rate. However, in columns (4) and (5), when the estimates are adjusted for selection on observables using propensity scores (as in Table 6), the effect is substantially reduced in magnitude, to a 7.9 percentage-point reduction in being shut down. Evidently, the selected nature of the firms with ties to banks had a much greater effect on their survival rates than on their growth rates. Nonetheless, the effect estimated in column (4) is equivalent to 20% of the mean failure rate.

6. Conclusion

In the 1870s, bank-firm affiliations, cemented with board seats, were quite common in Massachusetts. Entrepreneurs who founded and invested in manufacturing enterprises and other firms commonly held board seats with the state's banks. These relationships likely helped address problems related to asymmetric information in credit markets, and improved the firms' access to credit.

The Panic of 1873 presents an opportunity to assess the value of these relationships. In the wake of the financial contraction, there was a significant decline in industrial production, and a wave of bankruptcies. In such an environment, adverse selection problems in credit markets become particularly acute. And if bank-firm ties help address those problems, they would likely become quite valuable. The

[22] In the propensity score adjusted case, a Cox regression-based test for the equality of the survival curves produces a Wald $\chi^2(1)$ statistic of 5.67, for a p-value of 0.017.

results of the empirical analysis of this paper are quite consistent with that conclusion. All firms suffered following the panic, but those firms that had ties to banks saw their growth rates fall by considerably less. In contrast, firms with ties to insurance corporations, which were similarly 'elite' in nature but did not form the basis of a lending relationship, did not experience any similar benefits.

The sources used to assemble the dataset of this paper indicate that 55% of Massachusetts corporations had bank representation on their boards in 1872. For the corporations whose stock was traded on the Boston Stock Exchange, the rate rises to 81%. This is roughly similar to that of modern Germany, and substantially higher than that of modern Japan, both known for their bank-centered financial systems and extensive bank representation on boards. In contrast, modern publicly traded corporations in the U.S. have bankers on their boards at far lower rates, from 26% to 31%, and most of those do not represent lending relationships (Güner, Malmendier, and Tate, 2008; Kroszner and Strahan, 2001). The principal reasons usually cited for the low rate of bank representation among modern U.S. firms are regulatory restrictions on bank-firm relationships, especially restrictions against banks owning equity, the weak rights granted to creditors by the American legal system, and doctrines of lender liability. The banks of the 1870s faced similar prohibitions against owning stock, but the issues of lender liability and the doctrine of equitable subordination do not appear to have been significant concerns at the time. This suggests that the evolution of these doctrines was likely an important part of the decline in bank activism in American corporate governance.

References

Adams, Renée B., Benjamin E. Hermalin, and Michael S. Weisbach. 2010. "The Role of Boards of Directors in Corporate Governance: A Conceptual Framework and Survey." *Journal of Economic Literature* 48(1): 58-107.

Allen, Franklin, and Douglas Gale. 2000. *Comparing Financial Systems*. Cambridge: MIT Press.

Aoki, M., Patrick, H., & Sheard, P. 1994. The Japanese main bank system: An introductory overview. In M. Aoki & H. Patrick, eds, *The Japanese main bank system: Its relevance for developing and transforming economies*: 3–50. Oxford and New York: Oxford University Press.

Atack, Jeremy, and Peter Rousseau. 1999. "Business activity and the Boston Stock Market," *Explorations in Economic History*, 45: 185-198.

Ayer, J.C. 1863. *Some of the usages and abuses in the management of our manufacturing corporations*. Lowell, MA: C. M. Langley and Company.

Baskin, Jonathan Barron. 1988. "The Development of Corporate Financial Markets in Britain and the United States, 1600-1914: Overcoming Asymmetric Information. *Business History Review*, Vol. 62, No. 2 (Summer): 199-237.

Berle, Adolf, and Gardiner Means. 1932. *The Modern Corporation and Private Property*. New York: MacMillan.

Bernanke, Ben. 1983. "Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression." *American Economic Review* 73(3): 257-276.

Bernanke, Ben and Mark Gertler. 1995. "Inside the Black Box: The Credit Channel of Monetary Transmission." *Journal of Economic Perspectives* 9(4): 27-48.

Bodenhorn, Howard. 2003. "Short-Term Loans And Long-Term Relationships: Relationship Lending In Early America," *Journal of Money, Credit and Banking*, 2003, 35(4): 485-505.

Bodenhorn, Howard. 2007. "Usury ceilings and bank lending behavior: Evidence from nineteenth century New York," *Explorations in Economic History*, 44(2), 179-202.

Bordo, Michael, and Joseph G. Haubrich. 2010. "Credit Crises, Money and Contractions: An Historical View." *Journal of Monetary Economics* 57(1): 1-18.

Calomiris, Charles. 1995. "The Costs of Rejecting Universal Banking: American Finance in the German Mirror, 1870-1914." In Lamoreaux and Raff, eds., *Coordination and Information: Historical Perspectives on the Organization of Enterprise*. Chicago: University of Chicago Press.

Calomiris, Charles, and Gary Gorton. 2000. "The Origins of Banking Panics: Models, Facts, and Bank Regulation," in *U.S. Bank Deregulation in Historical Perspective*. New York: Cambridge University Press.

Cantillo Simon, Miguel. 1998. "The Rise and Fall of Bank Control in the United States: 1890-1939," *American Economic Review*, 88(5): 1077-93.

Carter, Susan B., et al. 2006. *Historical Statistics of the United States, Millennial Edition*. New York: Cambridge University Press.

Charumilind, Chutatong, Kali, Raja, and Yupana Wiwattanakantang. 2006. "Connected Lending: Thailand before the Financial Crisis." *Journal of Business*, 79(1): 181-218.

Comptroller of the Currency of the United States. 1872-1880. *Annual Report*. Washington: Government Printing Office.

Cull, R., J Matesova and M. Shirley. 2002. "Ownership and the temptation to loot: Evidence from privatized firms in the Czech Republic," *Journal of Comparative Economics*, 30: 1-24.

Davis, Joseph H. 2004. "An Annual Index of U.S. Industrial Production, 1790-1915." *Quarterly Journal of Economics* 119(4): 1177-1215.

Davis, Lance E. 1957. "Sources of Industrial Finance: The American textile Industry: A Case Study," *Explorations in Entrepreneurial History*, 9, 190-203.

Davis, Lance E. 1960. "The New England Textile Mills and the Capital Markets: A Study of Industrial Borrowing 1840-1860." *The Journal of Economic History*, 20(1): 1-30.

Davis, Lance E. 1966. "The Capital Markets and Industrial Concentration: The U.S. and U.K., a Comparative Study." *Economic History Review*, Vol. 19, No. 2: 255-272.

DeLong, J. Bradford. 1991. "Did J.P. Morgan's Men Add Value? An Economist's Perspective on Finance Capitalism," in Temin, ed. *Inside the Business Enterprise: Historical Perspectiveso n the Use of Information.* Chicago: University of Chicago Press.

Dewatripont, M. and J. Tirole. 1994. "A theory of debt and equity: diversity of securities and manger-shareholder congruence." *Quarterly Journal of Economics* 109(3): 1027-1054.

Diamond, D. 1984. "Financial intermediation and delegated monitoring." *Review of Economics Studies,* 51(3): 393-414.

Franks, Julian and Colin Mayer. 1996. "Hostile takeovers and the correction of managerial failure." *Journal of Financial Economics*, 40(1): 163-181.

Frydman, Carola, and Eric Hilt. 2014. "Investment Banks as Corporate Monitors in the Early Twentieth Century United States." *NBER Working Paper Series*, number 20544.

Frydman, Carola, and Eric Hilt. 2015. "Economic Effects of Runs on Early "Shadow Banks": Trust Companies and the Panic of 1907." *Journal of Political Economy,* forthcoming.

Gibbons, J.S. 1859. *The Banks of New York, Their Dealers, The Clearinghouse, and the Panic of 1857.* New York: D. Appleton & Co.

Gilson, S. 1990. "Bankruptcy, boards, banks, and blockholders: evidence on changes in corporate ownership and control when firms default." *Journal of Financial Economics* 27(2): 355-88.

Gorton, G., and F. Schmid. 2000. "Universal banking and the performance of German firms." *Journal of Financial Economics*, 58(1-2): 29-80.

Guinnane, Timothy W. 2002. "Delegated Monitors, Large and Small: Germany's Banking System, 1800-1914." *Journal of Economic Literature* 40(1): 73-124.

Güner, A. Burak, Ulrike Malmendier, and Geoffrey Tate. 2008. "Financial expertise of directors." *Journal of Financial Economics*, 88(2): 323–354.

Handlin, Oscar, and Mary Flug Handlin. 1974. *Commonwealth: A Study of the Role of Government in the American Economy, Massachusetts, 1774-1861*. Cambridge: Harvard University Press.

Harris-Gastrel, J.P. 1875. *Reports of Her magesty's Secretaries of Embassy and Legislation respecting Factories for the Spinning and Weaving of Textile Fabrics*, London.

Hilt, Eric. 2008. "When did ownership separate from control? Corporate governance in the early nineteenth century," *Journal of Economic History*, 68(3): 645-85.

Hilt, Eric. 2015. "Corporate Governance and the Development of Manufacturing Enterprises in Nineteenth-Century Massachusetts," in Collins and Margo, eds., *Enterprising America: Businesses, Banks and Credit Markets in Historical Perspective.* University of Chicago Press, forthcoming.

Holderness, Clifford G., Randall S. Kroszner, and Dennis P. Sheehan. 1999. "Were the Good Old Days That Good? Changes in Managerial Stock Ownership since the Great Depression." *The Journal of Finance*, 54(2): 435-469.

Hoshi, Takeo, Kashyap, Anil and David Scharfstein. 1990. "Bank monitoring and investment: Evidence from the changing structure of Japanese corporate banking relationships." In R. Glenn Hubbard ed., *Asymmetric Information, Corporate Finance and Investment.* Chicago: University of Chicago Press.

Hoshi, Takeo, Kashyap, Anil and David Scharfstein. 1991. "Corporate Structure, Liquidity, and Investment: Evidence from Japanese Industrial Groups." *The Quarterly Journal of Economics*, 106(1): 33-60.

Jaremski, Matthew. 2014. "National Banking's Role in U.S. Industrialization, 1850-1900." *Journal of Economic History* 74:109-140.

Jensen, M. and W. Meckling. 1976. "Theory of the firm: managerial behavior, agency costs, and capital structure." *Journal of Financial Economics* 3(4): 305-360.

Kang, J.-K., A. Shivdasani and T. Yamada. 2000. "The effect of bank relations on investment decisions: an investigation of Japanese takeover bids." *Journal of Finance*, 55(5): 2197-2218.

Keister, Lisa A. 1998. "Engineering Growth: Business Group Structure and Firm Performance in China's Transition Economy," *American Journal of Sociology*, 104(2): 404-440.

Kroszner, R.S. 1996. "The evolution of universal banking in the twentieth century America." In Saunders and Walter, eds., *Financial System Design: Universal Banking Considered*. NY: Irwin Professional Publishers.

Kroszner, Randall S., and Philip E. Strahan. 2001. "Bankers on Boards: Monitoring, Conflicts of Interest, and Lender Liability." *Journal of Financial Economics*, 62(3): 415-52.

Laeven, L. "Insider lending and bank ownership: The case of Russia," *Journal of Comparative Economics*, 29: 207-29.

Lamoreaux, Naomi R. 1986. "Banks, Kinship, and Economic Development: The New England Case." *Journal of Economic History*, 46(3):647-67.

Lamoreaux, Naomi R. 1994. *Insider Lending: Banks Personal Connections, and Economic Development in Industrial New England*. NY: National Bureau of Economic Research/Cambridge University Press.

LaPorta, Rafael, Lopez-de-Silanes, Francisco, and G. Zamarripa. 2003. "Related lending," *Quarterly Journal of Economics*, 118: 231-68.

Lockard, Paul A. 2000. *Banks, insider lending and industries of the Connecticut River Valley of Massachusetts, 1813—1860*. Unpublished Ph.D. Dissertation, University of Massachusetts.

Macey, Jonathan R., and Geoffrey P. Miller. 1992. "Nondeposit Deposits and the Future of Bank Regulation." *Michigan Law Review*, 91(2): 237-273.

Martin, Joseph G. 1886. *Martin's Boston Stock Market*. Boston: Published by the Author.

Maurer, Noel, and Stephen Haber. 2007. Related lending and economic performance: Evidence from Mexico. *Journal of Economic History*, 67(3): 553–580.

McGouldrick, Paul F. 1968. *New England Textiles in the Nineteenth Century*. Cambridge: Harvard University Press.

Meissner, Christopher M. 2005. "Voting rules and the success of connected lending in 19th century New England banks." *Explorations in Economic History*, 42(4): 509-28.

Oberholtzer, Ellis Paxson. 1926. *A History of the United States Since the Civil War, Volume 3.* NY: Macmillan.

Peek, J. and E. S. Rosengren. 2005. "Unnatural selection: Perverse incentives and the misallocation of credit in Japan," *American Economic Review, Papers and Proceedings*, 95: 1114-16.

Rajan, R.G. 1992. "A theory of the costs and benefits of universal banking." *Center for Research in Security Prices,* working paper no. 346. Chicago: University of Chicago Press.

Ramirez, Carlos. 1995. "Did J.P. Morgan's men add liquidity? Corporate investment, cash flow and financial structure at the turn of the twentieth century," *Journal of Finance*, 50(2).

Rezneck, Samuel. 1950. "Distress, Relief, and Discontent in the United States during the Depression of 1873-78." *Journal of Political Economy*, 58(6): 494-512.

Rosenberg, Chaim M. 2011. *The Life and Times of Francis Cabot Lowell, 1775-1817*. Lanham, MD: Lexington Books.

Sprague, O.M.W. 1910. *A History of Crises Under the National Banking System*. Publications of the National Monetary Commission. Washington, DC: Government Printing Office.

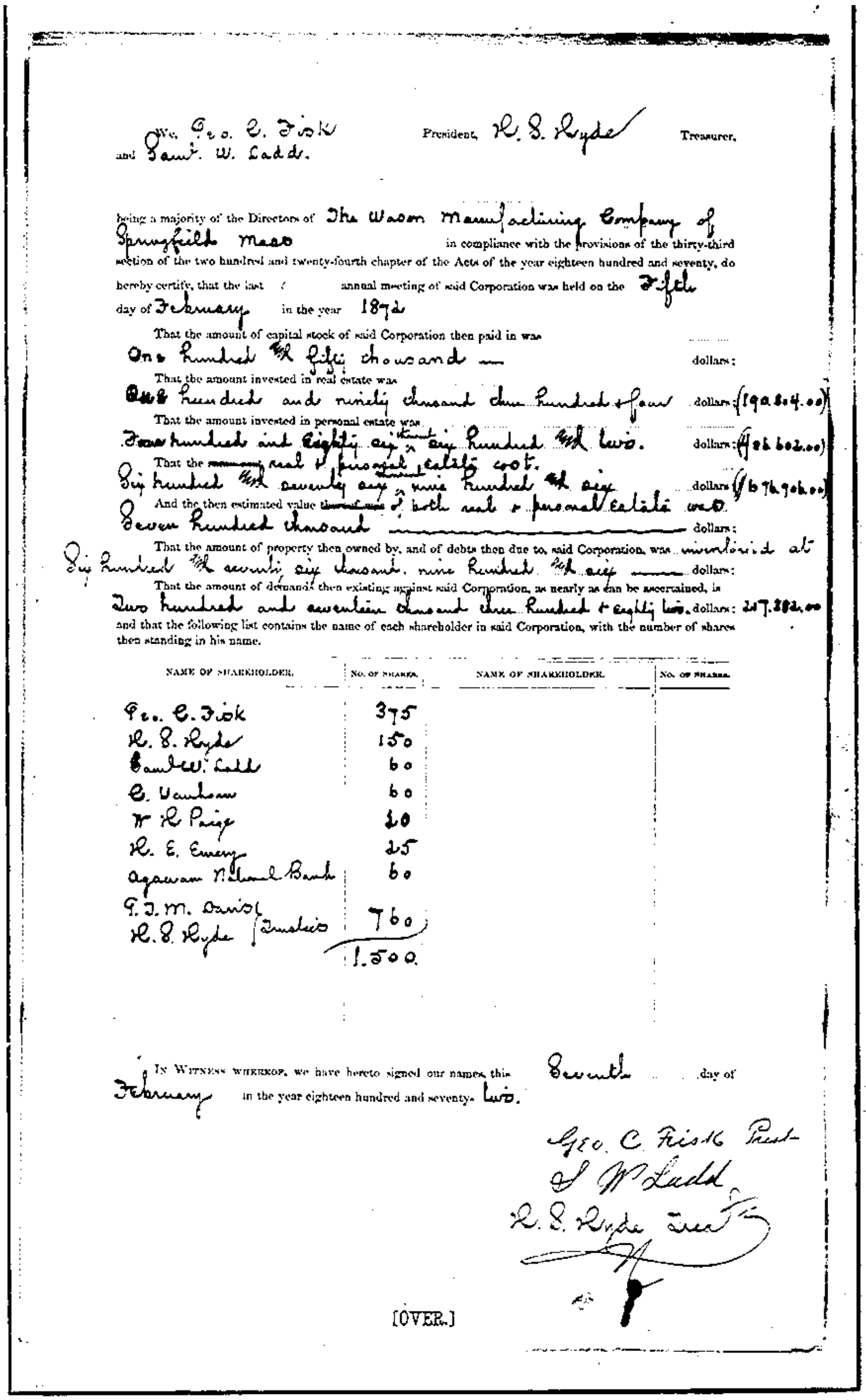
Wang, Ta-Chen, 2008. "Paying back to borrow more: Reputation and bank credit access in early America," *Explorations in Economic History*, 45(4):477-488.

Ware, Caroline F. 1931. *The Early New England Cotton Manufacture*. New York: Houghton Mifflin.

Weinstein, David E., and Yishay Yafeh. 1998. "On the Costs of a Bank-Centered Financial System: Evidence from the Changing Main Bank Relations in Japan," *Journal of Finance*, 53(2), 635-72.

Wicker, Elmus. 2000. *Banking Panics of the Gilded Age*. Cambridge, U.K.: Cambridge University Press, 2000.

Wright, Robert E. 1999. "Bank Ownership and Lending Patterns in New York and Pennsylvania, 1781–1831," *Business History Review*, 73(01): 40-60.



We, Geo. C. Fisk President, R. S. Hyde Treasurer, and Saml. W. Ladd.

being a majority of the Directors of The Wason Manufacturing Company of Springfield Mass in compliance with the provisions of the thirty-third section of the two hundred and twenty-fourth chapter of the Acts of the year eighteen hundred and seventy, do hereby certify, that the last annual meeting of said Corporation was held on the Fifth day of February in the year 1872

That the amount of capital stock of said Corporation then paid in was One hundred and fifty thousand — dollars;

That the amount invested in real estate was One hundred and ninety thousand three hundred & four dollars (190.304.00)

That the amount invested in personal estate was Four hundred and eighty six thousand six hundred and two. dollars (486.602.00)

That the real & personal estate cost. Six hundred and seventy six thousand nine hundred and six dollars (676.906.00)

And the then estimated value of both real & personal estate was Seven hundred thousand — dollars;

That the amount of property then owned by, and of debts then due to, said Corporation, was inventoried at Six hundred and seventy six thousand, nine hundred and six — dollars;

That the amount of demands then existing against said Corporation, as nearly as can be ascertained, is Two hundred and seventeen thousand three hundred & eighty two. dollars: 217.382.00

and that the following list contains the name of each shareholder in said Corporation, with the number of shares then standing in his name.

NAME OF SHAREHOLDER.	NO. OF SHARES.	NAME OF SHAREHOLDER.	NO. OF SHARES.
Geo. C. Fisk	375		
R. S. Hyde	150		
Saml. W. Ladd	60		
C. Vanhorn	60		
W. H. Paige	10		
R. E. Emery	25		
Agawam National Bank	60		
G. J. M. Davis / R. S. Hyde Trustees	760		
	1.500		

IN WITNESS WHEREOF, we have hereto signed our names this Seventh day of February in the year eighteen hundred and seventy- two.

Geo. C. Fisk Prest
S. W. Ladd
R. S. Hyde Treas

[OVER.]

Figure 1: Certificate of Condition, Wason Manufacturing Company, 1872

The form required companies to submit the names of their officers and directors, the date of their most recent annual meeting, basic balance sheet information, and the names of all stockholders and the amounts held.

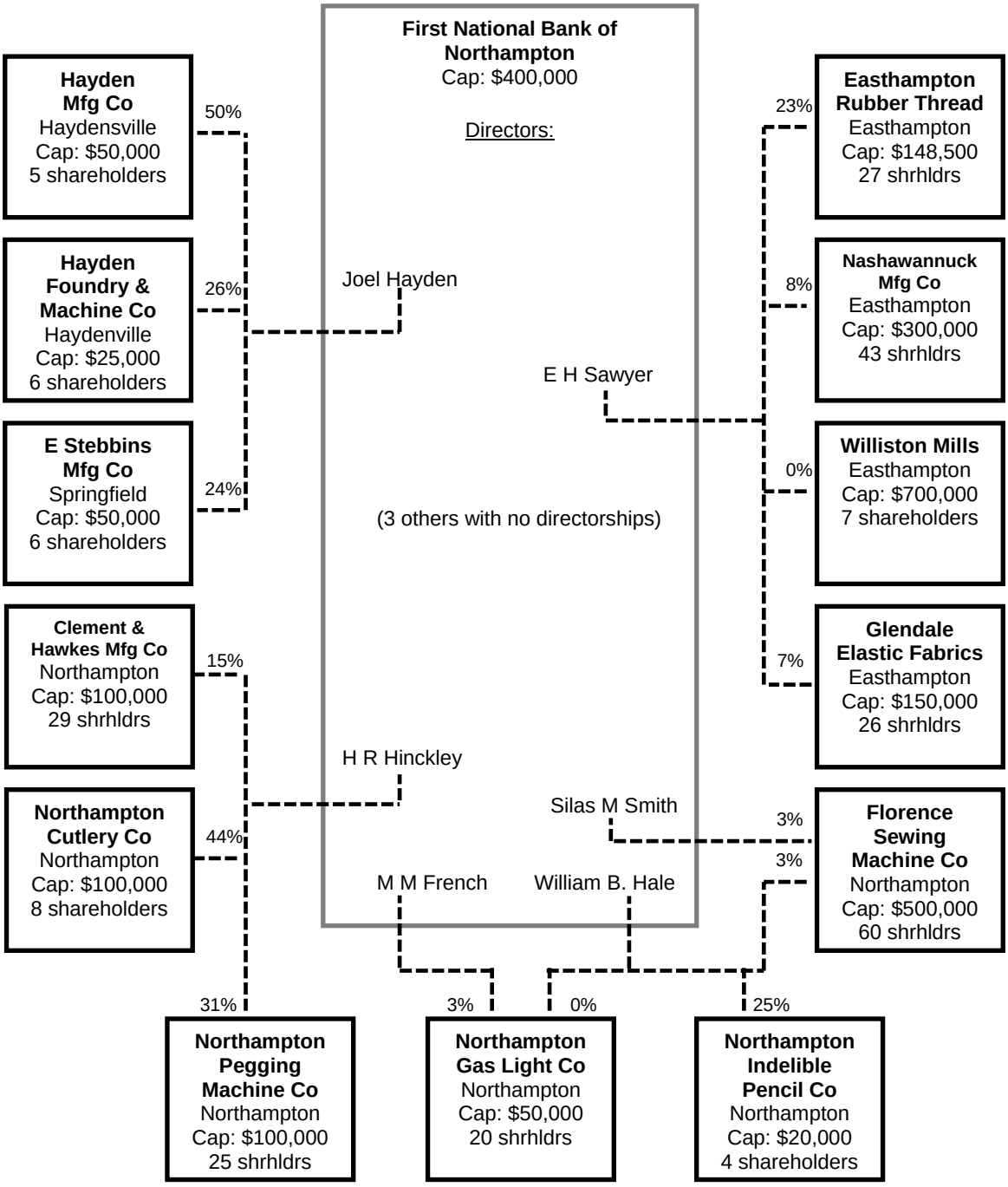


Figure 2: Directorships in Nonfinancial Corporations Held by the Board of the First National Bank of Northampton, 1872

The figure illustrates the directorships in nonfinancial corporations held by the board of a typical Massachusetts bank. Four of the banks nine board members held such directorships. The directors' ownership stakes in the nonfinancial companies, presented in the figures as percentages, were often quite substantial

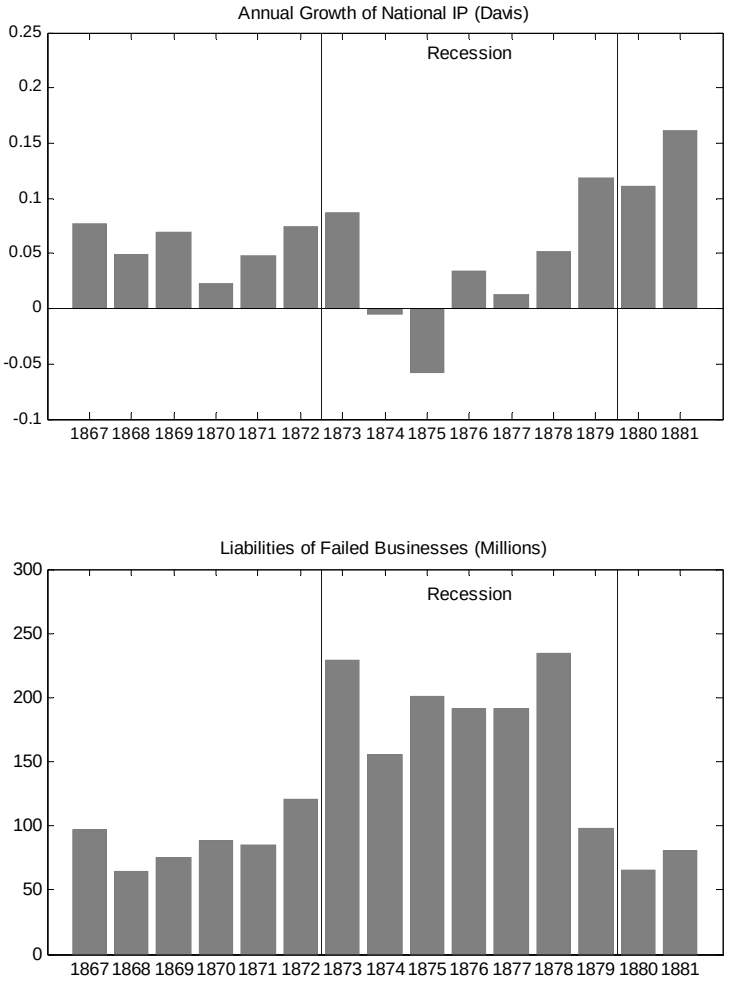


Figure 3: Effects of the Panic of 1873

The upper panel of the figure presents annual growth rates for industrial production, 1867-81, calculated from Davis (2004). The lower panel presents the annual totals for current liabilities of failed businesses, from the "Dun & Bradstreet Reference Book and Failure Statistics," as reported in *Historical Statistics of the United States*. The vertical lines indicate the period officially designated as a recession by the NBER.

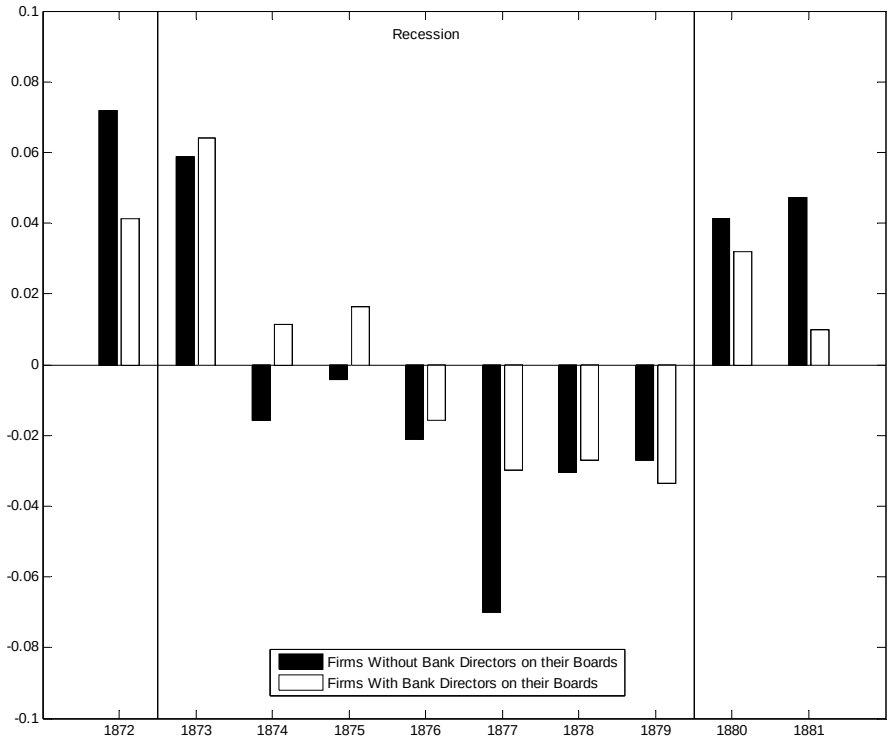


Figure 4:
Annual Growth Rates of
Firms With and Without Bank Directors on their Boards, 1872-81

This figure presents the annual growth rates of total assets of all Massachusetts Corporations with and without bank directors on their boards, for 1872-81. The vertical lines indicate the period officially designated as a recession by the NBER.

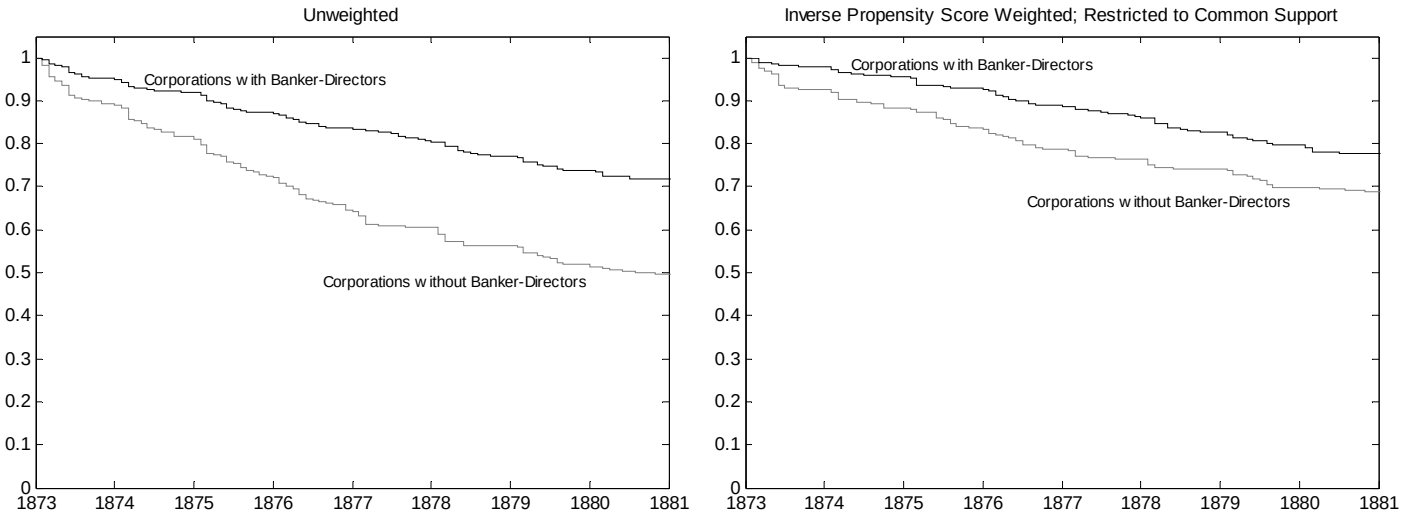


Figure 5:
Kaplan-Meier Survival Curves (1873-81):
Unweighted, and Inverse Propensity Score Weighted

The left panel presents Kaplan-Meier survival curves for the entire sample, for corporations with and without bank directors on their boards. In the right panel, the sample is restricted to corporations within the common support in the propensity to have a banker on their boards, and the observations are weighted by the inverse propensity score. The date at which a firm failed is assumed to be one year following the date of the final certificate of condition submitted to the state.

Table 1:
Financial and Ownership Data,
Massachusetts Nonfinancial Corporations, 1872
(*N*=573)

	Mean	Stdev	Min	Max
	(1)	(2)	(3)	(4)
Firm characteristics				
Paid-in capital	198,566	311,151	925	2,500,000
Total assets	307,741	551,072	1,000	5,745,085
Leverage (debt/assets)	0.324	0.259	0	1
Percent of assets in buildings, land	0.312	0.281	0	1
Years since incorporation	12.279	12.591	0	58
Listed on Boston Stock Exchange	0.071	0.258	0	1
Incorporated via General Act	0.618	0.486	0	1
Growth rate of assets, 1872	0.062	0.265	-0.757	0.646
Firm shuts down prior to 1881	0.393	0.489	0	1
Ownership and board of directors				
Board size	4.786	1.490	2	13
Total board ownership share	0.429	0.290	0	1
Mean assessed wealth of directors	115,221	195,726	316	1,942,847
Total shareholders	51	88	2	730

Note: Data collected from Certificates of Condition, Massachusetts Corporations, Massachusetts State Archives, and from the manuscripts of the 1870 Federal Census. For details, see the Appendix.

Table 2:
Financial and Ownership Data, by Industry
Massachusetts Nonfinancial Corporations, 1872
(*N*=573)

	N	Total Assets	Leverage	Total Shrholdrs	Director Avg. Wealth	Director Ownership
	(1)	(2)	(3)	(4)	(5)	(6)
Manufacturing						
Brick and stone	20	142,641	0.242	34	83,266	0.458
Chemicals	10	113,971	0.285	28	99,164	0.403
Food and tobacco	20	300,811	0.247	32	51,944	0.349
Lumber products	47	186,073	0.345	18	75,895	0.598
Metal products	143	250,416	0.376	27	94,210	0.494
Mining and petroleum	21	99,857	0.202	36	69,173	0.365
Textiles	160	618,248	0.351	74	187,226	0.447
Other Manufacturing	28	301,474	0.351	52	82,210	0.478
Other Business Corporations						
Cooperatives	23	14,503	0.460	117	5,235	0.161
Transportation infrastructure	17	67,140	0.215	47	153,251	0.360
Utilities	59	141,323	0.183	73	119,327	0.258
Other	25	110,701	0.291	52	67,705	0.380

Note: Data collected from Certificates of Condition, Massachusetts Corporations, Massachusetts State Archives, and from the manuscripts of the 1870 Federal Census. For details, see the Appendix.

Table 3:
Board Interlocks Between Corporations, Banks, and Insurance Companies
Massachusetts Nonfinancial Corporations, 1872
(*N*=573)

	Interlocks with banks				
	Bank director On board	Number of Banks Represented On board	Ownership Shares of Bank director On board	Insurance Corporation Director On board	Nonfinancial Corporation Director On board
	(1)	(2)	(3)	(4)	(5)
Manufacturing					
Brick and stone	0.400	0.850	0.087	0.300	0.550
Chemicals	0.500	0.900	0.084	0.300	0.500
Food and tobacco	0.350	0.450	0.062	0.250	0.450
Lumber products	0.532	0.723	0.137	0.255	0.468
Metal products	0.510	0.888	0.094	0.231	0.685
Mining and petroleum	0.476	0.810	0.073	0.286	0.571
Textiles	0.681	1.406	0.157	0.419	0.744
Other Manufacturing	0.571	0.964	0.116	0.286	0.643
Other Business Corporations					
Cooperatives	0.043	0.043	0.000	0.043	0.043
Transportation infrastructure	0.588	1.529	0.169	0.412	0.647
Utilities	0.695	1.085	0.093	0.458	0.695
Other	0.440	0.680	0.044	0.360	0.680
Total					
All business corporations	0.551	1.000	0.110	0.321	0.635
Corporations listed on BSE	0.805	1.732	0.028	0.780	0.878

Note: Data collected from Certificates of Condition, Massachusetts Corporations, Massachusetts State Archives, and from the *Massachusetts Register and Directory* (for bank director names). For details, see the Appendix.

Table 4:
Ownership Stakes, Directors of Boston National Banks
Who Also Held Directorships with Nonfinancial Corporations
(*N*=87)

	Bank	Nonfinancial Corporation	Difference
	(1)	(2)	(3)
Mean fraction of shares held	0.0069	0.0805	-0.0736***
	[0.0098]	[0.1020]	(0.011)
Mean par value of shares held	6,175	22,116	-15,941***
	[8,264]	[28,420]	(3,118)
Total par value of shares held	6,344	43,111	-36,767***
	[8,364]	[57,938]	(6,125)

Note: A total of 87 individuals held directorships with a Boston National Bank and at least one nonfinancial corporation. These individuals held directorships with an average of 1.83 nonfinancial companies; the number ranges from 1 to 8.The first row compares the fraction of the shares they held in their bank, to the average fraction they held in their nonfinancial corporation(s). The second row compares the par (Dollar) value of the shares, and the third row compares the total par value of their stakes in their banks and in their nonfinancial corporations. Standard deviations are presented in brackets, standard errors in parentheses. Ownership stakes in banks obtained from *A List of Stockholders in the National Banks of Boston, May 1 1866.*

Table 5:
Firm Characteristics:
Those With Bank Directors on their Boards vs. Those Without, 1872

	Mean [Stdev]	Differences: Firms With and Without A Bank Director on Board (SE)	Differences: Firms With and Without An Insurance Co Director on Board (SE)
	(1)	(2)	(2)
Total assets	307,741	249,163**	231,396**
	[551,072]	(70,406)	(46,459)
Leverage (debt/assets)	0.324	-0.047+	-0.060*
	[0.259]	(0.026)	(0.023)
Percent of assets in buildings, land	0.312	0.018	-0.030
	[0.281]	(0.038)	(0.025)
Years since incorporation	12.279	3.275*	2.247*
	[12.591]	(1.338)	(1.088)
Growth rate of assets, 1872	0.062	-0.027	0.002
	[0.265]	(0.018)	(0.026)

Note: Column (1) presents means and standard deviations for all sample corporations. Columns (2) and (3) present the average differences between firms with and without bank directors and insurance directors on their board, as estimated from regressions with industry fixed effects. That is, the within-industry differences are presented. Standard errors in partentheses; **, *, and + denotes significance at 1%, 5% and 10%, respectively.

Table 6:
Panel Regressions:
Firm Growth Rates, 1871-81

	Full sample			Inverse propensity score Weighted; sample limited To common support In propensity To have bank director on board	
	(1)	(2)	(3)	(4)	(5)
Bank director on board '72 × post-1873	0.047*	0.058**	0.061**	0.053*	0.050*
	(0.022)	(0.023)	(0.023)	(0.024)	(0.025)
Log(assets 1872) × post-1873		-0.024**	-0.034**	-0.036**	-0.037**
		(0.007)	(0.008)	(0.009)	(0.009)
Leverage 1872 × post-1873		-0.040	-0.056	-0.067	-0.069
		(0.045)	(0.046)	(0.052)	(0.053)
Firm age 1872 × post-1873		0.003**	0.003**	0.003**	0.003**
		(0.001)	(0.001)	(0.001)	(0.001)
Log(avg. director wealth) × post-1873					0.002
					(0.010)
Constant	-0.014	0.201*	0.111**	0.108**	0.109**
	(0.016)	(0.083)	(0.020)	(0.018)	(0.018)
Observations	4,151	4,024	4,020	3,941	3,876
R-squared	0.262	0.250	0.261	0.241	0.242
Firm FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Industry trends	NO	NO	YES	YES	YES
County trends	NO	NO	YES	YES	YES

Note: The regressions presented in the table use panel data on firms to estimate the difference in the change in growth rates in the fiscal years 1874-81, compared to 1871-73, between firms with and without bank directors on their boards in 1872. Columns (1)-(3) present regressions using the full sample of corporations; columns (4)-(5) present regressions in which the sample is restricted to corporations within the common support in the propensity to have a bank director on their boards, and the observations are weighted with the inverse propensity scores. Standard errors, adjusted for clustering by firm, in parentheses. **, *, and + denotes significance at 1%, 5% and 10%, respectively.

Table 7:
Panel Regressions:
Firm Growth Rates, 1871-81
(Falsification Tests)

	(1)	(2)	(3)
Insurance director on board '72 × post-1873	-0.001		-0.012
	(0.022)		(0.023)
Nonfinancial co director on board '72 × post-1873		0.001	-0.022
		(0.024)	(0.025)
Bank director on board '72 × post-1873			0.071**
			(0.025)
Log(assets 1872) × post-1873	-0.028**	-0.028**	-0.028**
	(0.008)	(0.008)	(0.008)
Leverage 1872 × post-1873	-0.066	-0.066	-0.066
	(0.047)	(0.047)	(0.047)
Firm age 1872 × post-1873	0.003**	0.003**	0.003**
	(0.001)	(0.001)	(0.001)
Constant	0.111**	0.111**	0.111**
	(0.019)	(0.019)	(0.019)
Observations	4,020	4,020	4,020
R-squared	0.258	0.258	0.261
Firm FE	YES	YES	YES
Year FE	YES	YES	YES
Industry trends	YES	YES	YES
County trends	YES	YES	YES

Note: The regressions presented in the table use panel data on firms to estimate the difference in the change in growth rates in the fiscal years 1874-81, compared to 1871-73, between firms with and without board interlocks with various other types of corporations in 1872. The regressions using the full sample of corporations. Standard errors, adjusted for clustering by firm, in parentheses. **, *, and + denotes significance at 1%, 5% and 10%, respectively.

Table 8:
Linear Probability Regressions:
Firm Failures, 1873-81

	Full sample			Inverse propensity score Weighted; sample limited to Common support In propensity To have bank director on board	
	(1)	(2)	(3)	(4)	(5)
Bank director on board 1872	-0.255**	-0.141**	-0.125**	-0.079+	-0.076+
	(0.040)	(0.043)	(0.045)	(0.042)	(0.043)
Log(assets 1872)		-0.063**	-0.077**	-0.079**	-0.081**
		(0.013)	(0.015)	(0.017)	(0.018)
Leverage 1872		0.418**	0.387**	0.392**	0.412**
		(0.076)	(0.080)	(0.093)	(0.093)
Firm age 1872		-0.004**	-0.004*	-0.005**	-0.005**
		(0.001)	(0.002)	(0.002)	(0.002)
Log(avg. director wealth)					0.002
					(0.019)
Constant	0.533**	1.096**	1.258**	1.139**	1.134**
	(0.031)	(0.141)	(0.273)	(0.293)	(0.312)
Observations	573	548	546	526	516
R-squared	0.067	0.186	0.228	0.192	0.199
Industry FE	NO	NO	YES	YES	YES
County FE	NO	NO	YES	YES	YES

Note: The regressions presented in the table use linear probability models to estimate the differences in failure rates (over 1874-81) between firms with and without bank directors on their boards in 1872. Columns (1)-(3) present regressions using the full sample of corporations; columns (4)-(5) present regressions in which the sample is restricted to corporations within the common support in the propensity to have a bank director on their boards, and the observations are weighted with the inverse propensity scores. Standard errors, adjusted for clustering by firm, in parentheses. **, *, and + denotes significance at 1%, 5% and 10%, respectively.