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Industrial Finance Before the Financial Revolution: Japan at the Turn of the Last Century

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Abstract: In a series of pathbreaking articles, Sylla argues that successful economies experience "financial revolutions" before they undergo their periods of rapid growth. In turn, governments generate these revolutions by putting public finance in order, and thereby giving private investors the incentive to create banks and securities markets. In the U.S., suggests Sylla, Hamilton masterminded the revolution. Might Matsukata, he continues, have done the same in Japan?

Consistent with much of Sylla's work, Japan did indeed experience a financial revolution in the late 19th century. Matsukata, however, did not mastermind the revolution in advance of private-sector demand. Instead, private investors created the financial infrastructure in response to demand from industrial firms. What is more, most firms (at least in the pivotal silk industry) raised the funds they needed through trade credit rather than securities markets or banks.

In this environment, the financial revolution contributed to economic growth in three ways: (a) the new securities markets funded the very largest firms, particularly the railroad firms; (b) the new banks sold the transactional services that merchants used to provide their trade credit, and (c) the banks supplied some of the funds that the merchants as intermediaries then re-lent to the manufacturing firms.

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Most rich societies have institutional structures that give people incentives to invest, and most societies with investment-inducing institutions grow rich. But do good institutional structures promote economic growth? Do rich people have a preference for good structures? Or does some third factor prompt people both to promote good institutions and to invest at efficient levels?

Where many scholars use modern cross-country panel data sets to explore the do-good-institutions-drive-growth puzzle, Richard Sylla takes a different approach. Rather than manipulate big data sets of 20th-century economies, he studies a few prominent high-growth economies intensively and historically. On that basis, he suggests that those societies that grow rapidly tend to have experienced "financial revolutions" immediately before their spurt.

Through these financial revolutions, explains Sylla, countries acquire sophisticated securities markets and banking sectors. Those markets and banks, in turn, fund the firms that drive economic growth. In the U.S., Alexander Hamilton masterminded the financial revolution. Might 19th-century Finance Minister Masayoshi Matsukata, Sylla asks, have done the same for Japan?

Japan did indeed experience Sylla's financial revolution as it began to grow fast. Yet as surely as this financial-revolution hypothesis intrigues, it fits Matsukata less well than it fits Hamilton. Although Matsukata may have placed Japanese public finance on a sound basis, he did less for private finance. And although Japan did undergo a financial revolution, the government did not engineer the institutional supply in advance of private-sector demand. Instead, private investors supplied the necessary capital to private firms (i) in response to industrial demand, and (ii) largely (not wholly, to be sure) independently of securities markets and banks.

In Japan at the turn of the last century, manufacturing firms raised much of the money they needed through trade credit. In effect, merchants used the institutional and informational advantage they obtained through their brokerage activities to earn a competitive advantage in the financial market. To date, most scholars of financial transformation have focused on banks and securities markets. That they did is unfortunate. Particularly in societies where regulatory restrictions or underdeveloped legal systems stymie bank or security-market growth, we suspect trade credit plays a crucial role in financial intermediation (Fisman & Love, 2003).

In the article below, we first outline the financial-revolution hypothesis (Section I). We explore its fit with Japan, and the tenuous parallel between Hamilton and Matsukata (Sec. II). We then use data from the silk industry to show how industrial demand drove financial supply (Sec. III). In the process, we stress (i) the relative importance of informal non-bank finance; (ii) the relative unimportance of government leadership; and (iii) the integration of finance and production through merchants who exploit brokerage-generated institutional and informational advantages in the credit market.

I. Financial Revolution and Industrial Growth:

A. Hamiltonian Point:

In his recent Presidential Address to the Economic History Association (and in a variety of other thoughtful studies as well), Sylla suggests that good financial institutions beget rapid industrial growth. Secure property rights and contract enforcement matter too, of course. Harold Demsetz, Douglas North, and others made the point decades ago. But even when firms have secure rights to property and can cut the contracts they want, to develop good projects they need funds. The more readily banks and securities markets let them raise those funds, the more rapidly they will grow. The better the financial infrastructure, writes Sylla (2002: 280), the more effective "the acquisition and application of both nonhuman and human capital" will become.

Supply seldom precedes demand, and Sylla does not claim investors create these institutions because they anticipate future demand. Instead, suggests Sylla, governments indirectly lead investors to create them when they stabilize the public fisc. The "basic idea" of a "financial revolution," he continues (Sylla, et al., 1999: 4), is that states "adapt their financial practices to capitalist standards." In the process, they "appeal to the self-interest of capitalists in the form of an offer of assets that [has] an attractive combination of return, liquidity and risk of default." As the states improve their credit, investors create banks to lend them funds and securities markets to trade their bonds. Once they put the banks and markets in place, private firms use them to raise their own funds as well.

Governments generate this infrastructure, Sylla explains, by credibly tying their hands. They enforce claims against themselves. They centralize borrowing. They stabilize the currency. They then approach investors, and investors willingly create banks and securities markets as necessary. When "public finances are put in order," concludes Sylla (1999a: 269; see 1999b: 428), "orderly private financial institutions and markets will probably follow."

To motivate his account, Sylla (2002) cites Alexander Hamilton. As Treasury Secretary to Washington, Hamilton centralized tax and public borrowing. He adopted a national currency. He backed it with gold and silver. And he organized a central bank.

While that much may be standard history, Sylla collectively characterizes Hamilton's measures as a revolution. Together, he suggests, the steps Hamilton took transformed public finance directly, and private finance indirectly. By stabilizing the national fisc, Hamilton caused investors to create a modern infrastructure: banks to fund the government, and securities markets on which to trade both the government's debt and the shares of the new banks. Once the investors did so, private firms turned the institutions to their own finance.

Indirectly but effectively, concludes Sylla (1999: 250), Hamilton "launch[ed] a banking system and a securities market." Those institutions then became "to the new nation's economy what independence and the Constitution were to its political life -- fundamental institutions that determined the course of all subsequent development." With the financial infrastructure in place, "insurance companies, nonbank financial corporations, began to appear in numbers, along with nonfinancial corporations chartered to build roads, bridges, canals, manufactories, and the like" (Sylla, 2002: 284).

B. Japanese Counter-Point:

Might Matsukata have played Hamilton to Japan, asks Sylla (2002, 1999; see Sylla, et al., 1999)? In the late 19th century, he rationalized public finance. In the process,

might he indirectly have caused investors to create the institutions to which private firms could turn for funds?

When Matsukata became Finance Minister in 1881, he had already served as chief of taxation and Vice Finance Minister. He found the treasury in dire straits. Most famous for the deflation he engineered in the early 1880s, in fact he also took several Hamiltonian steps to fix the mess: slash government expenses, establish the Bank of Japan, privatize government firms, restructure the national debt. What is more, during his tenure entrepreneurs did create banks (Table 1). And by 1886 the yen was stable enough that he could back it with silver.

[Insert Table 1 about here.]

Matsukata eventually resigned as Finance Minister, but he continued to move in and out of government over the rest of the century. After controlling the Finance Ministry until 1891, he became Prime Minister for a year. He returned as Finance Minister for a few months in 1895, became Prime Minister again from 1896 to 1898 (concurrently holding the Finance Ministerial post), and worked again exclusively as Finance Minister from 1898 to 1900.

Might not the reforms Matsukata accomplished in his first ministerial stint, asks Sylla, have caused in the 1880s "a financial revolution" (Sylla's [2002: 282] words)? They did include the entire Hamiltonian panoply: according to Sylla, "sound public finances and public debt management, stable money, sound banking, a good central bank, securities markets, and sound institutional investors such as insurance companies."[1] As Sylla (2002: 290) summarized the situation:

> Matsukata like Hamilton installed a modern financial system for his country. It encompassed the establishment of every one of the key components of financial systems that had arisen in earlier modernizing economies. Almost immediately Japan began to grow rapidly and become a major player on the world's stage.

II. Industrial Finance in Late 19th-Century Japan:

A. Meiji (1868-1912) Infrastructure:

1. The changes. -- For Japan during the closing decades of the 19th century, the extensive financial reforms constituted a corner of a much broader-ranging set of institutional changes. U.S. Commodore Matthew Perry may have initiated the process when he demanded trading rights in 1853, but the change began in earnest in 1868. That year, samurai from several out-of-power clans grabbed control. Through what was nominally an imperial restoration but functionally a coup d'etat, they ousted the Tokugawa (1600-1868) shogunate.

Once in office, these samurai engineered nothing less than a total transformation in government. Immediately, they opened the country to foreign trade. They abolished political barriers to inter-regional trade (1871). They hired a modern police force (1871-

[1] For this article, we take Matsukata's place in the financial transformation as given. In fact, the actual role he played is the subject of considerable dispute. Although some scholars (e.g., Muroyama, 2004) do stress the break between Matsukata's policies and those of his predecessor Okuma, the claim remains controversial (see generally Oishi, 1989). Much of the evidence for Matsukata's achievements rests on documents compiled for the purpose of strengthening his historical legacy; the 1880s deflation began before Matsukata's first tenure; corrected for this deflation government expenditures actually rose under Matsukata's tenure; and Matsukata's later tenure saw massive inflation (see Table 11 below).

72). They appointed judges who enforced contracts and property rights (1875; see Someno, 1958; Takahashi, 1968: 76 et seq.). They declared (and through the new property rights regime made credible) an end to forced exactions from wealthy merchants and industrialists. They cancelled stipends to the samurai (1876). And they quelled an insurrection within their own ranks (1877).

Once they had put the military uprising behind them, these ex-samurai-turned-oligarchs continued their massive institutional reforms. In their zeal to "get the institutional structure right," they reformed and re-reformed. Granted, they reformed with a zeal that might itself have threatened to destabilize investment. Might -- but ultimately it did not destabilize, for a simple reason: the regimes with which they experimented (French, German, and Anglo-American) all protected trade and property rights, and in an essentially similar manner.

Yet the frequency with which the oligarchs replaced their legal codes does destroy any notion that "legal families" might be exogenous (e.g., Levine, 2004, and the many articles in the wake of La Porta, et al., 1998). In 1880, they adopted French-based Criminal and Criminal Procedural Codes. They then replaced the procedural code with a German-based code in 1890 and the Criminal Code with a similarly Germanic version in 1907. They adopted a Napoleonic Civil Code in 1890, but swapped it for a Prussian one in 1898. They fashioned a Commercial Code that blended French, Germany and English elements in 1890. They then abandoned it for a more exclusively German version in 1899, and added an overlay of Anglo-American trust and commercial legislation in 1905 and 1922. And once they had Western-style universities in place, they swapped the judges they had hired earlier for more professionally trained ones (Ramseyer & Rosenbluth, 1995: 75-82).

2. Implications for research. -- For our study, this chronology poses a problem. The government began its financial reforms at the very point that it had quelled the military uprising and turned to consolidate a radical set of institutional changes. At the very point that it engineered financial changes, it adopted others that protected property rights, enforced contracts, and promoted international and interregional trade. On the one hand, Sylla suggests that financial reform generates growth; on the other, scholars in the Demsetz-North tradition argue the need for trade and property rights. We propose to explore the relative importance of the two sets of institutional changes, yet their very simultaneity presents a conundrum: at the very point when the government engineered Sylla's financial revolution, it also adopted Demsetz-North's stable property rights and free trade arrangements. At the very time that investors created banks and securities markets, the government stabilized the returns to investment, created a national market for goods and services, and integrated Japan into the world trading order.

Perhaps in some countries scholars can ask whether a financial revolution preceded or followed stable property rights and industrial growth. In Japan, we cannot. Perhaps Matsukata did engineer a financial revolution. If so, he engineered it at the same time other bureaucrats installed basic property and trading rights, and at the same time private firms pushed the economy toward spectacular growth.

Unable to declare which set of reforms came first (answer: neither), we begin by exploring the mechanism behind Sylla's financial-revolution hypothesis. Toward that end, we ask whether the reforms that facilitated government borrowing drove the

development (as the hypothesis posits) of banks and exchanges (Sec. B). We turn to industrial finance, and ask where those firms most critical to the turn-of-the-century economy obtained their funds. We start at the very largest firms (Sec. C). We conclude with two small-firm sectors that played key roles in the late 19th-century economy: silk reeling (Sec. III.A) and weaving (Secs. III.B, C).

B. Banks and Exchanges:

1. The puzzle. -- The financial-revolution hypothesis posits a clear mechanism: governments transform the financial sector by putting the public fisc in order, and that expanded sector then facilitates industrial growth. Governments first improve their credit quality. Investors respond by willingly lending. To facilitate their direct loans to the government, they organize banks. To trade their securitized loans to the government (and the shares of the new banks), they organize exchanges. Once they install the banks and exchanges to lend to the government, they use them to fund private firms besides. In the U.S., Hamilton reformed the public fisc and thereby transformed finance. In Japan, asks Sylla, might Matsukata have done the same?

2. Banks. -- As nicely as the hypothesis seems to fit the late 18th-century U.S., it founders a bit on Matsukata's reforms. Take the issue of whether Matsukata promoted banking growth during his early years, and whether those banks then funded an industrial boom. During Matsukata's early years in the Finance Ministry, the number of banks did increase: from 239 in 1881 to 353 by 1890. Not until the 1890s, though, did it begin to grow exponentially: to 1,013 by 1895 and to 2,272 by 1900 (Table 1).

Although investors formed these banks while Matsukata ran the ministry, they did not form them to lend to the government. According to the hypothesis, a government promotes the banking sector by so improving its public finance that investors willingly organize banks to lend it money. Yet rather than borrow from banks, the Japanese government issued bonds. In 1880 it had 234 million yen in outstanding bonds but bank debt of only 15 million yen; in 1890 it had 243 million yen in bonds but only 32 million in bank debt; and by 1900 it had 486 million yen in bonds but bank debt still of only 32 million (Ando, 1979: 19).

To be sure, even during the 1880s, investors did form financial intermediaries -- they just did not form many banks. As Sylla, et al. (1999: 2) rightly remind us, "finance involves and involved much more than banking." And in Japan in the late 19th century, hundreds of firms other than banks did offer financial services. Many of these firms traced their roots to the Tokugawa period, but because they lacked a banking license the Ministry of Finance did not record their activities. By one estimate, though, the number of firms in this informal financial sector more than quintupled during the first half of the 1880s (Table 2; Asakura, 1961).

[Insert Table 2 about here.]

What is more, even if the banks did not lend directly to the government, they did buy government bonds. Indirectly to be sure, investors did fund the government through the banks. They deposited their savings with banks, and the banks then used the money to buy government bonds. According to Table 1, in 1880 the banks lent 43.6 million yen.

Concomitantly, the 153 "national banks" held 65 million yen's worth of government bonds.[2]

Nevertheless, that the banks held the government bonds fundamentally misleads. Although the hypothesis posits that investors form banks to lend to the reformed government, Japanese banks bought government bonds only because they had to buy them. They did not hold the bonds because they liked their investment potential. They held the bonds because they wanted to issue paper money. By regulatory fiat, to earn signorage they had to hold government securities (Noda,1980: 52).

3. Exchanges. -- Or take the question of whether through his reforms Matsukata induced investors to form securities exchanges. As Sylla (2002: 298) himself properly notes, investors organized the Tokyo and Osaka exchanges in 1877-1878 -- three years before Matsukata become Finance Minister. What is more, Matsukata himself did not use bond finance anyway. Instead, during his tenure in the Finance Ministry he kept the amount of outstanding bonds largely unchanged. In 1881, the government had 231 million yen in bonds outstanding. By 1891 it had raised that amount only to 243 million (Table 3).

[Insert Table 3 about here.]

Granted, investors did organize the Tokyo and Osaka exchanges to trade government bonds. In 1878, they traded 8.7 million yen in government bonds (face value) on the newly formed Tokyo Stock Exchange (TSE), but the shares of only 4 firms. Even by 1880 they traded 73 million yen in government bonds but the shares of only 25 firms (TSE, 1928: app. 24, app. 53). On the Osaka Stock Exchange (OSE), they traded no stocks in 1878, and by 1880 still traded far more in national bonds than in stocks (OSE, 1928: app. 1).

Although the late 19th-century Japanese government twice floated massive amounts of bonds, only once did it decide to float them because it had good credit. First, during the Tokugawa period the samurai had served as hereditary salaried bureaucrats to the many domains. In 1876, the oligarchs decided to abolish their status. In compensation, they issued the samurai bonds with a face amount of 174 million yen (Noda, 1980: 40).

The oligarchs did not issue these bonds because of any access to credit; they issued them because they could force the samurai to take them. Theirs was not a popular move. The summarily fired samurai responded by organizing a counter-coup, and the oligarchs promptly crushed them (to be sure, they could crush them effectively because they were able to issue a modest amount of additional bonds to pay their expenses; Table 3).

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[2] Noda (1980: 42). The distinction between "national" and "private" banks reflects the regulatory regime in place when formed; the banks in both groups were nationally chartered private firms. The earlier banks were formally denominated “national" banks. Through legislative change, these banks disappeared by the end of the 19th century, to be replaced by banks known as “private” banks. By the turn of the century, the Japanese banking sector included the Bank of Japan (the central bank), "ordinary" banks (primarily commercial finance vehicles; the largest category of banks), "savings banks" (conceived of as savings vehicles for the general population), the Yokohama Species Bank (for international trade), four banks specializing in long-term finance, and two banks specializing in colonial finance. Momose (1990: 191-203).

Nor (at least initially) would the 1876 bonds reward their holders. With only haphazard economic policies, the oligarchs faced massive inflation. From 1877 to 1881 the price of one koku (about 5 bushels) of rice rose from 5.33 yen to 10.59 yen and the market interest rate (for Tokyo) climbed from 10.4 percent to 13.1.[3] Bond prices plummeted correspondingly.

Second, in 1894-95 the government issued bonds to pay for war with China (Table 3). Absent Matsukata's public finance reform, perhaps it could not have afforded the war, and would have chosen a less belligerent course. Importantly for our purposes, however, not until this 1894 Sino-Japanese War did the government chose to use the access to credit it had earned over a decade before.

C. Finance Among Large firms:

1. Relative size. -- According to the financial-revolution hypothesis, governments facilitate industrial growth by inducing investors to create securities markets and banks. To fund their long-term investments the biggest firms in late-19th century Japan did indeed turn to the former. The latter, however, they used only for transactional services and short-term operating needs.

By 1900, big Japanese firms everywhere had ready access to a bank. Banks numbered 2,000 and operated nearly 2,000 branch offices (Table 1). Although the average bank was small, the largest firms did not need to borrow from the average bank. They could borrow from the top banks, and the top banks were big indeed. In 1893, all banks together loaned 205 million yen. Among them, the Mitsui Bank alone lent 11 million and the Daiichi Bank another 9 million (Table 4). Between the two, they lent a tenth of all bank loans in the country.

[Insert Table 4 about here.]

2. Large-firm balance sheets. -- Yet if the largest banks could offer big firms the funds they needed long-term, it was an offer the firms refused. Take the capitalization patterns at Toshimitsu Imuta's sample of 44 large firms (Table 5; reproduced from Miwa & Ramseyer, 2002a: 135). To select the firms, Imuta first examined all firms that published their balance sheet in the Osaka Asahi newspaper in the first half of 1898. He then excluded those in the textile, railroad, and trading industries, and those in other industries on which he lacked information about multiple firms.

[Insert Table 5 about here.]

Imuta's firms illustrate how heavily the biggest firms depended on stock finance, and how little (at least for long-term investments) on banks. These firms relied on initial equity for 50-75 percent of their funds, and on earnings for another 5-20 percent. They turned to banks for less than 15 percent, and in half of the industries for less than 5. In other research (Miwa & Ramseyer, 2002a) we examine funding patterns at large firms in the 1920s and 30s. Among them too, the pattern reappears: large firms used banks for no more than 15 percent of their funds.

3. Cotton-spinning and railroad firms. -- To avoid the sample bias created by looking only at firms that advertise their financials, take all firms in two industries

[3] Noda (1980: 40-41). Note the CPI reproduced below in Table 11.

dominated by big corporations: cotton spinning and railroads. In 1893, the mean bank had paid-in capital of 203,000 yen (Table 1) and the mean non-bank firm of 7,000 yen (Nihon, 1928: 87, 130). By contrast, the mean cotton-spinning firm had paid-in capital of 444,000 yen and the mean railroad of 1.8 million yen (1897 data; Table 6).

[Insert Table 6 about here.]

These large firms did not raise their capital requirements from banks. Instead, they raised them from equity investors. Tables 7 and 8 (reproduced from Miwa & Ramseyer, 2002a: 142, 144) present the capitalization patterns at the railroads and cotton spinning firms. In 1898, the railroads raised 6 percent of their funds through bonds, and borrowed 1 percent from banks. For the rest, they used equity.

[Insert Table 7 about here.]

The cotton spinning firms raised funds through banks more than railroads did, but not by much. In 1898, the 52 spinning firms (on which we have data) again raised most of their funds through equity. Generally, they raised 58 percent of their funds through stock issues. In most cases, they did not raise this initial capital on the exchanges. Instead, they sold the shares to local business leaders and acquaintances (Miwa & Ramseyer, 2000; 2002b: 295-97).

These firms raised another 10 percent through earnings, and 5 through bonds. Only 11 percent of their funds did they borrow from banks. Although the largest half of the firms raised the least from the banks (9-10 percent for the 27 firms with 10,000 or more spindles), even the smaller firms borrowed less than 20 percent there (Table 8).

[Insert Table 8 about here.]

III. Silk at the Turn of the Century

A. Finance in the Reeling Sector:

1. Production.[4] -- Brewers of sake and soy sauce played prominent roles in the Tokugawa economy, and they continued to play those roles into the later decades of the 19th century. In 1874, sake brewers constituted the largest of the manufacturing sectors, and produced 16.8 percent (by value) of all manufacturing output. Textile weaving firms (silk and cotton together) followed at 15.5 percent, and the soy sauce brewers with 5.7. The silk-reeling firms trailed. With only 5.5 percent of all manufacturing (6.17 million yen), they roughly tied the miso producers (6.14 million).

But silk-reeling was a growth industry in turn-of-the-century Japan; sake, soy sauce, and miso were not. Already by 1900, silk-reeling firms employed 227,000 workers, 34 percent of all factory operators. By 1912, textile weaving firms led industrial production with 21.7 percent of the (greatly expanded) all output. The giant cotton-spinning firms followed at 14.1 percent, and silk-reeling at 12.7 percent (169 million yen). Sake brewers had fallen to 13.1 percent, and soy sauce to 3.7 percent.

From the start, silk thread dominated exports. Since 1853 the pebrine parasite had ravaged silk-worm production in France and Italy (Warner, 1911: 99-100) and the opium wars and residual unrest had disrupted the thread supply from China (Ueyama, 1982: 172). Because of the long indigenous experience with silk production, Japanese entrepreneurs sensed an opportunity. To that turbulent European consumer market they

[4] Except where otherwise noted, this introductory material is based on Yamaguchi (1966: 3-24); Hirano (1990: 3-59); Ueyama (1982).

could offer what European and Chinese producers could not: a stable supply. As the Meiji era opened in 1868, silk thread comprised 42.3 percent of all exports. By 1877 exports had grown dramatically, but silk thread now accounted for 43.1 percent. Even in 1887 it remained at 41.3 percent (see generally Table 9).

[Insert Table 9 about here.]

In 1877 merchants sent the silk thread mostly to France (47 percent) and the U.K. (41 percent). In 1887 they shipped primarily to the U.S. (58 percent), and secondarily to France (34 percent). In 1897 they still shipped to the U.S. (58 percent) and France (36 percent). In the late 1870s, Italy had exported 1,922 tons of silk thread, China 4175 tons, and Japan only 1,033 tons (Ishii, 1999: 402-03). By 1902, Japan had passed Italy and China to become the world's leading exporter (Snow, 1911: 104; see Federico, 1997: 11).

To spin cotton thread, firms formed corporations. They raised massive amounts of equity capital; imported heavy, advanced machinery from England; hired dozens if not hundreds of employees from the start; and often listed their shares on the Tokyo or Osaka exchanges. Because they were large and registered as corporations, they appear prominently in national statistics: in 1898, as 77 firms with aggregate paid-in capital of 34 million yen (Yamaguchi 1970: 22).

Not so the silk-reeling firms. As vast an industry as collectively they comprised, individually they were small. Generally, they operated as sole proprietorships. Even of the mechanized reeling firms, 88 percent (measured by basin capacity) operated in non-corporate form (Ishii, 1999: 404). They hired few employees, and bought relatively simple equipment. As small unincorporated operations, most appear on no national statistics.

Traditionally, silk reelers unwound the line from the cocoon by hand. In the early Meiji years, the typical worker operated a spindle with one hand while she unraveled the cocoon with the other. She worked in a small shop. In Gunma prefecture in the late 1880s, for example, she worked in a firm with only one or two reeling basins. It produced 7 kg of thread a year, and employed fewer than 10 workers. Compared to its mechanized competitors, it reeled lower quality thread and sold it at cheaper prices.

By the mid-1890s the mechanized firms began to out-produce these hand-reeling shops. The machines themselves varied, with some based on Italian technology, some on French, and many on an indigenous blend of foreign approaches (Ueyama, 1982). At a mechanized shop, the firm mounted multiple spindles on a pole. It then used hydraulic (or steam or man) power to rotate the pole. By using power to turn the spindles, it freed workers to focus on unraveling the cocoons. In the process, it raised production. Because the spindle now turned at a steady speed, it simultaneously increased the uniformity of the thread (Ishii, 1986: 82). In 1889, firms in the hand-reeled sector produced half again as much as the mechanized firms. By 1894 the tables had turned. Mechanized firms now produced over a quarter more than the traditional shops (Table 9).

Mechanization proceeded differentially across the country. Of the many silk-reeling firms, those in Nagano owed their eventual preeminence to their willingness to invest in mechanized production. As of 1880, the firms in unmechanized Gunma prefecture still out-produced those in Nagano (Ishii, 1886: 81). Soon thereafter, however, the Nagano firms passed their Gunma rivals (Table 10).

[Insert Table 10 about here.]

The mechanization also progressed differentially over time. During the first Meiji years, it reflected a steady increase in the number of mechanized operations. From 1893 to 1905, the number of mechanized shops apparently trebled from about 2,600 to 7,700 (Hirano, 1990: 24). Later, it reflected an increase in the size of the existing mechanized shops. In 1893, for example, only 18 percent of the mechanized factories had 50 or more reeling basins. By 1905, 39 percent did.

Steadily, the reeling firms increased the length of their work year. In the early Meiji years, farmers produced almost all their cocoons in June. As they learned to produce high quality cocoons in July and August as well, the reeling firms stayed open longer. In 1905, the modal Nagano firm operated only 5 to 7 months a year. By 1911, it operated 7 to 9 months (Hirano, 1990: 25).

Even if they avoided mechanization, the hand-reeled shops modernized on other dimensions. Many upgraded the equipment with which they prepared the cocoons for reeling. And many switched from hand-turned spindles to foot-powered machines. Because the latter freed an operator to use both hands to unravel the cocoon, they enabled her to reel more uniform (and higher quality) thread.

2. Finance. -- In catapulting their industry into national flag-ship status, the silk-reeling firms needed long-term capital. Like the cotton-spinning and railroad firms, for those long-term requirements they avoided the banks. Although they did use banks for transactional services, even for short-term funds they borrowed first from their trading partners. Unlike the cotton and railroad firms, they shunned the exchanges too. As noted earlier, most did not even incorporate. Instead, they operated as sole proprietorships.

(a) Fixed assets. To reel silk, firms needed equipment. Those who hoped to run mechanized operations obviously required more funds than the hand-reeled shops. They would need bigger and costlier machines at the outset. They would need extra machines when they expanded. If their rivals bought more cost-effective equipment, they would need to upgrade their own stock to keep pace. And if their buyers demanded higher quality (as U.S. importers did in the 1890s; Ueyama, 1982: 203), they would need to swap their machines for higher-end models.

Even the hand-reeling firms needed regularly to invest. Over time, they would change the way they killed the larvae. They would change the way they unraveled the cocoons, and the way they reeled the thread. Even firms that reeled by hand upgraded their equipment or died (Ueyama, 1982).

For die they did. Market competition kept the reeling firms on the brink of insolvency. Aggregate data imply that the industry steadily attracted new firms: 664 firms in 1879, 1,185 in 1884, and 2,723 in 1898 (Yamaguchi, 1966: 16 tab. 19). Yet the aggregate data deceive. Silk-reeling firms faced large fluctuations in the international price for their thread, and the weather could wreck havoc with cocoon production. From 1884-86, for example, cocoon prices climbed 52 percent while raw silk prices climbed only 17 percent. From 1893-96, cocoon prices rose 11 percent while raw silk prices fell by 19 percent (Table 11). Facing these vagaries, firms regularly failed.

[Insert Table 11 about here.]

The aggregate data suggest steady growth only because new firms replaced the hundreds that vanished. Of the 2,602 mechanized factories in one 1893 industry survey,

only 838 remained in 1904. The rest of the 2,320 plants in 1904 had entered the market since 1893 (Ishii, 1999: 404-05). Some of the new firms would make do with the equipment of those that failed (Hirano, 83-98). Given that many failed because they did not keep pace with technological change, however, the more promising new firms obviously bought new, improved capital stock when they could.

The silk-reeling firms -- even the incorporated firms -- did not raise their funds on stock exchanges. Of the 19 firms with stock listed on the OSE in 1890, none were in the silk industry. Neither were any of the 40 firms listed in 1900 (OSE, 1928). Of all firms listed on the TSE before World War II, only 3 were in silk (TSE, 1928: 27).

Neither did the reeling firms borrow the money for the new equipment from banks. Banks did (as we explain below) sometimes discount notes. They advanced part of the cost of cocoons. They lent some of the selling price of the thread. But even they seldom financed new machinery.

Instead, to buy their equipment the reeling firms seem to have turned to private savings, to family members, to friends and business associates. "Seem" -- because most government records detail only the firms that registered as legally chartered corporations and partnerships, and company archives detail only the firms still in business. Given that silk-reeling firms seldom used such arrangements and regularly failed, only haphazard evidence survives.

(b) Working capital. The challenge. As badly as the silk-reeling firms needed funds for equipment, they needed even more as working capital. On this point, they differed fundamentally from their counterparts in cotton. To spin cotton, firms sank large amounts in their physical plant, but used much less as working capital. To reel silk, they needed more working capital and less fixed. In 1895, even the relatively more capital-intensive mechanized reeling firms needed far more working capital (22 million yen) than fixed (6.5 million yen; Ishii, 1999: 404).

A silk-reeling firm used its working capital for cocoons. Every June (or, eventually, July and August), it bought a year's supply of cocoons. Because it bought from small-time farmers, it needed to pay cash, and sometimes even to offer an advance. And it paid a high price. To produce a bale of silk thread in Nagano in the early 20th century, a firm incurred costs of 522 yen. Of that amount, it paid 405 yen just for cocoons.[5]

The thread brokers appear. How Japanese reeling firms financed their annual cocoon purchases illustrates the crucial role that non-bank finance can play in industrial development and the integration of finance with production in the real world. When Japanese entrepreneurs obtained access to international markets in the 1860s, they discovered a massive demand for silk. Japanese farmers already produced silk thread for domestic consumers. They could not raise silk worms and mulberries in the coldest areas of northern Japan. Neither could they raise them in the hottest areas to the south. In temperate central Japan, however, they could indeed grow them -- and there they already produced considerable silk thread as one item in a diversified farm portfolio.

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[5] Yamaguchi (1966: 26-27); see Fujimoto (1933: 496-99). This was not a peculiarly Japanese phenomenon, as Federico (1997: 164) notes.

To exploit this overseas silk market, an entrepreneur faced a series of challenges. He needed to convince farmers to expand production. Toward that end, he needed to convince them to drop their other farming operations and focus on silk. He needed to tell them what the foreign buyers demanded. He needed to induce them to reel according to foreign specifications. He needed to help them buy the machines and cocoons they required. And he needed to ship the thread they ultimately reeled to the buyers in the port.

All this presented real challenges. The foreign buyers and their agents were on the coast, in Tokyo and the adjacent port of Yokohama. Many of the more promising farming communities were nestled high in the Japanese alps in prefectures like Nagano or adjacent Gunma. No railroad linked Nagano or Gunma to Tokyo in 1870. Neither did any modern highway, navigable river, or telegraph line.

In a few areas like Gunma, silk-reeling firms already sold their thread through brokers. These merchants had long marketed the Gunma silk to urban Japanese buyers. They could now try to sell to foreign buyers as well (Ishii, 1986: 83).

Elsewhere, some producers would band together in sales unions. These unions would then act as collective intermediaries. Not only would they negotiate price, they would inspect the thread produced and bundle it into large lots of uniform quality (Ueyama, 1982).

The firms that would play the central role in the nascent industry, however, were the Yokohama sales brokers (urikomi ton'ya). During the late 19th century, 20-30 such brokers operated out of the port. Of the group, four -- the Hara, Mogi, Shibusawa (headed by Kisaku Shibusawa), and Ono -- controlled 60-70 percent of the market (Yamaguchi, 1966: 8-10).

These Yokohama thread brokers did not just sell; they coordinated. During the late Tokugawa years, other brokers had sometimes done the same: acquire cocoons, distribute them to reelers, assemble the finished thread, and sell it to urban merchants (Yagi, 1960: 12-13). So now would the Meiji-era Yokohama brokers. They did not just assemble the silk in the mountain villages and ship it to Yokohama. Even less did they just arbitrage price differences between the two areas.

Instead, the Meiji-era Yokohama thread brokers coordinated production. They communicated to the silk-reeling firms the information they would need to produce for the market. They assembled the output, they transported it, and they negotiated the eventual sale. And through their financial role, they helped reelers acquire the cocoons they would need to produce their thread.

The thread brokers lend. That financial role was new. Traditionally, the Yokohama thread brokers had accepted thread only on consignment (Ishii, 1999: 409). They had collected it from the provincial farmers, transported it to Yokohama, negotiated a sale to the foreign buyers, charged the farmers for their service, and repatriated the net proceeds to the farmers. The process generally took considerable time.

The process put the silk-reeling firms in a bind. Most were small rural household operations. To maximize production, they needed to abandon their other farming activities and focus on reeling. Yet many months could elapse between the time they bought their cocoons and the time the buyers paid for their thread. For most, this delay created a chronic cash-flow crisis.

To mitigate the crisis, by the late 1880s Yokohama thread brokers began loaning the reeling firms operating funds. Initially, they advanced part of the expected sales price of the thread they took on consignment. Sometimes they loaned directly. Other times they assumed the loan the reeling firm obtained from a local bank on the strength of those expected sales proceeds (Ishii, 1999: 409; Yamaguchi, 1966: 10; Fujimoto, 1933: 499-503).

Eventually, the thread brokers financed the cocoon purchases explicitly. Typically, the broker advanced a large portion of the cost of the annual cocoon supply at 0.5 to 2.0 percent over his own cost of funds. In turn, the reeling firm obtained a guarantee from a credit-worthy friend or relative; it agreed to repay the loan from its sales proceeds; and it promised to sell that year's thread through the broker (Ishii, 1999: 409, 414; Yamaguchi, 1966: 27-28).

To this financial transaction, the thread brokers brought both an institutional and an informational advantage (see Ishii, 1999: 406). The institutional advantage they obtained by handling the reeling firm's product. As Peterson & Rajan (1997: 662) put it in the U.S. context, suppliers "rely on their ability to repossess and sell the goods against which credit has been granted." In Japan, the thread brokers held the firm's thread, negotiated its sales, and collected its cash. So long as they sold the silk for close to the expected price (and absent a prior security interest), they bore little risk of non-repayment.

The informational advantage the thread brokers obtained through two routes, routes that again track an advantage Peterson & Rajan (1997: 662) identify in the U.S.: an advantage based on information that flows "from product market transactions and perhaps from other suppliers."[6] First, the brokers maintained regular contact with their foreign buyers. As a result, better than other plausible creditors they knew the price the silk would fetch. Second, they regularly visited the villages. As a result, they also knew better how close each producer stood to insolvency. They knew how many cocoons it had bought, the condition of its plant, and the quality of its thread. More than other creditors they knew their potential exposure.

The banks help.[7] In financing the reeling firms, the banks played two subsidiary roles. First, they offered transactional services. When thread brokers loaned reeling firms funds, they used promissory notes and drafts. Those documents the banks then cleared and discounted. Second, the banks loaned to the silk-reeling firms indirectly. They did not necessarily lend directly. Instead, they sometimes lent to the thread brokers who then (fungibility being what it is) loaned to the firms.

When the banks did lend directly to the reeling firms, they tended to supplement the broker loans. Not that the banks loaned trivial amounts. Eventually they lent more than the brokers themselves. As of 1907, reeling firms borrowed 25 to 30 million yen to buy cocoons. Of this amount, they borrowed barely a quarter from the Yokohama thread brokers. The rest they -- especially those that could post real estate as collateral -- borrowed from banks.

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[6] The same phenomenon characterized silk firm finance in other countries, as Federico (1997: 165) notes.

[7] For this account, except where otherwise noted we draw on Yamaguchi (1966: ch. 1, 28-33, 75-82, 90); Fujimoto (1933: 502-11)

Yet the banks played a subsidiary role in the way they "piggy-backed" on the brokers' institutional and informational advantage. Fundamentally, the banks followed where the brokers led. Where the brokers lent first, they sometimes followed with additional loans. In making that loan, they sometimes demanded a priority in repayment over the brokers, and sometimes demanded a security interest in the cocoons or thread. Whether because the brokers kept the safest loans for themselves, because they could use their physical control over the thread to undercut any security interest banks held, or because they could offset lower interest income with higher sales -- whatever the reason, the banks tended to charge the reeling firms higher interest rates than the brokers.

And not all banks operated independently of the thread brokers. Those brokers (along with some of the reeling firms) themselves owned several of the banks that lent most heavily to the industry. In Nagano, for example, the Ono merchant house had lent extensively to the silk-reeling firms. When the house failed in 1874, local reeling firms responded by trying to form a bank. They obtained their license in 1876, and with it formed the 19th National Bank.

The 19th financed the industry from the start. Local thread broker Takajiro Kurosawa had been a principal architect of the bank, and one of its largest initial shareholders. The Mogi Yokohama thread-brokerage firm began to amass the bank's stock in 1881, and in 1985 became its largest shareholder -- yet the Kurosawa house overtook the Mogi the next year. Kurosawa (at age 39) became bank CEO (todori) in 1887, and held that post until his death in 1919. Throughout these changes in ownership,the bank remained a major lender to the industry.

The thread brokers also controlled several Yokohama banks. The initial major Yokohama bank, for example, was the 1874 2nd National Bank. The Hara and Mogi firms were among its major shareholders. They were also among the eventual principal owners of the 1878 74th National Bank. In time, Hara came to dominate the 2nd, and Mogi the 74th (Ishii, 1999: 415).

The banks searched for ways to replicate the safety brokers obtained by handling a debtor's thread. Although they could demand a security interest in real estate, doing so obviously limited the firms that would qualify. As an alternative, once the storage industry developed, banks began accepting warehouse receipts in thread (for the European analogue, see Federico, 1997: 166-67). In 1881, the Hara-dominated 2nd still avoided security interests in thread. By 1885, it accepted such security interests for a third of its loans, and by 1887 for nearly three quarters. At the Mogi-dominated 74th, by 1886 the bank made over 80 percent of its loans on such a basis.

B. Finance in Kiryu Silk Weaving:

1. Production. -- (a) What they produced.[8] Although the center of silk-reeling shifted over the last half of the 19th century along mechanization patterns, the center for silk-weaving stayed unchanged. In the mid-Tokugawa period, that center lay in the Kiryu district of (what became) Gunma prefecture and the Nishijin district of (what became) the city of Kyoto. At the close of the 19th century, it remained in Kiryu and Nishijin.

[8] For this account, we draw generally on Yamaguchi (1974: 353-57).

Yet if the principal locations remained unchanged, the work itself did not. The textiles that the weavers wove began to change. The technology by which they wove them began to change. And the amount they wove changed.

As the Meiji era opened, the Kiryu weaving firms wove primarily silk kimono and obi (elaborate belts). Almost immediately, however, thread brokers discovered high levels of foreign demand. In response, they began exporting large amounts of their thread. As they did, they drove up the domestic price of thread.

Kiryu weavers responded to the price spike by blending cotton with silk. By the early 1880s, they wove as much (by value) blended thread as silk. Cocoon producers also responded to the spike, and did so by expanding production. As supplies expanded, the Kiryu weavers returned to their focus on unblended silk (Table 12).

[Insert Table 12 about here.]

Of the thread reeled, the Kiryu weavers tended to use the cheaper variants. Foreign buyers preferred the uniformity of the mechanically reeled thread. Given that the foreign buyers were willing to pay a premium for that uniformity, the brokers tended to export the mechanically reeled thread. Kiryu weavers turned instead to cheaper hand-reeled variants. When mechanically reeled thread failed the Yokohama quality inspections, they turned to that as well.

Although the Kiryu weavers produced primarily for the domestic market, over time they began to export too. Through the 1880s, they still produced mostly for Japanese consumers. In the 1890s they began to produce the cloth foreign buyers wanted, particularly the plain fabric known as habutae. By 1898, they exported 70 percent of their cloth (though their export share thereafter declined).

(b) How they produced.[9] At the center of Kiryu fabric production lay the 700-800 "weaving firms" (in various circumstances, known as the motobataya or orimoto). Although most such firms did weave, more fundamentally they coordinated. And in weaving and coordinating they built on centuries of domestic technology. From firms that specialized in twisting raw thread into weavable form, they bought yarn. They then arranged to have it dyed. They arranged to have it coated with paste. The number of such preparatory steps varied, but once they had readied the yarn they turned to the weaving.

Typically, the weaving firm itself wove less than half its fabric. The rest it out-sourced to 20 to 30 (and sometimes up to 100) independent weavers (known as chinori). For this work, in Kiryu the weaving firm turned to members of farm households who wove for the extra by-employment income. Generally, it lent them a loom and paid on a piece-rate basis.

In the 19th century, most weaving firms still relied heavily on hand looms. In the early years of the 20th they began to shift to power looms, and by the First World War had almost entirely switched. They did not shift just to increase quantity; they also shifted to produce the higher value-added fabric their buyers wanted.

Upon finishing a piece of fabric, weaving firms usually sold it to a fabric broker (orimono nakagai or orimono kaigi sho) -- whether bound for domestic consumers or

[9] For this account, we draw generally on Yamaguchi (1974: 357-61, 364-67, 432, 475).

foreign. In turn, that broker re-sold it to a metropolitan wholesaler (ton'ya) in Osaka, Kyoto, Tokyo or Nagoya.

2. Finance. -- (a) Payment.[10] In the closing decades of the 19th century, 20-40 firms competed in the Kiryu fabric brokerage market. They included several that had survived the transition from the Tokugawa period and many new firms that had entered since. A few firms dominated this market: the house of Sawa handled a majority of all Kiryu fabric, and the Kakiage and Onosato houses followed. The Sawa house failed in the 1896 recession, however, and by 1910 the Kakiage house had become the preeminent Kiryu fabric broker.

Although the brokers handled both domestic- and foreign-bound fabric, they acquired the two by different routes. Much of the fabric for domestic consumers they bought at the local market. Six-times a month the weavers and brokers gathered at a morning market. A broker would choose the fabric he wanted and for it give a seller a tentative promissory note (kaifuda). On the note he would specify which and how much fabric he wanted. In the afternoon, the seller would visit his shop and trade the preliminary note for a standard (usually 30 day) promissory note. He then either discounted the note at a bank or used it to buy yarn -- in which case the yarn seller discounted it with a bank.

Kiryu brokers traced this use of cheques not to Western antecedents but to indigenous practice. Largely, the weaving firms and brokers had already standardized the practice by the 18th century. Before that time, when a seller brought the broker his tentative promissory note on the market-day afternoon, the broker had paid cash. Eventually, however, sellers began to accept notes, and over time they came to accept increasingly long-term notes.

By contrast, brokers bought most of their export-bound fabric (as well as some of their domestic fabric) on special order. Generally, a broker obtained the order from a foreign buyer or metropolitan wholesaler who specified the type and amount of fabric. He then transmitted that order to one or more weaving firms. When a firm delivered the fabric, he gave it a promissory note for 90 percent of the sales price. He paid the rest when he collected the funds from his buyer.

Urban wholesalers did not always pay the broker on delivery. Sometimes they paid immediately, but sometimes on extended credit. As the terms shifted, sometimes brokers were net debtors, and other times net creditors.

(b) Loans. Both to increase quantity and to raise quality, weaving firms steadily upgraded their capital stock. To pay for the equipment, they sometimes chose to borrow. If they approached a bank, however, most faced resistance. Although a few of the biggest firms had good enough credit to borrow from a bank, most did not. To induce a bank to lend, they needed to offer security. Yet for security most could offer only fabric.

Few banks would lend on a security interest in any fabric other than the most standardized varieties. Instead, they demanded real estate or thread. Although the price of the silk thread could fluctuate too, most thread presented little idiosyncratic risk. By contrast, fabric fluctuated not just by the price of generic (hand- or mechanically reeled)

[10] For this account, we draw generally on Yamaguchi (1974: 364-67, 384-89, 400-01).

thread, but by the whims of fashion: not only did it fluctuate as the demand for and supply of silk varied; it fluctuated as the popularity of various designs waxed and waned to boot (Yamaguchi, 1974: 358, 477).

Unable to borrow from banks, the small weaving firms turned to other firms. They had many to which they could turn. Over the decades, however, the largest lender in Kiryu was the family partnership known as Mori shoten.

Mori did many things. It sold thread. It wove fabric. It brokered textiles. And it loaned money. Indeed, by the late Tokugawa period it had made money-lending its principal business, and at the close of the century its head Sosaku Mori the richest man in Kiryu (Yamaguchi, 1974: 452).

Although the Mori house loaned money on real estate, it also lent money on fabric. It could do so more profitably than a bank because it also wove and brokered the fabric. Through that work, it acquired the information by which it could gauge the likely future popularity of a design.

For the funds to lend to weaving firms, The Mori house turned to the 40th Bank. Although ex-samurai had formed the 40th in 1878, after the bank established a branch in Kiryu the next year silk merchants began assembling its stock. Soon, they served on the bank's board and Yuemon Sawa of the Sawa fabric brokerage firm ran its lending operations. Under his leadership, the Sawa house borrowed extensively from the 40th, and re-lent to the weavers. The firm failed in 1896, however, and the Mori then took its place. In time, not only would Sosaku Mori head the brokerage firm, he would also head (todori) the 40th. In effect, the Mori and Sawa used their informational advantage in the weaving industry to arbitrage the bank's funds (Yamaguchi, 1974: 477-78, 487, 521-23, 526-27).

C. Finance in Nishijin Silk Weaving:

1. The weaving firm.[11] -- During the late 19th and early 20th century, weavers in the Nishijin district wove (by value) about 15 to 20 percent of all textiles. Primarily, they focused on luxury pieces for the domestic market.

As in Kiryu, the weaving firm (the kigyoka, hataya, or orimoto; the appellation varied) operated at the center of this activity. It bought its thread from one of 50-80 metropolitan thread brokers (kiito nakagai) who, in turn, obtained it from one of 10-20 regional thread brokers (kiito ton'ya). It then worked the thread and wove it (or arranged for others to work it and weave it).

The Nishijin weaving firm sold the fabric it produced to a primary fabric broker (kami nakagai), who resold it to a secondary broker (shimo nakagai). The latter apparently handled a wider scope of textiles, and resold the fabric to a metropolitan fabric wholesaler (ton'ya) with retailing contacts. As of 1904, 79 registered (with the trade association) primary brokers competed in the Nishijin area, along with 53 secondary brokers and 55 brokers providing both services. In addition, roughly as many unregistered fabric brokers operated as well.

Again as in Kiryu, the Nishijin weaving firm often did not so much produce as coordinate. It sent any as-yet untwisted thread to a firm that twisted it into yarn (yoriito

[11] For this account, we draw generally on Yamaguchi (1974: 201-31); Hareven (2002: ch. 3).

gyosha). In the early Meiji years, these twisting "firms" were small family operations. By 1905, they competed with 18 local factories employing several hundred workers.

Once the weaving firm obtained twisted yarn, it sent it to a series of other firms. Preliminarily, it sent it to a refining firm (nerimono ya) that gave it the requisite flexibility. It sent it to another firm that dyed it (though increasingly a single firm both refined and dyed). It attached the paste necessary to make it weavable. It wound it (or arranged to have it wound) onto spools. It hired specialists to design a fabric pattern and to translate the pattern into warp and woof combinations.

And then the weaving firm wove. Or maybe not. Some weaving firms ran a household weaving operation. Others ran a small factory. And still others outsourced the weaving to independent contract-weavers (as did even some firms that wove cloth themselves; see Table 13, Panel A).

[Insert Table 13 about here.]

Because of the intricacy of the upscale Nishijin fabric, Nishijin contract-weavers were skilled artisans. In areas that produced simpler cloth, young farm women sometimes augmented their family income by working as contract weavers. Not so in Nishijin. There, a weaver usually learned his trade through a seven- to ten-year apprenticeship with a weaving firm. During that time, he received a modest wage. If by the end of the apprenticeship he had saved enough to buy a loom, he sometimes did so. If not, he borrowed a loom from a weaving firm and worked as a contract weaver.

Nishijin weaving firms steadily invested in new technology. In the 1890s they still wove half their fabric on traditional two-worker looms -- one worker to operate the shuttle, and another to raise and lower the threads according to the fabric pattern. During the next few decades, weaving firms increasingly switched to "Jacquard" equipment. By imprinting the fabric pattern onto a stack of punch cards, they could use these French-style machines to eliminate the need for the second worker (Hareven, 2002: 42-45, 57). In the process, they could also treble or quadruple production, and raise fabric quality as well.

In 1900, Nishijin weaving firms still wove most of the fabric on manually powered machines (whether traditional or Jacquard). Increasingly, however, factories[12] dominated Nishijin production, and these factories began to use externally powered machines. From 1900 to 1914, the number of manual looms fell by nearly half and the number of externally powered looms doubled (Table 13).

2. Thread sales.[13] -- Consider the financial consequences as the thread traveled from the reeling to the weaving firm. Ten to 20 regional thread brokers supplied Nishijin. Eighty to 90 percent of this thread they acquired from reeling firms on consignment. Upon shipping the thread, however, the reeling firm borrowed from a bank the lion's share of the expected sales price of the thread. To take delivery, the regional broker then paid off the bank -- either immediately or within about ten days. In effect, the regional brokers paid the reeling firm 80 to 90 percent upfront.

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[12] Defined here as weaving firms with 10 or more workers. In 1902, 79 Nishijin factories had 10-19 workers, 6 had 20-99, and 7 had 100 or more.

[13] For this account, we draw generally on Yamaguchi (1974: 211-15).

These regional brokers sold the consigned thread to the metropolitan thread brokers (or occasionally either to a weaving firm directly or to a firm that twisted thread into weavable yarn). Because the regional broker held the thread on consignment, after preliminarily negotiating a sale he contacted the reeling firm by telegram. If the reeling firm consented to the price (apparently he often quoted a lower price than the buyer had agreed to pay), he delivered the thread. After subtracting the 80-90 percent he had already paid the reeler, the interest on that advance, his expenses, and his fee (1 to 1.2 percent), he paid the reeling firm the remainder.

The metropolitan thread brokers paid the regional brokers only on a deferred basis. At the turn of the century, they generally settled their accounts with the regional brokers in cash after about 40 days. Over time, however, they increasingly settled with promissory notes that delayed actual settlement further still. By 1914, they settled their accounts with notes payable only after another 30 to 60 days.

If the metropolitan brokers borrowed from the regional brokers, they lent to the weaving firms. For over time, the weaving firms too gradually deferred settlement. At the turn of the century, they still paid for their thread within 30 to 90 days. By 1914, they settled their accounts only after 100 to 120 days. At those periodic settlements, many weaving firms used promissory notes and partial payment to delay payment further still.

3. Fabric sales.[14] -- The weaving firms sold their fabric to the primary fabric brokers. In the high-fashion segment for which the Nishijin weavers produced, fabric price depended not just on design intricacy and yarn quality, but also on the vagaries of fashion. This risk primary brokers would not bear. As a result, when a weaving firm delivered the fabric, the parties did not set a price. Instead, the broker acknowledged receipt, and each month paid the firm 60-70 percent of the anticipated price of the fabric the firm had delivered.

Perhaps because of closer contact to the retail market or perhaps because of greater diversification, the secondary fabric brokers were willing to bear this fashion risk. Consequently, when the secondary brokers received the fabric, they agreed to a price on the spot. They too, however, paid on credit -- generally, 70 percent at the end of the month and the remainder at the next June or December. In the early 1900s, they made these biannual settlements in cash. Over time, however, they began to settle with promissory notes, usually payable only after another 50 to 90 days. In turn, the primary broker either discounted the notes with a bank or used them to pay the weaving firms.

The primary brokers likewise settled their accounts with the weaving firms twice a year. From the price they received for the fabric from the secondary broker, they subtracted the money they had advanced, their expenses, and their fee (bubiki; typically 2 percent) -- and paid the weaving firm the remainder. The primary brokers usually settled their accounts with the weaving firms in cash, though they too increasingly used promissory notes payable in 50-80 days.

Typically, the secondary broker then resold the fabric to a metropolitan fabric wholesaler. The largest of the Tokyo wholesalers maintained offices in Kyoto and occasionally bought from the primary brokers directly. Usually, however, they dealt with the secondary brokers. Like the primary and secondary fabric brokers, the wholesalers

[14] For this account, we draw generally on Yamaguchi (1974: 222-27).

bought on credit. They paid a substantial portion of the purchase price in 1-2 months by promissory note, and settled accounts twice a year.

4. Kimura shoten. -- For a closer view of financing practices in the industry, consider Yamaguchi's (1974: 232-52) reconstruction of the books of the Kimura primary fabric brokerage house. Begun in 1753, by the early years of the 20th century the firm had passed to the founder's seventh-generation successor. It specialized in obi fabric (about half its fabric stock), and of the Nishijin silk merchants was among the more successful.

During the 1870s and 80s the Kimura firm invested slightly over half its working capital in fabric, and the rest in loans. Of the latter, it made the majority to weaving firms,[15] and the rest to secondary brokers (Table 14, Panel A). The firm largely funded its business out of earnings. Yamaguchi reproduces the data only for the early 20th century, but at least in those years the firm borrowed only occasionally from banks. The rest of the loans it apparently obtained from its business contacts (Table 14, Panel B).

[Insert Table 14 about here.]

Yamaguchi also traces the path of 287 promissory notes (totaling 20,929 yen) that the Kimura firm made in 1881. Of these notes, at least 227 (worth 15,955 yen) were payable to various weaving firms. Rather than cash the notes, the weaving firms usually used them to pay their thread suppliers: they endorsed 46 of the promissory notes themselves (worth 3,454 yen), and used at least 78 (worth 5,490 yen; Yamaguchi was unable to identify the endorsers on the rest) to pay for thread. Of the 287 promissory notes, the holders discounted 266 within 23 days, and 130 within 3 days.

5. Conclusion. -- In effect, the regional thread brokers financed much of the rest of the Nishijin weaving industry. They paid reeling firms promptly, but let the metropolitan brokers delay payment weeks or months, and the metropolitan brokers let the weaving firms delay payment a similar length of time. The primary fabric brokers often paid the weaving firms late,[16] the secondary brokers paid the primary brokers late, and the metropolitan wholesalers paid the secondary brokers late.

In this process banks played a primarily transactional role, clearing and discounting promissory notes.[17] When they discounted, they necessarily extended credit, of course. And they also sometimes lent directly, sometimes lent to metropolitan thread brokers, and sometimes lent on the strength of thread stock or securities holdings to regional thread brokers.

Yet the producers themselves (the weaving firms) largely obtained their funds through trade credit. As in Kiryu, brokers used their information about the industry to arbitrage the money banks provided -- and relend it to the producers. The banks had the

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[15] These are the advances (about 60-70 % of the expected selling price) that Kimura made to the weaving firms upon taking possession of the fabric. As discussed earlier, it generally accumulated the fabric and then negotiated sales in larger lots at periodic intervals. Because the weaving firms retained title to the fabric during this period, Yamaguchi treats the advances as a loan from the Kimura firm to the weaving firms. Alternatively, of course, one could characterize the consignment as an effective sale coupled with a loan of 30-40 % of the value of the fabric from the weaving firm to Kimura.

[16] Note the ambiguity discussed in the footnote [immediately preceding].

[17] In this industry, securities markets do not figure. Most firms were not even incorporated.

money, but knew little about the industry; the brokers had better information, but less money. Accordingly, the brokers used bank resources to leverage that information to their advantage. Although the banks funded some of industry, in other words, they did so through entrepreneurs with closer contact to the producers.

III. The Financial-Revolution Hypothesis and Japan

To explore the determinants of economic development, Sylla examines several prominent countries that experienced rapid growth. Consistently, he finds they underwent a "financial revolution" before their expansion. The U.S. in the late 18th century presents a case in point. Through men like Hamilton, explains Sylla, the government put its finances in order. Once it had done so, it presented capitalists an attractive investment opportunity. Once it had improved its credit, investors eagerly lent it what it needed.

In order to finance this newly reformed government, continues Sylla, investors created banks and securities markets. To lend directly, they formed banks. To trade the government bonds they bought, they organized securities markets. Once they had banks and markets in place, they discovered they could use them to fund private firms as well. By ordering its own finances, the government had given investors the incentives they needed to create the institutions at the heart of modern industrial finance. With those institutions in place, private firms obtained access to the capital that would fund the meteoric growth that ensued.

The hypothesis fits Hamilton and late 18th-century U.S., writes Sylla. Might it fit Matsukata and late 19th-century Japan? The question raises several component puzzles: (i) Assume Matsukata put the government's fisc in order; did investors create their banks and securities markets to lend to it? (ii) Did entrepreneurs use the new securities markets to fund the investments that fueled the rapid growth? (iii) And did they use the new banks to fund those investments?

Did investors create the banks and securities markets to exploit the attractive investment opportunities presented by the newly reformed government? Japanese investors at the close of the 19th century formed many banks, but they did not form them to lend to the government. Fundamentally, the government did not borrow from banks. From the start, the banks instead focused on (x) offering commercial firms transactional services and (y) lending on low-risk security interests like real estate. To the state, they simply did not lend.

Although investors did form the securities markets to trade government bonds, they did not buy the bonds because of any reform in public finance. Ex-samurai took the bonds because the new regime abolished their hereditary status and distributed the bonds in compensation. It was not a deal they welcomed. Rather, in response to the deal they organized a counter-coup.

Did entrepreneurs use the new securities markets to fund industrial investments? During the closing decades of the 19th century, few firms listed stocks or bonds on either the TSE or OSE. For the vast majority of firms, those organized markets simply did not matter. Their funds they obtained elsewhere.

Nevertheless, the organized securities markets did fund some firms. More specifically, they provided substantial equity capital to the railroad firms. To them, the securities markets mattered crucially. And by the turn of the century, those railroads would help tie Japan's disparate regional markets into an integrated national economy.

Did entrepreneurs use banks to fund new investments? Banks seldom directly funded the capital assets at the base of Japan's economic transformation. For fundamentally, banks seldom lent toward long-term investments. The biggest firms did not borrow their fixed capital from banks. At least in the silk industry, neither did smaller funds. When banks did lend long-term, they usually demanded low-risk security interests or followed the lead of more knowledgeable lenders.

Yet to say banks did not aggressively fund long-term capital investments potentially misleads. At root, it trivializes two crucial ways banks did contribute to Japan's economic transformation. First, they provided the transactional mechanisms by which firms traded. More specifically, they offered the clearance and discounting services merchants demanded. Those merchants then used the services both to advance credit to borrower firms, and to link the many regional economies into an integrated national market.

Second, banks lent merchants funds that they in turn advanced to small-scale producers. Banks rarely lent large amounts directly and independently to small producers. They simply lacked the expertise to evaluate the credit risks involved. Rather, they focused on established merchants with strong reputations and real estate to post as security.

These merchants, however, re-lent to the small-scale producers the funds the banks had advanced. As brokers, the merchants maintained regular contact with both the producers and their customers. By regularly visiting the producers and selling them supplies, they acquired information by which to judge their solvency. By regularly selling the output, they acquired information about the vagaries of the market into which they sold. Through that information, they could -- and did -- arbitrage the funds they obtained from the banks to fund the industrial expansion.

To focus on financial revolutions is right and good, but financial infrastructure includes more than securities markets and banks. Japan at the close of the 19th century did experience a financial revolution. By listing the shares of the largest firms, its new securities markets did provide those firms with liquidity and access to a national pool of capital. By offering transactional services, its new banks did facilitate trade in the inter-regional product market. But the intermediaries who directly supplied the capital to the firms that drove much of Japan's growth were neither. Instead, they were the brokers. Through the institutional advantages they obtained by handling a borrower's product, and the informational advantages they obtained through regular contact with the borrower and its customers, these merchants provided the link between investors and their banks on the one hand, and producers on the other.

Bibliography

Asakura, Kokichi. 1961. Meiji zenki Nihon kin'yu kozo shi [The Financial Structure of Early Meiji Japan]. Tokyo: Iwanami shoten.

Federico, Giovanni. 1997. An Economic History of the Silk Industry, 1830-1930. Cambridge: Cambridge University Press.

Fisman, Raymond & Inessa Love. 2003. Trade Credit, Financial Intermediary Development, and Industry Growth. Journal of Finance, 58: 353-74.

Fujimoto, Jitsuya. 1933. Nihon sanshigyo shi: seishi shi [A History of the Japanese Silk Thread Industry: Reeling]. No publication information.

Fujino, Shozaburo, Shiro Fujino & Akira Ono. 1979. Sen'i kogyo [Textiles]. Tokyo: Toyo keizai shimpo sha (LTES Series v. 11).

Hareven, Tamara K. 2002. The Silk Weavers of Kyoto: Family and Work in a Changing Traditional Industry. Berkeley: University of California Press.

Hirano, Yasushi. 1990. Kindai yosangyo no hatten to kumiai seishi [Early Modern Sericulture and Unionized Silk Reeling]. Tokyo: University of Tokyo Press.

Imuta, Toshimitsu. 1976. Meiji ki kabushiki kaisha bunseki josetsu [Introduction to the Analysis of Meiji-Era Corporations]. Tokyo: Hosei University Press.

Ishii, Kanji. 1986. Meiji ki no gunma no seishi [Silk Reeling in Meiji-era Gunma]. In Susumu hagihara, Gunma no seishi [Silk Reeling in Gunma]. Maebashi: Miyama bunko, pp. 79-164.

Ishii, Kanji. 1999. Kindai Nihon kin'yu shi jo setsu [Introduction to Early Modern Japanese Financial History]. Tokyo: University of Tokyo Press.

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer & Robert W. Vishny. 1998. Law and Finance. Journal of Political Economy, 106: 1113-55.

Levine, Ross. 2004. Finance and Growth: Theory and Evidence. NBER Working Paper 10766. Forthcoming in Handbook of Economic Growth.

Miwa, Yoshiro & J. Mark Ramseyer. 2000. Corporate Governance in Transitional Economies: Lessons from the Prewar Japanese Cotton Textile Industry. Journal of Legal Studies, 29: 171-203.

Miwa, Yoshiro & J. Mark Ramseyer. 2002a. Banks and Economic Growth: Implications from Japanese History. Journal of Law & Economics, 45: 127-64.

Miwa, Yoshiro & J. Mark Ramseyer. 2002b. The Value of Prominent Directors: Corporate Governance and Bank Access in Transitional Japan. Journal of Legal Studies, 31: 273-301.

Momose, Takashi. 1990. Jiten: Showa senzenki no Nihon -- Seido to jittai [Dictionary: Pre-war Showa Japan -- Institutions and Reality]. Tokyo: Yoshikawa kobunkan.

Muroyama, Yoshimasa. 2004. Matsukata zaisei kenkyu [Studies in Matsukata Public Finance]. Tokyo: Minerva shobo.

Noda, Masaho. 1980. Nihon shoken shijo seiritsu shi [A History of the Establishment of Japanese Securities Markets.] Tokyo: Yuhikaku.

Oishi, Kaichiro. 1989. Jiyu minken to Okuma-Matsukata zaisei [The Freedom and Popular Rights Movement and Okuma-Matsukata Public Finance]. Tokyo: University of Tokyo Press.

Osaka kabushiki torihiki jo. 1928. Okabu 50 nen shi [Fifty-year History of the OSE]. Tokyo: Osaka kabushiki torihikijo.

Peterson, Mitchell A. & Raghuram G. Rajan. 1997. Trade Credit: Theories and Evidence. Review of Financial Studies, 10: 661-91.

Ramseyer, J. Mark & Frances M. Rosenbluth. 1995. The Politics of Oligarchy: Institutional Change in Imperial Japan. New York: Cambridge University Press.

Snow, Richard. 1911. Silk: Part 2. Encyclopaedia Britanica, 11th ed. New York: Encyclopaedia Brinannica Co., v. 25, pp. 103-05.

Someno, Yoshinobu. 1958. Shiho seido [The Judiciary]. In Nobushige Ukai, Masao Fukushima, Takeyoshi Kawashima, Kiyoaki Tsuji, eds., Koza: Nihon kindai ho hattatsu shi [The Development of Early Modern Japanese Law]. Tokyo: Keiso shobo, 1958, pp. 99-176.

Sylla, Richard. 1999a. Shaping the US financial System, 1690-1913: The Dominant Role of Public Finance." In Richard Sylla, Richard Tilly & Gabriel Tortella, eds., The State, the Financial System and Modernization." Cambridge: Cambridge University Press, pp. 249-70.

Sylla, Richard. 1999b. Emerging Markets in History: The United States, Japan, and Argentina. In Ryuzo Sato, Rama V. Ramachandran & Kazuo Mino, eds., Global Competition and Integration. Boston: Kluwer Academic, pp. 427-46.

Sylla, Richard. 2002. Financial Systems and Economic Modernization. Journal of Economic History, 62: 277-92.

Takahashi, Kamekichi. 1930. Nippon zaibatsu no kaibo: chu [The Anatomy of the Japanese Zaibatsu: vol. II]. Tokyo: Chuo koron sha.

Takahashi, Kamekichi. 1968. Nihon kindai keizai keisei shi [History of the Establishment of the Early Modern Japanese Economy]. Tokyo: Toyo keizai shimpo sha.

Tokyo kabushiki torihiki jo. 1928. Tokyo kabushiki torihiki jo 50 nen shi [Fifty-year History of the Tokyo Stock Exchange]. Tokyo: Tokyo kabushiki torihiki jo.

Ueyama, Kazuo. 1982. Kikai seishi no kakuritsu to sanshi gijutsu [Sericulture and the Establishment of Mechanized Silk Reeling]. In Fukuju Unno, ed., Gijutsu no shakai shi [A Social History of Technology]. Tokyo: Yuhikaku.

Warner, Frank. 1911. Silk: Part 1. Encyclopaedia Britanica, 11th ed. New York: Encyclopaedia Brinannica Co., v. 25, pp. 96-103.

Yagi, Akio. 1960. Nihon kindai seishi gyo no seiritsu [The Establishment of the Early Modern Silk Reeling Industry in Japan]. Tokyo: Ochanomizu shobo.

Yamaguchi, Kazuo. 1966. Nihon sangyo kin'yu shi kenkyu: Seishi kin'yu hen [Studies in the History of Japanese Industrial Finance: Silk-Reeling Finance]. Tokyo: Tokyo daigaku shuppankai.

Yamaguchi, Kazuo. 1970. Nihon sangyo kin'yu shi kenkyu: Boseki kin'yu hen [Studies in the History of Japanese Industrial Finance: Cotton-Spinning Finance]. Tokyo: Tokyo daigaku shuppankai.

Yamaguchi, Kazuo. 1974. Nihon sangyo kin'yu shi kenkyu: Orimono kin'yu hen [Studies in the History of Japanese Industrial Finance: Weaving Finance]. Tokyo: Tokyo daigaku shuppankai.

Table 1: Formal Banking Sector, 1875-1900

	n	BO	PIC	Pft	Div	Dep	Lns.
1875	4	0	345	34	26	147	214
1876	6	0	435			250	349
1877	27	19	2499			458	1428
1878	96	38	3560			864	2667
1879	151	82	4277			1622	3952
1880	191	108	5087			1729	4359
1881	239	115	5593			2435	5083
1882	321	126	6618			2356	6996
1883	350	124	6871			3797	5156
1884	356	127	7198			4121	5257
1885	359	122	7124			4404	6044
1886	358	125	7038			4983	6788
1887	359	137	7923			4620	8670
1888	348	200	8070	1332	849	7111	11383
1889	354	208	8424	1292	878	6848	12702
1890	353	206	8872	1377	928	6367	16357
1891	388	260	9026	1461	907	7044	15502
1892	405	255	9114	1418	898	8596	14274
1893	703	339	14245	1396	919	11183	20501
1894	865	414	15017	1744	1020	13395	23791
1895	1013	577	17649	2628	1658	18441	32285
1896	1277	832	20989	4699	1491	23455	54782
1897	1505	1004	21769	4553	2676	30462	51082
1898	1752	1383	25366	4190	2139	37146	70633
1899	1943	1730	28713	4730	2698	53461	88257
1900	2272	2220	33613	5126	2795	57084	99225

Notes: n: Number of banks. BO: Number of branch offices. PIC: Paid-in capital. Pft: Profits. Div: Dividends paid. Dep: Deposits. Lns: Loans. Figures are for all banks, other than the Bank of Japan. All yen amounts are x 10,000 yen.

Sources: Koichi Emi, Masakichi Ito & Hidekazu Eguchi, Chochiku to tsuka [Savings and Currency] 184 (Tokyo: Toyo keizai shimpo sha, 1988) (Hitotsubashi LTES Series 5); Asahi shimbun sha, Nippon keizai tokei sokan [Comprehensive Economic Statistics of Japan] 347, 457(Osaka: Asahi shimbun sha, 1930).

Table 2: Formal and Informal Banking Sectors, 1880-1887

	Private Banks		Quasi-Banks*		National Banks	
	No.	PIC.	No.	PIC.	No	PIC .
1880	39	6280	120	1211	153	43041
1881	90	10447	369	5894	148	44886
1882	176	17152	438	7958	143	44236
1883	207	20487	573	12071	141	44386
1884	214	19421	741	15142	140	44536
1885	218	18758	744	15397	139	44456
1886	220	17959	748	15391	138	
1887	221	18896	741	15117	138	

Notes: No: Number. PIC.: Paid-in capital (x 1000 yen).

* Financial institutions not chartered as banks; defined by Asakura as "firms engaged in such financial business as money orders, money exchange, deposits, loans, etc."

Source: Kokichi Asakura, Meiji zenki Nihon kin'yu kozo shi [The Financial Structure of Early Meiji Japan] 187 (Tokyo: Iwanami shoten, 1961).

Table 3: National Debt Instruments, 1875-1900

	Bonds outstanding	Military bonds outstanding.
1875	55810	0
1876	53927	0
1877	226854	9486
1878	237364	15000
1879	235199	15000
1880	234338	15000
1881	231128	15000
1882	225511	15000
1883	217663	15000
1884	229862	15000
1885	231256	15000
1886	229994	15000
1887	237981	21000
1888	242548	23000
1889	250053	27000
1890	243237	27000
1891	242626	26990
1892	245894	26997
1893	234815	26994
1894	231706	66907
1895	320624	136016
1896	351122	147048
1897	382953	160141
1898	391282	160379
1899	478701	207970
1900	486464	209440

Notes: All yen amounts are x 1000. Bonds outstanding: nominal value of national bonds outstanding at the end of the year.

Source: Asahi shimbun sha, Nippon keizai tokei sokan [Comprehensive Economic Statistics of Japan] 176, 226 (Osaka: Asahi shimbun sha, 1930).

Table 4: Aggregate Loans at Selected Large Banks, 1891-1900

	Mitsui	Sumitomo	Daiichi
1891			7402
1892			8101
1893	10939		9251
1894	11382		9812
1895	16445	2142	12237
1896	18072	4310	13109
1897	20407	5336	12577
1898	25000	6190	12489
1899	28150	8164	18241
1900	23240	10030	20989

Notes: x 1000 yen.

Source: Asahi shimbun sha, Nippon keizai tokei sokan [Comprehensive Economic Statistics of Japan] 521 (Osaka: Asahi shimbun sha, 1930).

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Table 5: Mean Capitalization of Firms, 1897

	Food	Chem.	Brick	Cement	Metals	Machines
Paid-in Capital	64.6%	71.1%	71.8%	53.1%	72.5%	66.3%
Retained Earnings	15.6	5.3	14.9	18.4	7.3	7.3
Bonds	3.4	0	0	10.3	0	0
Bank Debt	5.2	1.8	9.7	4.5	13.2	2.6
Other Debt	11.3	21.7	3.7	13.8	7.1	23.8
No. of firms	15	7	8	4	5	5
Mean assets (x 1000 yen)	196.7	206.5	57.9	340.4	253.5	596.3

Notes: Sample construction described in text.

Source: Toshimitsu Imuta, Meiji ki kabushiki kaisha bunseki josetsu [Introduction to the Analysis of Meiji-Era Corporations] 138 (Tokyo: Hosei University Press, 1976).

Table 6: Capitalization of Railroads, Cotton-Spinning Firms, and Banks, 1897-1906

	Private Railroads		Cotton Spin--ning Firms		Ordinary Banks	
	A	B	A	B	A	B .
1897	66 (35)	122542	65	28881	1305	207741
1898	58 (16)	153925	74	32500	1485	287045
1899	58 (15)	169999	78	33721	1634	392257
1900	55 (14)	181267	79	33992	1588	436780
1901	50 (10)	192811	66	34993	1614	450187
1902	50 (9)	202604	56	34555	1585	536703
1903	46 (5)	208286	51	34029	1563	566228
1904	39 (2)	215922	49	33487	1521	605317
1905	39 (2)	223337	49	33564	1495	692521
1906	34 (3)	125948	47	38433	1470	1033763

Notes: (A) Number of firms; (B) Paid in capital, in 1000 yen. Firms not yet operational in parenthesis.

Source: Masao Noda, Nihon shoken shijo seiritsu shi [The History of the Establishment of Japanese Securities Markets] 157 tab. 3-10 (Tokyo: Yuhikaku, 1980).

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Table 7: Capitalization of Railroad Firms, 1884-1898

	1884	1886	1888	1890	1892	1894	1896	1898 .
Pd-in Cap.	5163(100)	8062(100)	14997(97)	38493(95)	46737(94)	59177(88)	89011(91)	169999(92)
Ret. Erngs	0 (0)	0 (0)	231 (2)	511 (1)	775 (2)	1322 (2)	1587 (2)	3374 (2)
Bonds	0 (0)	0 (0)	0 (0)	269 (1)	1710 (3)	5778 (9)	5350 (5)	10640 (6)
Bank Debt	0 (0)	0 (0)	165 (1)	1162 (3)	580 (1)	877 (1)	2316 (2)	2190 (1)
No. firms	1	2	6	12	13	20	27	41

Notes: Current values, in 1000 yen, followed by percentage. Bank debt excludes short-term.

Source: Tetsudo kyoku, Meiji 32 nendo Tetsudo kyoku nempo [1899 Railway Bureau Annual Report] 221-37 (Tokyo: Tetsudo kyoku, 1900).

Table 8: Mean Capitalization of Cotton-Spinning Firms, 1898

	Number of Operating Spindles				
	5,999 or less	6,000-9,999	10,000-19,999	20,000 or more	All Firms
Paid-in Capital	186 (64)	338 (59)	451 (59)	827 (55)	469 (58)
Retained Earnings	7 (2)	11 (2)	65 (9)	226 (15)	84 (10)
Bonds	0 (0)	25 (4)	41 (5)	99 (7)	44 (5)
Bank Debt	47 (16)	78 (14)	65 (9)	153 (10)	90 (11)
Other Debt	51 (18)	123 (21)	136 (20)	188 (13)	128 (16)
No. of Firms	12	13	12	15	52

Notes: The table gives the mean per firm figure, in 1000 yen, followed by the percentage of total firm capitalization in parenthesis. Bank debt includes shakunyu kin and toza karikoshi.

Source: Toshimitsu Imuta, Meiji ki kabushiki kaisha bunseki josetsu [Introduction to the Analysis of Meiji-Era Corporations] (20) (Tokyo: Hosei University Press, 1976).

Table 9: Silk Production

	Cocoon Production	Silk Thread Production				Silk Thread Exports
		Tot Silk	Mach-reeled	Hand-reeled	Dupion	
1879	37235	1669				982.0
1880	44030	1999				877.0
1881	50242	1729				
1882	49801	1856				1737.0
1883	41475	1712				1879.0
1884	43622	2138				1259.0
1885	32039	1905				1474.0
1886	41716	2696				1603.0
1887	45715	3019				1888.0
1888	44413	2794				2820.0
1889	44426	3624	1338	1968	318	2477.0
1890	43960	3458	1382	1873	203	1266.0
1891	59259	4413	1690	2496	227	3218.0
1892	55526	4493	1941	2262	290	3259.0
1893	63259	4913	2206	2420	287	2229.0
1894	67419	5218	2754	2109	355	3291.0
1895	84681	6410	3389	2624	397	3487.0
1896	68677	5801	3045	2365	391	2351.0
1897	79573	6156	3132	2634	390	4152.0
1898	76025	5898	2955	2594	349	2902.0
1899	94221	7374	3503	3076	795	3568.0
1900	103227	7102	3716	2868	518	2779.0
1901	94732	7068	3890	2674	504	5219.0
1902	95596	7253	4002	2721	530	4847.0
1903	97016	7493	4362	2555	576	4389.0
1904	105963	7487	4486	2491	510	5795.0
1905	102125	7310	4527	2370	413	4368.0
1906	111402	8213	5282	2456	475	6237.0
1907	129636	9198	6137	2598	463	5613.0
1908	132381	10168	6666	2869	633	6913.0
1909	136120	10883	7597	2682	606	8082.0
1910	146286	11905	8384	2846	675	8908.0
1911	158823	12805	8994	3091	720	8674.0
1912	166962	13669	10102	2745	822	10262.0
1913	172183	14029	10693	2387	949	12137.0
1914	165459	14085	10845	2317	923	10289.0

Notes: All figures are x1000 kg. “Dupion thread” was the coaser, inferior thread that resulted when two silk worms spun together and interlaced their threads.

Sources: Shozaburo Fujino, Shiro Fujino & Akira Ono, Sen'i kogyo [Textiles] 294-95, 298-99, 308 (Tokyo: Toyo keizai shimpo sha, 1979) (LTES Series v. 11).

Table 10: Silk Thread Production in Principal Prefectures, 1886-1906

	1886	1896	1906
Nagano	480	1238 (93%)	1991 (95%)
Gunma	450	784 (21)	615 (18)
Aichi	26	176 (88)	536 (83)
Saitama	139	233 (20)	503 (61)
Yamanashi	131	266 (80)	458 (84)
Total	2756	5801 (56)	8213 (68)

Notes: The first figure gives annual production in 1000 meetric tons, followed by the mechanization rate (in parentheses).

Source: Kazuo Yamaguchi, Nihon sangyo kin'yu shi kenkyu: Seishi kin'yu hen [Studies in the History of Japanese Industrial Finance: Silk-Reeling Finance] 14-15 (Tokyo: Tokyo daigaku shuppankai, 1966).

Table 11: Indexed Prices in the Silk Industry

	CPI	Cocoon Prices	Raw Silk Prices	Spun Silk Prices	Habutae Exp. Price
1879	33.1	85.5	101.7		
1880	38.0	71.3	102.8		
1881	41.8	102.3	101.2		
1882	38.9	78.5	100.3		
1883	33.4	65.0	92.4		
1884	32.3	53.7	85.7		
1885	32.4	56.9	85.7		
1886	28.5	81.5	100.2		
1887	30.3	78.0	94.5	108.2	
1888	29.8	63.2	88.1	99.0	
1889	31.6	65.3	98.9	103.1	
1890	33.7	67.4	96.0	100.0	
1891	32.3	69.6	83.8	89.8	
1892	30.1	71.7	107.1	89.8	
1893	30.4	73.8	124.3	101.0	
1894	31.4	75.9	108.6	111.2	
1895	34.4	78.0	119.6	127.6	
1896	37.8	80.2	104.6	122.4	
1897	42.2	82.3	113.2	123.5	
1898	45.7	84.4	126.0	133.7	
1899	43.1	89.8	156.5	172.4	
1900	48.5	92.7	138.8	177.5	164.3
1901	47.4	83.4	123.9	141.8	153.6
1902	49.3	90.9	135.8	150.0	145.7
1903	51.7	102.3	144.3	168.4	151.7
1904	52.9	88.7	129.9		152.3
1905	55.0	97.8	138.3		150.7
1906	56.0	109.1	149.0		163.1
1907	61.9	129.6	189.9		182.0
1908	59.8	93.2	141.8		153.7
1909	57.4	93.2	138.3		141.5
1910	57.6	88.7	135.8		140.0
1911	61.9	93.2	135.8		139.8
1912	65.3	93.2	134.6		134.0
1913	67.3	104.6	141.8		138.3
1914	62.0	102.3	140.8		141.7

Notes: For all figures, prices during 1934-36 are set at 100.

Sources: Shozaburo Fujino, Shiro Fujino & Akira Ono, Sen'i kogyo [Textiles] (Tokyo: Toyo keizai shimpo sha, 1979) (LTES Series v. 11);

Kazushi Ohkawa, et al., Bukka [Prices] (Tokyo: Toyo keizai shimpo sha, 1979) (LTES Series v. 8).

Table 12: Value of Silk Fabric Production in Kiryu, in Nominal and Constant Prices

	Production -- nominal prices		Production -- constant prices	
	Silk	Cott-Silk Blend	Silk	Cott-Silk
1880	2195	2237	5776	5887
1881	2201	2217	5266	5304
1886	1495	652	5246	2288
1887	1660	786	5479	2594
1888	1825	905	6124	3037
1889	1026	1186	3247	3753
1891	1460	1062	4520	3288
1892	1545	1150	5133	3821
1893	2361	1619	7766	5326
1894	2277	1029	7252	3277
1895	4844	2093	14081	6084
1896	5868	1726	15524	4566
1897	6433	1916	15244	4540
1898	7317	3050	16011	6674
1899	6560	6503	15220	15088
1900	6661	5501	13734	11342
1901	7271	5336	15340	11257
1902	4828	4151	9793	8420
1903	5021	2198	9712	4251
1904	3762	1240	7112	2344
1905	5191	2537	9438	4613
1906	5455	4272	9741	7629
1907	5383	4642	8696	7499
1908	6696	3860	11197	6455
1909	6705	3781	11681	6587
1910	6598	4225	11455	7335
1911	7804	4441	12607	7174
1912	7962	3660	12193	5605
1913	7751	3418	11517	5079
1914	5214	3360	8410	5419

Notes: Constant prices are adjusted by the consumer price index.

Sources: Shozaburo Fujino, Shiro Fujino & Akira Ono, Sen'i kogyo [Textiles] (Tokyo: Toyo keizai shimpo sha, 1979) (LTES Series v. 11); Kazushi Ohkawa, et al., Bukka [Prices] (Tokyo: Toyo keizai shimpo sha, 1979) (LTES Series v. 8).

Table 13: Nishijin Weaving Firms

A. Number of Weaving Factories, Households, and Contract Weavers in Nishijin

.	Factories	Households	Contract Weavers
1906	312	1979	4279
1907	284	1891	4658
1908	290	1835	4963
1909	305	1996	5330
1910	285	2794	6565
1911	265	2369	7768
1912	284	2374	8470
1913	141	2022	8886

B. Number of Looms, by Producer Type

.	Factories	Households	Contract Weavers
1905	4189	9006	9128
1909	6034	8467	10431
1914	2849	3797	6646

C. Number of Manually and Externally Powered Looms

.	Manual looms	Power looms
1900	23437	846
1901	22175	860
1902	21288	854
1903	15758	848
1906	22776	1014
1907	19932	1284
1908	20496	1323
1909	21520	1598
1910	20300	1598
1911	20645	1616
1912	20571	1699
1913	14709	1673
1914	12737	1639

Notes: Factories are defined as production units with 10 or more weavers, and households as units with 10 or (sic) fewer weavers. Households includes both kanai kogyo and orimoto.

Source: Kazuo Yamaguchi, Nihon sangyo kin'yu shi kenkyu: Orimono kin'yu hen [Studies in the History of Japanese Industrial Finance: Weaving Finance] 218-20, tabs. 9-11 (Tokyo: Tokyo daigaku shuppankai, 1974).

Table 14: Kimura House Accounts

A. Profits and Liquid Assets, 1874-85:

		Loans to			
	Profits	Fabric Stock	Weaving Firms	2dary Brokers	Cash
1874*	791	4833	1364	282	744
1875	714	3678	2088	322	502
1876	86	4826	1540	701	845
1878	349	2944	2929	870	409
1879*	716	4397	3120	585	970
1880	-1546	4331	3582	686	830
1881*	1632	5168	3568	1502	2832
1882	2219	6353	5987	1213	1147
1883	1490	7296	5408	1680	2050
1885	-21	8804	4364	583	1557

Notes: * As of July 1; all other figures are as of January 1 of each year. Figures exclude Osaka branch of the house.

B. Profits, Capital, and Debt, 1899-1905:

	Capital	Profits	Bank Debt	Other Debt.
1899*	51056	Not avail.	0	9052
1900	54066	3010	20740	10670
1901	59844	3476	15800	16324
1902	63021	1825	0	15020
1903	69487	2512	0	10135
1904	73716	3255	5500	10729
1905	70751	-3007	0	12849

Notes: * As of July 1; all other figures are as of January 1 of each year. Rather than borrow from banks, the brokerage firm acquired its funds from the Kimura house trasury, which in turn acquired equity from the family. The family and house treasury owned substantial assets beyond those invested in the brokerage firm, but loans were apparently taken out by the treasury, with real estate and securities posted as collateral. Capital and profit figures are for the brokerage firm; the debt figures are for those of the house treasury.

Sources: Kazuo Yamaguchi, Nihon sangyo kin'yu shi kenkyu: Orimono kin'yu hen [Studies in the History of Japanese Industrial Finance: Weaving Finance] 232-52 (Tokyo: Tokyo daigaku shuppankai, 1974).