

Related Lending and Economic Performance: Evidence from Mexico

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Abstract: There is a consensus among academics and policy-makers that related lending, a widespread practice in most LDCs, should be discouraged because it provides a mechanism through which bankers can loot their own banks at the expense of minority shareholders and depositors. We argue that neither looting nor credit misallocation are *necessary outcomes* of related lending. On the contrary, related lending often exists as a response by bankers to high information and contract enforcement costs. Whether it encourages looting crucially depends on the other institutions that support the banking system, particularly those give depositors and outside shareholders incentives and mechanisms to monitor directors, and that give directors incentives to monitor one another. We operationalize this argument by examining an LDC banking system in which there was widespread related--Mexico from 1888 to 1913. We find little evidence, during this 25year period, of tunneling or credit misallocation—even in the midst of a major, externally caused financial crisis that occasioned a government-organized rescue. The banking system was, in fact, remarkably stable and manufacturing enterprises that received related loans performed at least as well as their competitors.

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There is a broad consensus that banks in developing countries engage in related lending. They commonly extend credit to firms owned by close business associates of the directors, members of the directors' own families or clans, or businesses owned by the banks themselves. It is also common for bank directors to have significant non-financial interests, and to use their banks as mechanisms to finance those interests.

There are two views about the effect of related lending on the functioning of the financial system. The first view holds that related lending has negative economic effects. Related lending is bad, according to this view, because it provides a mechanism for bankers to loot their own banks at the expense of outside shareholders, depositors, and (when there is deposit insurance) taxpayers. This view comes out of the literature on financial crises in LDCs.¹ The second view holds that related lending is good. It allows banks to overcome information asymmetries and is therefore, in Naomi Lamoreaux's words, an "engine of economic development." Allowing banks to own part of the enterprises they lend to also, according to Charles Calomiris, "provides a strong incentive for continuing diligence by the banker," and avoids potential conflicts of interest between the firm and its creditors. This view is supported by Khanna and Palepu's work on business groups in India and by the financial histories of developed nations in North America, Europe and Asia.² In fact, as Kroszner and Strahan have shown, related lending is still widespread in contemporary banking systems in the U.S., continental Europe, and Japan.³

¹ Johnson, Boone, Breach, and Friedman 2000; Laeven 2001; Bae, Kang, and Kim 2002; Habyarimana 2003; La Porta, López-de-Silanes, and Zamarripa 2003.

² Lamoreaux 1994; Calomiris 1995; Fohlin 1998; Khanna and Fisman 2004; Khanna and Palepu 2000a, 2000b.

³ Kroszner and Strahan 2001.

One might be tempted to reconcile these two views by arguing that related lending is only pernicious in LDCs. In any environment, when the expected returns on investment in a firm fall, insiders have strong incentives to expropriate cash and tangible assets from outside investors and use them for other more-profitable purposes.⁴ In developed countries, however, strong institutions, such as efficient and honest judicial systems, well defined property rights, and the rule of law, limit the ability of insiders to expropriate a firm's resources for their own ends. In LDCs, however, outsiders are not protected by the society's institutions—they can be expropriated with impunity.

The implication of this view is that related lending will have pernicious effects—such as banking instability, widespread tunneling, and the misallocation of capital—in less developed countries with weak formal institutions. These effects will be particularly pronounced during financial crises, when the incentives of insiders to expropriate outsiders are strongest.

We test this hypothesis by examining the performance of the Mexican banking system during the 35-year dictatorship of Porfirio Díaz (1876-1911). We focus on Mexico during this period because it ambiguously lacked the rule of law, it had a corrupt judiciary, property rights were weakly enforced, related lending was widespread, and the economy was hit with an external shock of large magnitude (in 1908) that produced a financial crisis and a government-organized rescue of the banking system.

One would expect that bankers in this economy should have looted their own banks or used them as mechanisms to transfer resources to firms under their control. At

⁴ Johnson, Boone, Breach, and Friedman 2000. Also Rajan and Zingales 1998; Johnson, La Porta, López-de-Silanes, and Shleifer 2000; La Porta, López-de-Silanes, Shleifer, and Vishny 1997, 1998; Mitton 2002.

the very least, they should have allocated credit inefficiently, over-investing in relatively inefficient firms that they controlled.

We find, however, that none of these outcomes obtained. We do find that Mexican banks primarily lent to enterprises owned by their own board members (or enterprises owned by the families of board members). They did so, however, because information was costly and contract rights were extremely difficult to enforce through the legal system.⁵ Related lending, in effect, provided an informal means to assess ex ante risk and enforce contracts ex post.

We also find that, even when the economy was hit a large external shock, Mexico's bankers did not use related loans as a mechanism to loot their own banks at the expense of outside shareholders, depositors, or noteholders. In fact, the loans they made to their own enterprises were no worse an allocation of credit than that which they could have obtained by making arm's length loans to comparable enterprises. These results are consistent with the theory and evidence presented by Friedman, Johnson, and Mitton regarding the Asian crisis of 1997-98.⁶ The implication is that there is no *necessary connection* between related lending and looting.

We do find that related lending gave rise to a more concentrated industrial structure in downstream industries. That outcome, however, was not a necessary consequence of related lending: it obtained because related lending in Mexico took place in the context of a banking industry with a concentrated market structure. That is,

⁵ For a discussion of the importance of the legal system for financial development and economic growth, see Levine 1998, 1999 and La Porta, Lopez-de-Silanes, Shleifer, and Vishny 1998. For more discussion of the advantages that accrue to creditors from long-term relationships in the credit market see Greebaum, Kanatas and Venezia 1989; Sharpe 1990; Rajan 1992; Petersen and Rajan 1994, 1995.

bankers allocated credit to entrepreneurs on the basis of relational ties, and the number of such ties was small, because there were few banks in any market.

Our findings have implications beyond related lending. In recent years, a large literature has emerged on the effects of institutions on economic growth.⁷ One of the findings of the literature is that there are numerous cases of dictatorial governments with unambiguously weak institutions to specify and enforce property rights that, nevertheless, experience prolonged periods of rapid growth.⁸ Our findings imply that economic actors may be able to compensate for weak legal institutions (at least for a time) by exploiting ties based on long standing social and business relationships.

The rest of this paper is organized as follows. Section II provides a discussion of the data sets we develop. Section III provides a discussion of how related lending came to be the dominant business strategy of Mexico's bankers. Section IV analyzes our data on the performance of the banking industry. Section V examines the impact of related lending on a downstream industry—cotton textiles. Section VI concludes.

II Sources and Methods

The analysis that we carry out on the causes and consequences of related lending in Mexico draw on three bodies of evidence that we have developed. The first body of evidence consists of bank financial reports. These reports were published in the Mexican financial press, and allow us to estimate bank rates of return, share prices, dividend payments, and capital-asset ratios.

⁶ Friedman, Johnson, and Mitton 2003.

⁷ North and Weingast 1989; Barro 1991, 1997; Engerman and Sokoloff 1997; Rajan and Zingales 1998; Przeworski et. al. 2000; Bates 2001; Acemoglu, Johnson, and Robinson 2001, 2002; Keefer forthcoming.

The second body of evidence focuses on bank lending strategies. For two of Mexico's largest banks, the Banco Nacional de México and the Banco Mercantil de Veracruz, we retrieved internal bank records that allowed us to estimate the extent of related lending over long time periods--1884-1911, and 1898-1906, respectively. These records were located in the Archivo Histórico Banamex and the Archivo de la Nación, both in Mexico City. For four other large banks, we were able to develop a data set for a cross-section of the loans they made in 1908. These records were also retrieved from the Archivo General de la Nación.⁹ The two banks for which we have collected time series information (Banamex and the Banco Mercantil de Veracruz) accounted on average for nearly half of total bank assets. When we add the four banks for which we have cross-sectional data, our sample of banks covers two-thirds of all bank assets.

The third body of evidence focuses on a downstream industry that received related loans from the banks—cotton textiles. We note that the cotton textile industry is an ideal natural laboratory with which to study the impact of related lending on the real economy. In the first place, cotton textiles were Mexico's largest manufacturing industry. In the second place, the industry was finance-dependent, but at the same time it approximated the requirements of perfect competition to an unusual degree. There were not barriers to entry produced by patents, proprietary technology, control of raw materials, advertising, branding, or control of wholesale or retail distribution. The capital equipment was easily divisible and scale economies were exhausted at small firm sizes,

⁸ Przeworski et. al., (2000): 177.

⁹ We retrieved records of these loans by examining interbank loan sales to the state-owned Caja de Préstamos para Obras de Irrigación. See the Sesiones Administrativas de la Caja de Préstamos, Box 1, located in Galería 2 of the Archivo General de la Nación in

compared to such industries as steel, cement, paper, and chemicals. The industry was also characterized by a high degree of entry and exit. Finally, Mexico's cotton textile industry was protected from foreign competition by a high level of tariff protection.

We study the effect of related lending on this industry by employing the Razo-Haber textile data set. We draw seven censuses from their data set: 1888, 1891, 1893, 1895, 1896, 1912, and 1913.¹⁰ These censuses are enumerated at the mill level and contain information on inputs and outputs, as well as information about location and ownership. We also draw state and national data on textile inputs and outputs from their data set for every year from 1891 to 1913. This state and national data allows us to make certain that the years for which we have mill-level censuses are not outliers. Table 1 presents data on the overall size and growth of this industry.

TABLE 1 ABOUT HERE

We then coded the data set in order to capture relationships between bankers and textile mill owners. Specifically, we code for bank board members who were also the sole proprietors of a textile mill, a partner in a firm that owned a textile mill, or who served on

Mexico City. Data for the total size of the loan portfolios of these banks were retrieved from their end-of-year balance sheets published in the *Economista Mexicano*.

¹⁰ This data set links mills and firms across manufacturing censuses and excise tax records over the period 1850-1932. For a discussion of the sources and methods used to build the panel, see Razo and Haber, 1998. The census records employed in this study can be found in García Cubas, 1893; Mexico, Dirección General de Estadística 1894; Mexico, Secretaría de Fomento, 1890; Mexico, Secretaría de Hacienda. 1896a; Mexico, Secretaría de Hacienda. 1896b; Archivo General de la Nación, Ramo de Trabajo, Box 5, file 4; Archivo General de la Nación, Ramo de Trabajo, Box 31, file 2. We have recoded their data set to more effectively follow firms during the 1888-1913 period. We have also recalculated the real value of output by substituting the Gómez-Galvarriato and Musacchio price index for the INEGI cotton textile price index employed by Razo and Haber. In addition, we have culled stamping and knitting mills from the data set, and checked the data set against original manuscripts to verify observations with inordinately high or low values.

the board of directors of a joint stock corporation that owned a textile mill. We denote such mills as being “bank-related.”¹¹

Table 2 presents aggregate data on the relationships between mill owners and bankers. In 1888, 21 percent of textile mills were owned by bank directors or their close relatives. By 1913, the proportion had grown to 54 percent. The percentage of installed capacity controlled by related mills increased from 33 percent in 1888 to 80 percent in 1913.¹²

TABLE 2 ABOUT HERE

¹¹ We note that our definition of bank-connection is restrictive. Entrepreneurs who were connected to a bank in some way other than overlap between their membership on a bank board and ownership of a textile firm (for example, overlapping board memberships in a third, unobserved firm in a different industry, or marriage to a relative of a member of a bank board) are coded as “non-related” firms. We note that the assumption that overlap between mill ownership and a bank directorship is a good proxy for bank credit is consistent with three fundamental facts about Mexican banking. First, we know from case studies by historians that some banks were founded by textile entrepreneurs for the purpose of financing their existing manufacturing ventures. (Gamboa Ojeda 1985; Gamboa Ojeda and Estrada 1986; Rodríguez López 1995.). Second, in the case of Banamex (Mexico’s largest bank), some of its board members were textile industrialists and the bank itself was a major stockholder in one of the country’s largest textile companies. We know from the minutes of the bank’s board meetings that it lent heavily to these enterprises. (Maurer 2002: 98.). Third, evidence from other large banks (reviewed below) makes it clear that they lent primarily to their own board members, members of their families, and their business associates. We also know that the directors of many of these banks also owned textile mills. The list of banks related to textile entrepreneurs or joint stock textile companies consists of Banamex, the Banco de Londres y Mexico, the Banco Oriental, the Banco de Nuevo León, the Banco de Durango, the Banco de Coahuila, the Banco Mercantil de Veracruz, the Banco de Guanajuato, the Banco de Estado de México, and the Banco de Zacatecas.

III Related Lending and the Mexican Banking System

Circa 1880 the Mexican banking system was so small as to be practically non-existent.¹³ Over the next three decades, spurred on by legislation enacted by the country's dictatorial ruler (Porfirio Díaz, who ruled from 1876 to 1911), Mexico's banking system expanded. By 1896, Mexico had six chartered banks with total assets of 50 million dollars. By 1911, there were 42 banks, controlling assets of 385 million dollars. (See Table 3). The ratio of commercial bank assets to GDP was 27 percent, roughly the same as its ratio in 2004 (33 percent).

TABLE 3 ABOUT HERE

Mexico's banking system had three salient features. First, the federal government tightly regulated the number of banks that competed in any market by controlling the number and types of charters granted. Second, the institutions that governed banking produced strong incentives for bank directors to monitor one another: there was no deposit insurance; banks were extremely well capitalized; significant amounts of this capital were owned by banks' own directors; and minority shareholders had mechanisms to monitor bank directors. Third, the vast majority of lending was related lending.

¹² Following Kane 1988, we measure installed capacity by spindles, which constitute the most important capital input for the production of cotton textile goods.

¹³ Until the growth of the chartered banking system in the decades after 1884, most financial intermediation took place in merchant houses, which issued bills of exchange and advanced credits to entrepreneurs in their social networks. These institutions did not, however, have any of the advantages of banks: they did not sell equity to outside investors, they did not have limited liability, they did not take deposits, and their bills of exchange had to be 100 percent backed by specie reserves. In short, they were different from modern banks in a fundamental sense: they made money by speculating with the funds of their proprietor, rather than with funds that belonged to people other than the proprietor. For an examination of how such a merchant house operated, see Walker 1987.

Mexico's banking regulations created binding constraints on entry and competition. Only the federal government could grant a bank charter. It allowed only two banks, the Banco de Londres y México (BLM) and the Banco Nacional de México (Banamex), to branch nationally. All other banks were prohibited from branching outside their concession territories, which were generally contiguous with state lines. With very few exceptions, charters were granted to only one bank in any territory, meaning that there were typically only three banks operating in any state: Banamex, the BLM, and the bank that had a federal charter for that state. Special tax concessions and high minimum capital requirements safeguarded these charters. Finally, non-chartered banks were prohibited from issuing notes, meaning that they could not effectively compete against chartered banks.¹⁴

Bank directors had strong incentives to protect their reputations and monitor one another. There was neither deposit insurance nor guarantees that banks would redeem their notes for specie on demand. As Pratap, Huybens, and Luce have shown, depositors policed bank behavior by withdrawing funds from banks that pursued risky strategies.¹⁵ In addition, Mexico's banks typically had capital-adequacy ratios of 30-35 percent. In part, these capital ratios were driven by the legal requirement that note issues not exceed two (sometimes three) times a bank's cash on hand, or three times its paid-in capital.¹⁶ In equal part, however, these capital ratios were driven by risk aversion on the parts of both bankers and their creditors (depositors and noteholders). Banks usually did not, in fact, issue notes up to their legal maximum.

¹⁴ Maurer 2002, chap. 2; Haber, Razo, and Maurer, 2003, chap. 4.

¹⁵ Pratap, Huybens, and Luce 2004.

¹⁶ Maurer 2002: 43, 111.

Bank directors owned substantial stakes in their banks. As of the 1884 Commercial Code, receiving a bank charter required the founding group (who became the directors) to subscribe to the first tranche of the bank's capital. Banks could later sell additional tranches of capital to outsiders. In addition, bank directors could (and often did) sell parts of their original stakes. These outside shareholders (who owned a majority of bank stock) then insisted on the appointment of independent directors (typically other bankers) who monitored the founding board members. This meant that directors had strong incentives to monitor each other (because their own capital and reputations were at risk) and that shareholders possessed a mechanism to monitor directors.¹⁷ In fact, we have direct historical evidence that this mechanism was employed by outside shareholders. In March 1908, the outside shareholders of the Banco de Jalisco, displeased with the discovery of "severe irregularities" in the bank's books, replaced the entire board of directors save Vice-president Eugenio Cuzin.¹⁸

Mexico's bankers started out by making arm's length loans, but quickly shifted to related lending as the dominant lending strategy. Banamex, the largest bank in the country, received one of the first federal charters (in 1884). It began by making arm's length loans. The problem was that it did lack good mechanisms to assess the quality of borrowers or the collateral they offered. It therefore responded by placing onerous requirements on borrowers, but these only worked to create adverse selection. The history of one of its largest manufacturing loans is perhaps instructive in this regard. In 1884, it opened a 200,000 peso credit line (roughly \$200,000) to the Hercules textile

¹⁷ Ludlow 1985: 299-346; Gamboa Ojeda 2003: 106, 111, 116, 129, 132; Ludlow 2003: 147-149, 152; Cerutti 2003: 196, 211-213; Romero y Barra 2003: 229; Rodriguez Lopez 2003: 271-72; Maurer 2002, pp. 74-80, 94-95, 111-113.

factory for the purpose of purchasing new plant and equipment. Banamex charged an interest rate of 8 percent and required that the loan be collateralized with 250,000 pesos worth of the factory's inventory, with the warehousing costs to be borne by the factory. Given that the factory had to finance the cost of the inventory, this implied an effective interest rate of 18 percent. Terms like these, of course, tend to attract low quality borrowers—and this case was not an exception to that general rule. The Hercules mill was unable to make its payments. Eventually, Banamex sold a portion of the loan to a New York trading house (for only 65 percent of its face value) and recouped the rest by converting the loan into an equity interest in the mill.

This loan, as well as a series of others in which the collateral turned out to be fictitious or unrecoverable, caused Banamex's directors to shift strategy: after 1886 it lent primarily to its own directors, members of their families, or their close business associates. In fact, from 1886 to 1901 *all* of the private (non-government) loans made by Banamex went to its own directors. After 1901 Banamex extended credit to non-related borrowers, but only if they satisfied one of two criteria: the borrower had a loan guarantee from the federal government (as was the case with some railroad companies); or the borrower was either the Banco Oriental or one of that bank's directors. The reason given by Banamex board members for the latter exemption is instructive: most of the loans made by the Banco Oriental went to its own directors, all well-known textile magnates. Loans to them, and to their bank, were a means of investing in their

¹⁸ *Boletín Financiero y Minero*, 3/20/08.

manufacturing enterprises. Thus Banco Oriental loans were deemed low risk precisely because the bank practiced related lending.¹⁹

Related lending, in fact, appears to have been standard business practice for Mexico's banks. Data we have retrieved on the loan portfolio of the Banco Mercantil de Veracruz indicates that 86 percent of its loans to individuals from 1898 to 1906 went to the bank's own directors.²⁰ Banamex's largest competitor, the BLM (which controlled, on average, 17 percent of total bank assets), also made sizable loans to its own board members to finance manufacturing start-ups.²¹ A cross-section of loans we have drawn for 1908 for four other banks indicate similar lending strategies. 29 percent of the Banco de Nuevo León's loans went to a single firm, owned by one of its directors. 31 percent of the Banco Mercantil de Monterrey's loans also went to a single firm owned by one of its directors. 51 percent of the Banco de Durango's loans went to enterprises owned by the family members of one of its directors. An astounding 72 percent of the Banco de Coahuila's loans went to a single firm owned by family members of a director.²²

¹⁹ Maurer 2002: 95-103, 108-110; Maurer and Sharma 2001: 953-956. The case of the Banco Oriental, and its relationship to the Puebla textile industry, is detailed in Gamboa Ojeda 1985 and Gamboa Ojeda and Estrada 1986.

²⁰ The data for this estimate come from a random sample of 50 entries in the *Libro de Responsibilidades* of the Banco Mercantil de Veracruz, located in Galería 2 of the Archivo General de la Nación in Mexico City.

²¹ Maurer 2002: 103.

²² We retrieved records of these loans by examining interbank loan sales to the state-owned Caja de Préstamos para Obras de Irrigación. See the Sesiones Administrativas de la Caja de Préstamos, Box 1, located in Galería 2 of the Archivo General de la Nación in Mexico City. Data for the total size of the loan portfolios of these banks were retrieved from their end-of-year balance sheets published in the *Economista Mexicano*.

Qualitative evidence from case studies by historians, on the Banco de la Laguna, the Banco Occidental, and the Banco de Durango concur with our quantitative analysis.²³

The mechanism by which downstream firms established a relational tie to a bank is consistent with the view that related lending was a response to the inability of bankers to enforce arms-length contracts. Mexico's bankers did not choose to lend to a particular textile company, and then demand a seat on that company's board of directors. Rather, a textile mill owner would obtain a bank charter, sell shares in the bank to outside investors, issue bank notes, and then lend those notes to textile mills that he already owned (or, in some cases, found an entirely new mill). Of the 34 textile mills that switched from being non-related to being bank-related between 1888 and 1912, 33 were owned by textile entrepreneurs who later became bankers. In short, bankers did not look at their banks as independent credit intermediaries in the textbook sense of the term. Instead, they looked at them as the investment arms of their widespread commercial and industrial interests.

IV Related Lending and the Performance of the Banking System

Did Mexican bankers use related loans to loot their own banks? One would imagine that they had strong incentives to do so. Mexico was hit by an external shock in 1908 that drove down the prices of its major export commodities by between 14 and 56 percent (depending on the product). The decline in prices caused mineral and agricultural producers to drastically curtail production by between 20 and 64 percent (depending on the product), which in turn caused the demand for manufactured goods to fall by 9 to 20

²³ Aguilar Aguilar, 2003: 74; Rodriguez López 2003; 272, 278-79; Cerutti 2003; 169-70, 196, 204.

percent (depending on the product). The decline in Mexico's export and manufacturing sectors soon threatened the banking system. Deposits fell, interest rates on commercial paper rose from 8 percent to 10 percent, and net new lending dropped to zero. Indeed, total bank assets declined by 17 percent from 1908 to 1909.²⁴

In response to the crisis, the government quickly organized a rescue. In September 1908 the federal government chartered the *Caja de Préstamos para Obras de Irrigación y Fomento de la Agricultura*. The Caja was financed by requiring Mexico's four largest banks to purchase 10 million pesos of its shares, 25 percent of which they were not permitted to sell. The Caja then issued 44.5 million pesos of government-guaranteed bonds in Europe, with an effective coupon rate of 5.1 percent. (The nominal yield on Mexican government bonds in 1908 was 4.3 percent.)²⁵ The Caja used the funds from the bond and equity sales to purchase bank loans and bank-issued mortgage bonds in order to inject liquidity into the banking system.²⁶

Did Directors Loot?

The most obvious sign of bankers extracting resources from their own banks would be an unstable and unprofitable banking system. There are three testable implications of tunneling. First, tunneling produced bank failures that caused losses for depositors and noteholders. Second, directors diverted profits from their shareholders. Third, shareholders perceived holding bank stock was risky and discounted their value accordingly.

²⁴ Bank balances and the interest rate on commercial paper from *Economista Mexicano*. Bond price data from Escalona Salazar.

²⁵ *Mexican Herald*, 9/3/1908 and 9/4/1908.

The evidence does not indicate that any of these outcomes obtained. Mexico had, in fact, a remarkably stable banking system. As shown in Table 3, the number of reporting banks and total bank assets increased steadily throughout the period under study. The only downturn in the real value bank assets occurred in 1909, as a result of the crisis of 1908. The results of that episode, however, were short lived: by 1911 total bank assets exceeded their 1908 levels by 14 percent and their 1907 levels by 28 percent.

One might argue that although the banking system was stable, the directors were still able to extract resources from outside shareholders. That hypothesis, however, is not consistent with the fact that Mexican banks were extremely profitable enterprises for their shareholders. The real return on the book value of equity in 1901-12 for the entire banking system was 12 percent. These returns were not driven by the profits earned by a few large banks: the unweighted average real return-on-equity for all banks was 10 percent per year. Moreover, the evidence does not indicate that the 1908 financial crisis had a long term impact. The rate of return on equity fell in 1908, but it returned to pre-1908 levels in 1909.

INSERT TABLE 4 AROUND HERE

Mexican banks returned these high profits to shareholders by paying out high and regular dividends. In fact, over the 1901-10 decade, the banks paid out almost all of their profits to shareholders in the form of dividends.²⁷ Steady dividends translated into high returns from the ownership of banking stock. As Table 4 shows, someone who purchased

²⁶ Maurer 2002: 66-68.

²⁷ In fact, banks paid dividends worth 106 percent of their profits over the 1901-10 period. We estimated this figure from balance sheets published in the *Economista Mexicano*. Profits were calculated as changes in real net worth (adjusted for issues of new

an index of banking stock weighted by market capitalization would have earned an average *real* return of 9 percent per year. Our estimate of market returns is not driven by the high returns available from owning the stock of the largest banks: an investment strategy based on purchasing equally-sized stakes in all the banks would have yielded a slightly higher average annual real return of 10 percent. Moreover, the crisis of 1908 does not appear to have had a major impact on the returns to owning an index of banking stock. Investors would still have earned a positive rate of return in 1908. By 1910, their returns would have been back at the average levels for the entire decade. (They would have incurred real losses in 1911 and 1912, but that was because stock prices fell as a result of the overthrow of Díaz in 1911).

The returns available to investors in Mexican banking stock were, in fact, more than twice those available from investing in the Dow Jones Industrials. (See Table 4). They were also no lower, on average, than those available from investing in a portfolio of Mexican manufacturing, mining, or land development, firms.²⁸

It is possible that the high returns investors earned in the banking sector were simply compensation for the risk of tunneling by directors. If this were the case, then we would expect the value of banking stock to be highly discounted. In order to test the hypothesis that investors discounted bank stock, we estimated two measures: the banks' market-to-book ratios and the average yield on banking stock. Neither measure is consistent with the hypotheses that banking stocks were heavily discounted.

stock) plus dividends in 1900 pesos. Real net worth was calculated by revaluing assets and liabilities in 1900 pesos and subtracting the value of new stock issues, if any.

²⁸ Musacchio 2005.

Table 5 shows the average (weighted and unweighted) market value-to-book value ratio for Mexican banks in 1900-11. Bank stock traded at an average premium of 33 percent over its book value.²⁹ Moreover, the crisis of 1908 does not appear to have had a major effect on how investors valued their assets.

INSERT TABLE 5 AROUND HERE

The data on banking yields is also inconsistent with the hypothesis that investors heavily discounted banking stock. Between 1901 and 1912 the difference between the yield on Mexican banking stock and Mexican government bonds dropped from 4.4 percentage points to 3.0 percentage points. The risks associated with owning banking stock appears to have declined over time. Moreover, the 1908 financial crisis does not appear to have had a major effect on this overall trend.

INSERT TABLE 6 AROUND HERE

The evidence, in sum, does not indicate that Mexican bankers tunneled either before or after the crisis of 1908. In fact, there is evidence that during the crisis, bankers propped up banks with whom they shared interlocking directorates. For example, the Banco de Jalisco rescued the Banco de Aguascalientes, while the Banco Oriental purchased and merged with the troubled Banco de Oaxaca and the Banco de Chiapas. Banamex assumed responsibility for the note issues of the Banco de Michoacán and

²⁹ Only the Banco de Michoacán in the years 1909 and 1910 was valued at less than its book value. The Banco de Michoacán was hard-hit by the financial panic in 1909. Banamex agreed to accept responsibility for redeeming the Banco de Michoacán's banknotes if the Banco de Michoacán would agree to abandon its right to issue further notes in the future. There were no losses to depositors or noteholders. Maurer 2002: 80.

Banco de Campeche when they faced runs and could no longer support their note issues. Banamex also aided two troubled banks on the Yucatán peninsula in merging.³⁰

Did the banks succeed in weathering the crisis through the expedient of passing off their bad related loans to the Caja de Préstamos? That is, did Mexican bankers treat the Caja de Préstamos the same way they treated the Fobaproa bailout of the 1990s—transferring related loans with a low probability of repayment to the government? The evidence indicates that in 1908 the banks did transfer related loans to the Caja de Préstamos, but that these were chosen by the government precisely because they were high quality loans. In point of fact, the Caja de Préstamos may be the only banking bailout in world history to have made money. The assets held by the Caja (loans and mortgage bonds transferred from banks) consistently generated a positive cash flow, allowing the Caja to not only pay the interest due on its bonds, but to pay a 10 percent annual dividend on its outstanding share issues. We calculate that the Caja generated a nominal return to all claimants of its assets (bondholders and shareholders) of 4 percent in 1909, 7 percent in 1910, and 8 percent in 1911 and 1912.³¹

V Did Related Lending Misallocate Capital?

One might argue that even if bankers did not tunnel enough to jeopardize the health of the banking system, they may have nonetheless diverted resources to their own, relatively inefficient, enterprises.

³⁰ Maurer 2002: 58, 68; Luce 2003: 132-33.

³¹ Calculated from the balance sheets of the Caja de Préstamos, published in *Economista Mexicano*.

In order to test this hypothesis we turn to our panel of textile mills. If bankers were using their textile mills to channel resources from the banks to themselves, then we would not expect bank related mills to grow. Textile mills would simply be mechanisms to extract the wealth of the bank.

When we look at the growth in the size of mills, however, we find precisely the opposite: not only did bank-related mills grow, they grew faster than their non-related competitors. In Table 7 we calculate the growth rates of mills that existed across various census periods. In each inter-census period, we find that mills that were bank-related outgrew mills that were not bank-related.

INSERT TABLE 7 AROUND HERE

Technical Efficiency:

A somewhat weaker argument about tunneling would suggest that bankers may have used their banks to support their own, relatively inefficient firms. In this view, bank-related mills may have been productive enterprises (rather than zombie firms whose purpose was to extract bank resources), but would be less productive than their competitors. If this hypothesis holds, it implies that related lending misallocated capital.

As a first step in testing this hypothesis, we estimate a series of probit regressions, where the dependent variable is whether a mill was bank-related, and the independent variables are the characteristics of mills. If credit was misallocated, then we should be able to predict which firms were bank-related based on their performance characteristics. We measure these characteristics as profitability and technical efficiency.

We begin our analysis with the 1893 manufacturing census, because it provides extremely detailed data on the costs and volumes of all inputs and outputs. We employ

two measures of mill performance: operating margins, and labor productivity. We add controls for mill size and age.

Regardless of the specification, our qualitative results are the same: there were no statistically significant differences between bank-related and non-related mills. (See Table 8.) We estimate similar probits—whose results are not reported here—for 1888, 1891, 1895, 1896, 1912, and 1913. The only difference is that these probits do not include a variable for operating margins because of data constraints. Not a single one of these probits, regardless of the specification employed, found any relationship between technical efficiency and bank relation. The probits imply, in short, that there was a dead-heat between bank-related and non-related mills in terms of their technical efficiency.³²

INSERT TABLE 8 AROUND HERE

One might conceivably argue that the probit results on individual cross sections are too blunt an instrument to pick up small, but consistent, differences in productivity across censuses and mill types. We therefore estimate a time series, cross-sectional regression on labor productivity, and report the results in Table 9.³³ We control for mill age, location, bank-relation, and whether it was publicly traded.³⁴ Our results do not

³² These probit results are available from the authors.

³³ We measure output as the real value of production. Following Attack and Sokoloff on productivity in the United States, and Bernard and Jones on international productivity comparisons, we took the number of workers as the measure of the labor input. We adjusted, however, for changes in the legal length of the workday. Attack, 1985; Bernard and Jones, 1996; Sokoloff, 1984.

³⁴ We do not report the results on mill age, location, and traded status because none of the coefficients were large or significant, and because the addition of these variables had no material impact on our cross-sectional dummies or the interaction of the cross-sectional dummies with the dummy for bank-relation.

support the hypothesis that bank-related mills had lower labor productivity than their non-related competitors. None of the coefficients on bank-relation are significant.³⁵

INSERT TABLE 9 AROUND HERE

A skeptical reader might argue that our productivity measures treat each observation (a mill-year) equally. The regressions do not weight the results by firm sizes. Thus, it might be the case that small, particularly efficient, related mills drive the regression results. We therefore break the sample of mills into two sectors, non-related and bank-related, and calculate the labor productivity of each sector in the aggregate for individual census years. The results, reported in Table 10, indicate that for the entire period under study, there were no significant differences in productivity between the bank-related mills, taken as a whole, and their non-related competitors.

INSERT TABLE 10 AROUND HERE

Economic Efficiency:

An even more skeptical reader might argue that differences in technical efficiency are too restrictive a criterion. What matters is economic efficiency. Efficient mills thrive and grow. Inefficient mills go out of business. Were bank-related mills less economically efficient than non-related mills?

In order to test this hypothesis, we employ a Cox maximum-likelihood proportional hazards model to estimate the effect of bank-relation on the probability of mill failure. Mills are defined as "failed" when they disappeared from the subsequent

³⁵ We also estimated an OLS regression on labor productivity in which we controlled for mill size and capital intensity. That regression produced similar results. We therefore do not report them here.

census, never to reappear. All coefficients (and standard errors) are transformed into hazard rates.

Our findings, presented in Table 11, are not consistent with the hypothesis that bank related mills were less economically efficient. In fact, we find exactly the opposite: bank-related mills were only 23 percent as likely to fail as their non-related competitors. This result is robust to the addition of conditioning variables for mill size, labor productivity, and age.

INSERT TABLE 11 AROUND HERE

The Cox hazard model also suggests that being big was endogenous to being bank related. Bank related firms lived longer, and therefore grew larger. This is consistent with our finding that bank related mills grew much faster than their competitors, reported in Table 7.

Related Lending and Market Structure:

If bank-related firms grew at a much faster rate than their non-related competitors, then it logically follows that there should have been big size differences between bank related and non-related mills. Table 12 is unambiguous on this point: in 1888, bank related mills were, on average, almost twice the size of unrelated mills; by 1913, they were nearly four times as large.

INSERT TABLE 12 AROUND HERE

If bank-related mills were larger than non-related mills, then it logically follows that the market structure of the textile industry became more concentrated as the

proportion of bank-related mills grew. In order to measure concentration we aggregate mills into firms, and estimate four-firm concentration ratios and the Herfindahl index.

In order to determine how low concentration would have been in the absence of related lending, we specify three counterfactuals. The first compares Mexico to itself over time. Cotton textile manufacturing was an industry characterized by constant returns to scale technologies and the absence of entry barriers. We should expect that, in the absence of related lending, as the industry grew, concentration should have fallen. The second compares Mexico to other countries that had large textile industries, but which did not have Mexico's banking system. We focus on three countries: the United States, Brazil, and India.³⁶ The third, following Sutton, compares the Mexican textile industry's actual market structure to a hypothetical, fully competitive industry, in which the market structure was a function solely of industry size and a stochastic growth process.³⁷

The results of all three experiments, reported in Table 13, indicate that the Mexican cotton textile industry was "too concentrated." First, concentration in Mexico actually increased over time, even though the industry was growing quickly. (In the United States, Brazil, and India, concentration fell or remained stable as the textile industry grew.) Second, the Mexican cotton textile industry was much more concentrated than the U.S., Brazilian, or Indian cotton textile industry. Third, the Mexican cotton

³⁶ Haber 1991, 1997, 2003.

³⁷ The method assumes that all firms in a market have an identical chance of gaining or losing market share over time. Even under perfect competition, therefore, firms will have unequal market shares in equilibrium, but the market share of the largest firms will solely be a function of the number of firms in the industry and a stochastic growth process. See Sutton 1998.

textile industry showed much higher four-firm ratios compared to the ratio that would be expected in a perfectly competitive market, given the number of firms in the industry.

INSERT TABLE 13 AROUND HERE

We note that even though Mexico's textile industry was concentrated by world standards, our results do not suggest that the industry departed very far from perfect competition. The four-firm ratio never exceeded 38 percent, and the number of firms hovered around 110. It is hard to believe that this level of concentration was sufficient to allow even the largest firms to exercise market power. This interpretation is consistent with the historical evidence about firm behavior during this period.³⁸

VI Conclusions and Implications:

In recent years, policy-makers and academics have become interested in the nexus between finance and growth. Researchers in this field have noted that poor countries tend to have small banking systems. Some have also noted that banks in poor countries engage in related lending. The consensus view that has emerged from the related lending literature is that causality runs from related lending to a small and inefficient banking system, and from a small banking system to slow growth. The posited mechanism behind the relationship between related lending and a small banking system is that bankers loot their own banks or systematically misallocate capital.

We argue, based on a study of a banking system characterized by widespread related lending, there is no *necessary connection* between related lending and looting. We also find that there is *necessary connection* between related lending and a misallocation of capital. Our analysis of the performance of a downstream industry

indicates that Mexican bankers did not choose to lend to firms that were systematically less productive than their competitors.

Our analysis has two implications. First, the fact that related lending is an endogenous outcome of the ability of bankers to assess risks and enforce contracts means that a ban on related lending may actually produce little (or no) lending at all. The canonical case of this phenomenon also comes from Mexico, where regulators have been quite effective in curtailing related lending since a series of accounting and regulatory reforms in 1997. The response of Mexico's banks has been to drastically curtail private lending, shifting their assets into corporate and government securities, as well as loans to states and municipalities.³⁹

One might argue that this effect can be mitigated if governments invest in institutions that enhance property rights, thereby encouraging more arm's length lending. We would argue, however, that for both fiscal and political reasons, enhancing property rights, especially in the short run, is much easier said than done. Enhancing property rights comes at a fiscal cost because it requires costly investments in organizations such as property registers, professionalized police forces, and judiciaries that are not subject to bribery and threat. Enhancing property rights also requires political reform because public officials must be blocked from behaving opportunistically when it comes to adjudicating and enforcing private contracts. Removing their discretion requires that they (and the government) be bounded by formal political institutions that create ex ante veto points and ex post sanctions. Thus, to argue that governments can enhance property rights enforcement at the stroke of a pen is to engage in a nirvana thesis.

³⁸ See Haber 1989: 94-95, and Gómez-Galvarriato 1999.

The second implication of our analysis is that if bankers have their own capital and reputations at risk, they will make related loans based on the performance criteria of the receiving firms. The case we have analyzed indicates that three conditions appear to be crucial. The first condition is that banks enjoy high capital-asset ratios. In the case under study, the capital asset ratios were four times the levels recommended by Basel. The second condition is that bank directors own substantial equity shares in their own banks. This gives bank directors incentives to monitor one another. The third condition is that depositors and outside shareholders have their own money at risk. This gives depositors and outside shareholders incentives to monitor the directors.

We note that the results we obtained for the Mexican case are consistent with those of other cases—particularly contemporary India.⁴⁰ They are also consistent with the results obtained in historical case studies of the nineteenth century United States and Continental Europe.⁴¹ We would submit, therefore, that far more research is needed into the causes and consequences of related lending before academics and public officials embrace any particular set of policy recommendations.

³⁹ Haber and Musacchio 2004.

⁴⁰ Khanna and Fisman 2004; Khanna and Palepu 2000a, 2000b.

⁴¹ Calomiris 1995; Lamoreaux 1994.

Reference List

- Acemoglu, Daron, Simon Johnson, and James Robinson. 2001. "The Colonial Origins of Comparative Development: An Empirical Investigation." *American Economic Review* 91: 1369-1401.
- Acemoglu, Daron, Simon Johnson, and James Robinson. 2002. "Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution," *Quarterly Journal of Economics* 118.
- Aguilar Aguilar, Gustavo. 2003. "El sistema bancario en Sinaloa (1889-1926): Su influencia en el crecimiento economico." In Mario Cerutti and Carlos Marichal eds., *La banca regional en Mexico, 1879-1930*. Mexico: Fondo de Cultura Económica, pp. 47-100.
- Atack, Jeremy. 1985. *Estimation of Economies of Scale in Nineteenth Century United States Manufacturing*. New York: Garland Press.
- Bae, Kee-Hong, Jun-Koo Kang, and Jin-Mo Kim. 2002. "Tunneling or Value Added: Evidence from Mergers by Korean Business Groups." *Journal of Finance* 57(6): 2695-2740.
- Barro, Robert. 1991. "Economic Growth in a Cross Section of Countries." *Quarterly Journal of Economics*, 106(2): 407-443.
- Barro, Robert. 1997. *Determinants of Economic Growth: A Cross-Country Empirical Study*. Cambridge, MA: MIT Press.
- Bates, Robert H. 2001. *Prosperity and Violence: The Political Economy of Development*. New York: W.W. Norton.
- Bernard, Andrew, and Charles Jones. 1996. "Productivity across Industries and Countries: Time Series Theory and Evidence." *Review of Economics and Statistics*, 78(1): 135-146.
- Calomiris, Charles. 1995. "The Costs of Rejecting Universal Banking: American Finance in the German Mirror, 1870-1914." In Naomi Lamoreaux and Daniel Raff, eds., *Coordination and Information: Historical Perspectives on the Organization of Enterprise*. Chicago: University of Chicago Press: 257-322.
- Cerutti, Mario. 2003. "Empresariado y banca en el norte de Mexico, 1879-1910: La fundacion del Banco Refaccionario de la Laguna." In Mario Cerutti and Carlos Marichal, eds., *La banca regional en Mexico, 1870-1930*. Mexico: Fondo de Cultura Económica: 168-215.
- Escalona Salazar, Ana Maria. 1998. "La entrada de México al patrón oro y el acceso a los capitales extranjeros." B.A. thesis, ITAM, México, D.F.
- Fohlin, Caroline M. 1998. "Relationship Banking, Liquidity, and Investment in the German Industrialization." *Journal of Finance* 53: 1737-1758.
- Friedman, Eric, Simon Johnson, and Todd Mitton. 2003. "Propping and Tunneling," *Journal of Comparative Economics* 31(4): 732-50.
- Gamboa Ojeda, Leticia. 1985. *Los empresarios de ayer: El grupo dominante en la industria textil de Puebla, 1906-1929*. Puebla: Universidad Autonoma de Puebla.
- Gamboa Ojeda, Leticia. 2003. "El Banco Oriental de Mexico y la formacion de un sistema de banca, 1900-1911." In Mario Cerutti and Carlos Marichal eds., *La banca regional en Mexico, 1870-1930*. Mexico: Fondo de Cultura Económica, pp. 101-133.

- Gamboa Ojeda, Leticia, and Rosalina Estrada. 1986. *Empresas and empresarios textiles de Puebla: Analisis de dos casos*. Puebla: Universidad Autonoma de Puebla.
- García Cubas, Antonio. 1893. *Mexico: Its Industry, Trade, and Resources*. Mexico: Departamento de Fomento.
- Gómez Galvarriato, Aurora. 1999. "The Impact of Revolution: Business and Labor in the Mexican Textile Industry, Orizaba, Veracruz, 1900-1930." Ph.D. Dissertation, Harvard University, Cambridge, MA.
- Gómez Galvarriato, Aurora and Aldo Musacchio. 1998. "Un nuevo índice de precios para México, 1886-1930." Working Paper 113, CIDE, Mexico City.
- Greenbaum, Stuart, George Kanatas and Itzhak Venezia. 1989. "Equilibrium Loan Pricing Under the Bank-Client Relationship," *Journal of Banking and Finance*, 13: 221-35.
- Haber, Stephen. 1989. *Industry and Underdevelopment: The Industrialization of Mexico, 1890-1940*. Palo Alto: Stanford University Press.
- Haber, Stephen. 1991. "Industrial Concentration and the Capital Markets: Mexico, Brazil, and the United States, 1840-1930." *Journal of Economic History* 51(3).
- Haber, Stephen. 1997. "Financial Markets and Industrial Development: A Comparative Study of Governmental Regulation, Financial Innovation, and Industrial Structure in Brazil and Mexico, 1840-1930." In Stephen Haber (ed.), *How Latin America Fell Behind: Essays on the Economic Histories of Brazil and Mexico, 1800-1930*. Palo Alto: Stanford University Press, pp. 146-178.
- Haber, Stephen. 1998. "The Efficiency Consequences of Institutional Change: Financial Market Regulation and Industrial Productivity Growth in Brazil, 1866-1934." In John H. Coatsworth and Alan M. Taylor eds., *Latin America and the World Economy Since 1800*. Cambridge, Massachusetts: Harvard University Press, pp. 275-322.
- Haber, Stephen. 2003. "Banks, Financial Markets, and Industrial Development: Lessons from the Economic Histories of Brazil and Mexico." In José Antonio González, Vittorio Corbo, Anne O. Krueger, and Aaron Tornell (eds.), *Latin American Macroeconomic Reforms: The Second Stage*. Chicago: University of Chicago Press, pp. 257-292.
- Haber, Stephen. 2004. "Mexico's Experiments with Bank Privatization and Liberalization, 1991-2003." Mimeo. Stanford University.
- Haber, Stephen, and Aldo Musacchio. 2004. "Foreign Bank Entry and the Mexican Economy." Mimeo. Stanford University.
- Haber, Stephen, Armando Razo, and Noel Maurer. 2003. *The Politics of Property Rights: Political Instability, Credible Commitments, and Economic Growth in Mexico, 1876-1929*. New York: Cambridge University Press.
- Habyarimana, James. 2003. "The Benefits of Relationships: Evidence From Uganda's Banking Crisis." Mimeo, Harvard University.
- Huybens, Elizabeth, Astrid Luce, and Sangeeta Pratap. 2003. "Financial Market Discipline in Early 20th Century Mexico." ITAM working paper 01-04.
- Johnson, Simon, Peter Boone, Alasdair Breach, and Eric Friedman. 2000. "Corporate Governance in the Asian Financial Crisis," *Journal of Financial Economics* 58(1-2): 141-186.

- Johnson, Simon, Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer. 2000. "Tunnelling." Harvard Institute of Economic Research Paper No. 1887.
- Kane, Nancy. 1988. *Textiles in Transition: Technology, Wages, and Industry Relocation in the U.S. Textile Industry*. Westport, Connecticut: Greenwood Press.
- Keefer, Philip. Forthcoming. "What Does Political Economy Tell Us About Economic Development—and Vice Versa?" *Annual Review of Political Science*.
- Khanna, Tarun, and Raymond Fisman. 2004. "Facilitating Development: The Role of Business Groups." *World Development* 32(4): 609-628.
- Khanna, Tarun, and Krishna Palepu. 2000a. "Emerging Market Business Groups, Foreign Investors, and Corporate Governance." In Randall Morck, ed., *NBER Volume on Concentrated Ownership*. Chicago: University of Chicago Press: 265-294.
- Khanna, Tarun, and Krishna Palepu. 2000b. "Is Group Affiliation Profitable in Emerging Markets: An Analysis of Diversified Indian Business Groups." *Journal of Finance* 55: 867-891.
- King, Robert G. and Ross Levine. 1993a. "Finance and Growth: Schumpeter Might be Right." *Quarterly Journal of Economics* 108: 717-738.
- King, Robert G. and Ross Levine. 1993b. "Finance, Entrepreneurship, and Growth: Theory and Evidence." *Journal of Monetary Economics* 32: 513-542.
- Kroszner, Randall, and Philip Strahan. 2001. "Bankers on the Boards: Monitoring, Conflicts of Interest, and Lender Liability." *Journal of Financial Economics*, 62(3): 415-452.
- La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny. 1997. "Legal Determinants of External Finance." *Journal of Finance* 52 : 1131-1150.
- La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny. 1998. "Law and Finance." *Journal of Political Economy* 106(6): 1113-1155.
- La Porta, Rafael, Florencio Lopez-de-Silanes, and Guillermo Zamarripa. 2003. "Related Lending." *Quarterly Journal of Economics* 118(1): 231-268.
- Laeven, Luc. 2001. "Insider Lending and Bank Ownership: The Case of Russia." *Journal of Comparative Economics* 29(2): 207-229.
- Lamoreaux, Naomi. 1994. *Insider Lending: Banks, Personal Connections, and Economic Development in Industrial New England*. Cambridge, England: Cambridge University Press.
- Levine, Ross. 1998. "The Legal Environment, Banks, and Long Run Economic Growth." *Journal of Money, Credit, and Banking* 30(Pt. 2): 596-620.
- Levine, Ross. 1999. "Law, Finance, and Economic Growth." *Journal of Financial Intermediation* 81(1/2): 36-67.
- Ludlow Leonor. 1985. "La construccion de un banco: El Banco Nacional de Mexico, 1881-1884." In Leonor Ludlow and Carlos Marichal eds., *Banca y poder en Mexico, 1800-1929*. Mexico: Editorial Grijalbo, pp. 299-346.
- Ludlow, Leonor. 2003. "El Banco Mercantil de Veracruz, 1898-1906." In Mario Cerutti and Carlos Marichal eds., *La banca regional en Mexico, 1870-1930*. Mexico: Fondo de Cultura Económica, pp. 134-167.
- Maurer, Noel. 2002. *The Power and the Money: The Mexican Financial System, 1876-1932*. Palo Alto: Stanford University Press.

- Maurer, Noel, and Andrei Gomberg. 2004. "When the State is Untrustworthy: Public Finance and Private Banking in Porfirian Mexico." *Journal of Economic History*, forthcoming.
- Maurer, Noel, and Tridib Sharma. 2001. "Enforcing Property Rights Through Reputation: Mexico's Early Industrialization, 1878-1913." *The Journal of Economic History* 61(4): 950-973.
- Mexico, Dirección General de Estadística. 1894. Anuario estadístico de la Republica Mexicana 1893-94.
- Mexico, Secretaría de Fomento. 1890. Boletín semestral de la República Mexicana.
- Mexico, Secretaría de Hacienda. 1896a. Memoria de la Secretaría de Hacienda.
- Mexico, Secretaría de Hacienda. 1896b. Estadística de la República Mexicana.
- Mexico, Secretaría de Hacienda, 1904. Boletín de estadística fiscal, 1903-04.
- Mitton, Todd. 2002. "A Cross-Firm Analysis of the Impact of Corporate Governance on the East Asian Financial Crisis." *Journal of Financial Economics* 64 (2): 215-241.
- Musacchio, Aldo. 2005. "Can Civil Law Countries Get it Right? Institutions and Financial Market Development in Southeastern Brazil, 1890-1940." Ph.D. Dissertation, Stanford University.
- Musacchio, Aldo, and Ian Read. 2003. "Bankers, Industrialists, and their Cliques: Elite Networks in Turn of the Century Mexico and Brazil." Mimeo. Stanford University.
- North, Douglass and Barry Weingast. 1989. "Constitutions and Commitment: the Evolution of Institutions Governing Public Choice in Seventeenth-century England." *Journal of Economic History*, 49(4): 803-32.
- Petersen, Mitchell, and Rajan, Raghuram. 1994. "The Benefits of Lending Relationships: Evidence from Small Business Data." *Journal of Finance* 49: 3-37.
- Petersen, Mitchell, and Rajan, Raghuram. 1995. "The Effect of Credit Market Competition on Lending Relationships." *Quarterly Journal of Economics* 110: 407-444.
- Przeworski, Adam, Michael Álvarez, José Antonio Cheibub, and Fernando Limongi. 2000. *Democracy and Development: Political Institutions and the Material Well-Being of the World, 1950-1990*. New York: Cambridge University Press.
- Rajan, Raghuram. 1992. "Insiders and Outsiders: The Choice Between Informed and Arms-Length Debt," *Journal of Finance*, 47: 1367-1400.
- Rajan, Raghuram, and Luigi Zingales. 1998. "Financial Dependence and Growth." *American Economic Review* 88(3): 559-86.
- Razo, Armando. 2003. "Social Networks and Credible Commitments in Dictatorships: Political Organization and Economic Growth in Porfirian Mexico, 1876-1911." Ph.D. dissertation, Stanford University.
- Razo, Armando and Stephen Haber. 1998. "The Rate of Growth of Productivity in Mexico, 1850-1933: Evidence from the Cotton Textile Industry." *Journal of Latin American Studies* 30 (3): 481-517.
- Rodríguez López, María Guadalupe. 1995. "La banca porfiriana en Durango." In Mario Cerruti ed., *Durango (1840-1915): Banca, transportes, tierra e industria*. Monterrey, Nuevo León: Impresora Monterrey: 7-34.

- Rodríguez López, María Guadalupe 2003. "Paz y bancos en Durango durante el Porfiriato," In Mario Cerutti and Carlos Marichal eds., *La banca regional en Mexico, 1870-1930*. Mexico: Fondo de Cultura Económica, pp. 254-290.
- Romero y Barra, Maria Eugenia. 2003. "El Banco del Estado de Mexico 1897-1914." In Mario Cerutti and Carlos Marichal eds., *La banca regional en Mexico, 1870-1930*. Mexico: Fondo de Cultura Económica, pp. 216-251.
- Rousseau, Peter, and Paul Wachtel. 1998. "Financial Intermediation and Economic Performance: Historical Evidence from Five Industrial Countries." *Journal of Money, Credit, and Banking* 30(4): 657-678.
- Sharpe, Steven. 1990. "Assymetric information, Bank Lending, and Implicit Contracts: A Stylized Model of Customer Relationships," *Journal of Finance*, 45: 1069-87.
- Sokoloff, Kenneth. 1984. "Was the Transition from the Artisanal Shop to the Nonmechanized Factory Associated with Gains in Efficiency? Evidence from the U.S. Manufacturing Censuses of 1820 and 1850." *Explorations in Economic History*, 21(4): 351-382.
- Sutton, John. 1998. *Technology and Market Structure*. Cambridge, Massachusetts: MIT Press.
- Stulz, René. 2001. "Does Financial Structure Matter for Economic Growth? A Corporate Finance Perspective." In Asli Demirgüç-Kunt and Ross Levine eds., *Financial Structure and Economic Growth: A Cross-Country Comparison of Banks, Markets, and Development* (Cambridge, MA: MIT Press), pp. 143-188.
- Walker, David W. 1987. *Business, Kinship, and Politics: The Martinez del Rio Family in Mexico, 1824-1867*. Austin, Texas: University of Texas Press.

Table 1
The Mexican Textile Industry

	<u>Number of Mills</u>	<u>Output in 1900 Pesos</u>	<u>Output in Meters</u>	<u>Spindles</u>	<u>Workers</u>	<u>Price Index</u>
1878	73	na	73,597,000	249,294	11,922	
1888	84	11,484,000	na	249,591	15,083	94
1891	85	13,795,758	93,526,834	277,784	14,051	87
1893	113	19,925,011	122,550,335	370,570	21,963	96
1895	98	26,013,666	170,928,751	411,090	18,208	91
1896	100	25,338,269	206,411,839	430,868	19,771	93
1898	112	na	na	469,547	na	93
1899	120	32,564,462	231,685,692	491,443	23,731	91
1900	122	35,458,578	261,397,092	588,474	27,767	100
1901	133	35,553,376	262,043,539	591,506	26,709	95
1902	124	27,938,569	235,955,965	595,728	24,964	103
1903	115	31,338,693	262,169,838	632,601	26,149	118
1904	115	34,645,972	280,709,989	635,940	27,456	123
1905	130	46,097,321	310,692,041	678,058	30,162	111
1906	130	44,894,422	349,711,687	688,217	31,673	114
1907	129	41,325,963	376,516,577	693,842	33,132	125
1908	132	35,303,315	368,370,354	732,876	35,816	121
1909	129	36,656,495	314,227,874	726,278	32,229	118
1910	121	39,118,584	315,322,022	702,874	31,963	129
1911	119	39,286,480	341,441,477	725,297	32,147	131
1912	126	46,848,154	319,668,409	762,149	32,209	136
1913	128	36,642,671	298,897,198	752,804	32,641	147

Sources: Haber 1989, Table 8.1; Haber, Razo, Maurer, Tables 5.2 and 5.8. Original censuses for 1888, 1891, 1893, 1895, 1896, 1912, and 1913 can be found in: México, Secretaría de Fomento, 1890; México, Departamento de Fomento, 1893; México, Dirección General de de Estadística, 1894; México, Secretaría de Hacienda, 1896a; México, Secretaría de Hacienda, 1896b; Archivo General de la Nación, Ramo de Trabajo, Box 5, file 4; Archivo General de la Nación, Ramo de Trabajo, Box 31, file 2. A discussion of how these censuses were merged into a panel with a uniform format can be found in Razo and Haber 1998.

Table 2
 Mexico's Textile Industry, By Bank Relation, 1888-1913

	Percent of Mills Related to Banks	Percent of Output (By Value) Produced by Bank Related Mills	Percent of Output (By Volume) Produced by Bank Related Mills	Percent of Capacity (By Spindlage) Installed in Bank Related Mills
1888	21%		32%	33%
1891	20%		32%	
1893	30%	48%	51%	51%
1895	39%	58%	59%	59%
1896	40%	58%	60%	62%
1900	57%	75%		
1904	55%	75%		
1909	61%	81%		
1912	55%	79%	80%	82%
1913	54%	77%	78%	80%

Source: See Table 1.

Table 3
The Mexican Banking Industry, 1896-1912

	Number of Reporting <u>Banks¹</u>	Total Bank Assets <u>(M U.S. \$)</u>	Banamex Market <u>Share</u>	BLM Market <u>Share</u>	Herfindahl <u>Index²</u>
1896	6	50	58%	28%	0.42
1897	10	54	na	na	na
1899	13	78	51%	26%	0.34
1900	17	113	39%	25%	0.22
1901	20	107	38%	22%	0.20
1902	23	107	35%	19%	0.17
1903	25	130	37%	17%	0.18
1904	26	184	41%	15%	0.20
1905	26	205	39%	18%	0.20
1906	28	264	40%	16%	0.21
1907	28	301	44%	14%	0.23
1908	34	339	40%	12%	0.19
1909	35	283	37%	12%	0.17
1910	35	302	39%	12%	0.18
1911	35	385	39%	12%	0.18
1912	34	342	36%	11%	0.16

1. In 1911 there were 42 banks in operation, but only 35 reported data to the Secretary of the Treasury. The banks which did not report were small operations.

2. Computed nationally, thus assumes that banks with territorial concessions could operate in one another's concession territories. Thus, this is a lower bound estimate.

Source: Calculated from balance sheets published in *El Economista Mexicano*.

Table 4

Real Rates of Return on Mexican Banking, 1901-12^a

	Real Returns on Book Equity		Real Returns from Owning an Index of Bank Stocks		Real Returns from the Dow Jones Index
	Weighted Average ¹	Unweighted Average	Weighted Average ¹	Unweighted Average	(Peso Terms)
1901	10%	10%	11%	17%	-7%
1902	14%	13%	16%	17%	-7%
1903	1%	0%	8%	14%	-24%
1904	4%	7%	6%	7%	41%
1905	40%	29%	33%	29%	37%
1906	23%	13%	16%	20%	-5%
1907	4%	6%	6%	8%	-41%
1908	0%	4%	2%	3%	52%
1909	14%	9%	12%	-1%	7%
1910	4%	3%	9%	10%	-21%
1911	20%	14%	-8%	-4%	9%
1912 ^b	11%	10%	-2%	1%	1%
Average	12%	10%	9%	10%	4%

a. All values converted to 1900 pesos using the Gómez-Musacchio index.

b. First semester, annualized.

1. Weighted by market capitalization.

Source: Stock prices and dividends reported in the *Economista Mexicano*.

Dow Jones data from Haber, Razo, Maurer, Table 5.12.

Table 5
Market to Book Ratios for Mexican Banks

	<u>Weighted Average¹</u>	<u>Unweighted Average</u>
1901	1.52	1.20
1902	1.63	1.27
1903	1.69	1.25
1904	1.84	1.27
1905	1.95	1.35
1906	1.81	1.44
1907	1.76	1.41
1908	2.09	1.45
1909	2.14	1.33
1910	2.09	1.37
1911	1.90	1.33
Average	1.86	1.33

1. Weighted by market capitalization.

Source: Stock prices and dividends reported in the Economista Mexicano.

Table 6
Banking Stock Yields

	Average Yield on Bank Shares ¹	Average Yield on Government Bonds	Bank Share Premium
1901	9.4%	5.0%	4.4%
1902	8.4%	4.9%	3.5%
1903	8.3%	4.9%	3.4%
1904	7.5%	4.8%	2.7%
1905	8.1%	4.3%	3.8%
1906	8.0%	4.3%	3.7%
1907	7.1%	4.4%	2.7%
1908	7.5%	4.3%	3.2%
1909	6.8%	4.3%	2.5%
1910	7.4%	4.3%	3.1%
1911	7.7%	4.5%	3.2%
1912	7.6%	4.6%	3.0%

1. Dividends divided by market price of common stock.

Source: Stock prices and dividends reported in the *Economista Mexicano*.
Government bond yields from Escalona Salazar, p. 93.

Table 7

Average Annual Growth in Capacity Across Census Periods¹

	<u>Years Between Censuses</u>	<u>Bank-Related Mills</u>	<u>Non-Related Mills</u>
1888-93	5	5.5%	4.0%
1893-95	2	11.0%	8.4%
1895-96	1	7.6%	4.1%
1896-1912	16	2.4%	0.4%

1. Rate of growth in capacity, measured in spindles, among firms listed in both censuses. Thus, 1888-93 cohort represents firms listed in both the 1888 and 1893 censuses.

Source: See Table 1.

Table 8
 Probit Results for 1893 Census Cross-Section
 Dependent Variable = 0 if Independent, 1 if Bank-Related
 T Statistics in Parentheses

	<u>Spec. 1</u>	<u>Spec. 2</u>	<u>Spec. 3</u>	<u>Spec. 4</u>	<u>Spec. 5</u>	<u>Spec. 6</u>
Number of Observations	81	81	81	101	100	100
Pseudo R2	0.01	0.01	0.10	0.01	0.01	0.11
Constant	-0.70*** (3.89)	-0.65** (2.05)	-4.93*** (3.09)	-1.70 (-1.50)	-1.67 (-1.49)	-4.08*** (-2.88)
Operating Margins	0.64 (0.98)	0.63 (0.97)	-0.05 (0.08)			
Ln (Output per worker) ¹				0.18 (1.02)	0.19 (1.18)	-0.15 (0.71)
Age of Mill		0.00 (0.21)	-0.01 (-0.72)		0.00 (-0.44)	-0.01 (-1.04)
Ln (Size) ²			0.58*** (2.78)			0.60*** (3.25)

* Significant at the 90 percent level.

** Significant at the 95 percent level.

*** Significant at the 99 percent level.

1. Output measured by value.

2. Size measured as natural log of installed spindlage.

Source: Dirección General de Estadística, 1894.

Table 9
Labor Productivity Regressions¹

Dependent variable = (LN) Output Per Worker (in 1900 Pesos)
T statistics in parentheses

	<u>Spec 1</u>	<u>Spec 2</u>
Observations	486	486
Mills	164	164
R ²	0.2706	0.2808
Constant	6.47*** (98.69)	6.45*** (83.78)
1895	0.59*** (8.19)	0.62*** (6.69)
1896	0.60*** (8.29)	0.64*** (6.91)
1912	0.58*** (7.94)	0.53*** (4.73)
1913	0.60*** (8.25)	0.57*** (5.18)
Bank-Related 1893		0.06 (0.46)
Bank-Related 1895		-0.13 (-0.10)
Bank-Related 1896		-0.05 (-0.40)
Bank-Related 1912		0.10 (0.85)
Bank-Related 1913		0.09 (0.76)

1. Functional form is OLS. Controls for mill age, location and traded status did not materially affect the results.

* Significant at the 90 percent level

** Significant at the 95 percent level

*** Significant at the 99 percent level

Source: See Table 1.

Table 10
Weighted Labor Productivity, By Mill Type

	Output Per Worker (1900 Pesos)		
	Non-Related	Bank-Related	Difference
1893	991	1,049	6%
1895	1,243	1,266	2%
1896	1,204	1,201	0%
1912	1,371	1,403	2%
1913	1,384	1,373	-1%

Source: Table 1.

Table 11
 Cox Proportional Hazard Model
 Dependent Variable=1 if Survive, 0 if Fail1
 (T Statistics in Parenthesis)

	<u>Spec. 1</u>	<u>Spec. 2</u>	<u>Spec. 3</u>	<u>Spec. 4</u>
Number of Observations	467	431	275	271
Prob > chi2	0	0	0.0001	0.0004
Bank-Related Dummy	0.23*** (-3.96)	0.39** (-2.53)	0.32*** (-2.62)	0.34** (-2.45)
LN (Installed Spindlage)--Proxy for Size		0.59*** (-3.92)	0.63** (-2.06)	0.66* (-1.76)
LN (Output Per Worker)--Real Value2			0.89 (-0.49)	0.92 (-0.36)
Age of Mill				0.98 (-1.25)

1. When coefficients are transformed into hazard rates they represent the effect that the independent variable has on the mill failing. The smaller the coefficient, the greater the independent variable's impact. For example, a coefficient of 0.23 on the bank connection dummy means that a bank connected mill has a 23 percent chance of failing in any given period compared to an independent mill.

2. Output per worker data adjusted for changes in length of legal workday.

- * Significant at the 90 percent level.
- ** Significant at the 95 percent level.
- *** Significant at the 99 percent level.

Source: See Table 1.

Table 12
Average Textile Mill Size (In Spindles), By Mill Type

	Non-Related Mills	Bank-Related Mills	Size Ratio (Bank Related/Non Related)
1888	2,549	4,611	181%
1893	2,320	5,467	236%
1895	2,759	6,711	243%
1896	2,862	6,417	224%
1912	2,303	8,725	379%
1913	2,234	8,680	389%

Source: See Table 1.

Table 13

Industrial Concentration in Cotton Textiles,
Mexico, Brazil, India, and the United States

Circa	Four Firm Ratio					Herfindahl Index		
	<u>Mexico</u>	<u>Expected</u>	<u>Brazil</u>	<u>India</u>	<u>U.S.A.</u>	<u>Mexico</u>	<u>Brazil</u>	<u>India</u>
1888	18%	19%	37%		8%	0.022	0.058	
1891	20%	19%				0.020		
1893	29%	15%				0.038		
1895	33%	17%	35%			0.042	0.059	
1896	30%	16%				0.041		
1900	30%	14%		19%	7%	0.038	0.028	0.018
1904	33%	15%	21%			0.042		
1909	38%	15%				0.045		
1912	30%	14%		19%	8%	0.039		0.018
1913	31%	14%	14%			0.041	0.014	

Source: For Mexico see Table 1; for Brazil, Haber 1997; for India and the U.S.A., Haber 2003.