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TSURUMI, Masayoshi / 鶴見, 誠良

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Note

Financial Development and Capital Structure in 19_{th} century Japan and the USA

Masayoshi TSURUMI

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I Introduction

This paper composes the capital structure of private corporations in the latter half of the nineteenth century in a comparative study of Japan and the USA. Based on this data analysis, we will discuss the characters and role of financial development in successful early industrialization.

Even in the early stage of industrialization, a large amount of capital are necessary in industries such as cotton, railroad, sugar, gas, electric power, shipbuilding, electric light industry and so on. How did private corporations raise such huge funds? Did they acquire funds from themselves, partnership, bank loans, or security markets? Are there considerable differences between capital-raising patterns of various industries? How did the financial sector promote and support the industrialization in both economies? Can we find a clear difference between in the

case of Japan and the USA?

There are, so far, few studies on the capital structure of private corporations in nineteenth century in Japan and USA. The main obstacle is a lack of data. In order to analyze the capital structure of any industry, we need to gather general balance sheets of as many firms in the industry as possible. Unfortunately, few balance sheets from the era survive. However, rating agencies' handbooks do provide some useful data. Although the data are not systematic, we can get a rough overview of the capital structure in the nineteenth century Japan and the USA.

This paper will compare Japanese and American corporations capital structures by sector, capital size, age, and stockholder in the latter half of the nineteenth century. The next two sections (II, III) briefly survey theoretical and empirical studies. Section IV scrutinizes balance sheet data drawn from investors' handbooks compiled by rating agencies in the late nineteenth century. In the middle three sections (V, VI, VII), we cast light on characteristics of corporate capital structure in both countries by analyzing the balance sheets of 211 Japanese and 66 U.S. corporations by clarifying main role of stock markets and supplementary role of banks in early industrialization. Section VIII discusses briefly the background of similarity and differences between Japan and the U.S.A. Section IX is the conclusion.

II Industrialization and Capital Structure

For developing countries, in general, industrialization is a difficult task. They must confront with financial scarcity, as well as a technical, managerial one, to raise huge funds for newborn modern industries

compared to their indigenous industries in a process of catching up with the economic predecessors. The U.S.A. and Japan are typical examples of post-British industrial successes. The U.S. economy established their modern industries around the Civil War in the middle of nineteenth century, while the Japanese industrial modernization after the Meiji Restoration, the Japan's Civil war in the late of the century, spurted remarkably. The background of both industrial revolutions was very different from each other: a pre-modern history, a global location, or a timing of economic spurt. The U.S. was free from a long, traditional, historical constraint, which could not help affecting heavily on the Japanese economic modernization. The U.S.A. was one of the British colonies, just across the Ocean, while Japan was an isolated, independent nation far from the Occidental imperialism whose arms had been reaching the Far East, the last remainder over the world. The U.S. economy developed more gradually step by step over a century, while the Japanese, who rushed to build up a modern economy modeled after the Occidental. Why did such different countries both succeed in early economic development? The main focus here is on the financial conditions necessary for their success.

An industrial revolution could be carried out through well-balanced development along technical, managerial, financial line. A financial sector development is, as Gerschenkron (1962) insisted long before, particularly important for a developing country to achieve successfully a high economic development (Cameron (1972)). A financial revolution tends to precede an industrial revolution. Not only in the U.S.A. but also in Japan, financial institutions stimulated and supported the real economy's development. It was a prerequisite, critical condition for a real economic spurt to reduce inflation following an independent or

civil war and to establish a stable financial system. Hamilton and Matsukata were the early public financiers who carryed out such epoch-making financial reforms in the U.S.A. and Japan respectively (Sylla 1999). On the firm ground, they established, various kinds of modern financial institutions were able to develop: commercial banks, saving banks, insurance companies, security markets and so on. By channeling savings to able entrepreneurs, financial institutions and markets stimulated the industrialization in both countries.

What kind of role should financial institutions play in industrialization? Which is a more efficient financial system for industrialization, a banking system or open markets? It is a serious issue not only for developed economies but also for developing countries. In the post-World War II era, the U.S. market-driven financial system and the Japanese bank-driven were both competitive and efficient. Some developing economies adopted a bank-driven system after Japan, while some adopted a market-driven modeled one after the U.S.A. The bank-driven system has been praised from a viewpoint of system-efficiency while the market-driven system has been appreciated from a viewpoint of market-efficiency. It seems to be easier in the former system than in the latter system for government to regulate a nation's fund allocations. Which is the better system? That question may be too simplified. We should reassess more accurately roles of the banking system and financial markets in the early industrial financial system. It is necessary to change or enlarge our view from the post-War era experiences to the pre-War era, especially the early industrialization era.

What roles did banks, the bond market, and the stock market play in the early industrialization of Japan and the U.S.A.? Each of them might have achieved their proper division of labor in the financial intermedia-

tion process. We approach the issue from the standpoint of corporate finance. A financial manager decides a liability structure that is a combination of equity, bonds, bank loans, and book credits. On the issue of optimal capital structure, we have a long list of studies since Modigliani and Miller (1958) who clarified theoretically indifference between equity and debts in the corporate finance decision under pure competition. It has been followed by many studies on an effect of tax or bankruptcy cost as distorting factors. More recent studies have focused on the asymmetric information or principal-agency problems: conflicts of interest among stockholders, managers, creditors, or workers (see Harris & Raviv (1991)).

An influential hypothesis other than the Modigliani and Miller theorem is a "pecking order theory", which argues there is a certain order from internal funds to debts to stock shares, in the corporation's decisions on fund raising (Myers and Majluf (1984)). The result, however, is still vague, although innumerable positive studies, many of which are based on econometrics, have been done so far around these two hypotheses. One of the more interesting, valuable studies among these may be the Singh research (Singh (1995)). He found that big corporations in the present developing economies raised their funds mainly from stock markets through a broad research about the capital structure of top 100 listed companies each in 10 representative developing countries in the 1980s. This result seems to support neither the Modigliani and Miller theorem nor the pecking order theory.

This paper casts light on historical experiences in two leading developed economies from a viewpoint of early industrial finance. The main result is the remarkable role of the stock market, which accords with the Singh research. The other one is a supportive role of banks, which

the Singh research neglects.

III Studies on Capital Structure in Nineteenth Century Japan and the USA

This section will survey briefly main topics of studies done so far on corporate capital structure in nineteenth century U.S.A. and Japan. The issue is how the credit, bond, or stock markets each contributed to the finance early industrialization. What was the role of each of them in Japan and the U.S.A.? Two kinds of approaches, a balance sheet analysis or a market development study, are possible.

There are few studies on the capital structure of corporations in the nineteenth century U.S.A., Quite a few studies, on the other hand, overviews the development of the U.S. financial markets. Carosso (1970), for example, focuses on the evolution of the market from a viewpoint of development of investment banking, while Navin (1955) sheds light on the development of industrial securities market in the late nineteenth century. Baskin & Miranti (1997) gives an overview of the development of securities market from corporate finance's point of view. While these studies are very valuable as financial history studies, they cast little light on rather their effects on a corporate capital structure. Studies focusing just on capital structure in the nineteenth century are very rare other than a business history analysis of some individual company's management. Some of them are very interesting and useful, but they are too fragmentary to compare with capital structures in other countries.

At an industry level, few studies other than those of the textile and railroad industries give us valuable information. Davis (1957, 1958,

1960) casts light on several aspects of industrial finance in the antebellum New England textile industry: a change of stock ownership, industrial borrowing and credit market, sources of industrial finance. McGouldrick (1968) analyzed financial issues of the postbellum textile industry: profit, dividends, financing of investments. Owing to these intensive studies, we could get a rough, sketch about the corporate finance of the nineteenth century New England textile industry. The New England textile firms raised their original capital from stock markets and then their additional funds from lenders and retained earnings. It was one of representative cases in industrial finance in the nineteenth century U.S. corporations.

Another case is a railroad industry. Chandler (1954) casts light on a change of patterns of the American railroad finance from 1830s to 1850s. The change consists of three stages; (1) the sterling bond leading by Philadelphia in the 1830s, (2) the common stock leading by Boston in the 1840s, (3) the mortgage bond leading by the Wall Street in the 1950s. Bond finance played an important role as well as stocks in capital finance in the nineteenth century railroad companies.

By these earlier studies, we are impressed by the fact that there was a salient difference between the capital structure of the textile and one of railroad industries in the nineteenth century. The issue is on other industrial corporations' capital structure. Where were they between two representatives: a textile and railroad industry? There are not so many studies in this point.

Studies of industrial finance in Japan's early industrialization have been a hot issue among economic historians in Japan for a long time. They focused particularly on a peculiar characteristic of the Japanese financial system compared to the precedent Occidental countries

through analyzing the structure of industrial finance. The argument has a long history. The issue was whether the main flow of industrial finance was bank loans or stock markets in the pre-World War II period.

The beginning came from one table made by the Japan Industrial Bank in 1956. According to the table, industrial corporations raised roughly a half of their funds from bank loans in the pre-World War I period (57.5%). This assertion has been generally accepted by many scholars in spite of the data's uncertainty. Patrick (1967) or Cho (1959), for example, emphasized the importance of bank loans rather than equity markets in the finance of early industrialization. On the other hand, studies on Zaibatsu progressed remarkably from a business history point of view. The studies cast light on a structure of insider lending and inter-locking in Zaibatsu such as Mitsui, Mitsubishi, and Sumitomo. Furthermore, it was discovered that insider lending was not a rare phenomenon confined to the so-called Zaibatsu but was relatively common among the local, rich entrepreneurs who run their family-business groups. A bank engaged in insider lending in such a group has been called an "institutional bank" (Kikan Ginko-in Japanese), which used to be criticized for often causing bank failure because group interests distorted the loan assessment in those days.

In the 1970s, a new wave of studies on industrial finance reassessed the role of securities markets. Yamamura (1968) questioned Patrick's "bank-dominated" hypothesis at the 1968 Business History meeting. The main contributors in Japan are Noda (1980), Imuta (1970), and Yamaguchi (1966, 1970, 1974). Noda devoted himself to the study of the co-development between the railroad industry and the securities market, while Imuta explained development of the stock market in late

nineteenth century Osaka. Yamaguchi organized a research group to study industrial finance in main industries and published four volumes on the cotton spinning, silk, textile and several other industries. Imuta and Noda separately found that stock-collateral bank loans played a key role in Japanese financial development as an intermediary between banks and stock markets. Banks loaned money to stockholders with collateral of stocks, even if the stocks were not fully paid up. The corporation employed that money for either fixed capital or working capital. If we neglect the role of stockholder as a middleman, the result appears as if banks had provided industrial funds for the corporation. From this point of view, Imuta and Noda both emphasized a role of banks and made light of stock markets: banks, in the end, supplied a main part of funds necessary for the early industrialization of Japan. Although they found some role of stock markets in early industrialization, their view inclined toward the traditional image of a bank-dominated system rather than to a market-driven system. Furthermore, they lost sight of a role of banks' direct loan to industrial corporations since they focused too much on the banks' stock-collateral lending to stockholders.

Interestingly enough, just the same mechanism worked not only in the Japanese industrialization but also in the U.S. Many banks provided stockholders of industrial corporation with stock-collateral loans, based on fully paid-in stocks or not. It was a common banking practice in both countries' early industrialization. The collateral loans were a key connector among industrial finance, bank loans, and stock markets. It is sure that this financial connection drove and supported early industrialization in both the U.S.A. and Japan. Both a well-established banking system and securities market is necessary for this mechanism

to work well (see Tsurumi (1994)). Nevertheless, many scholars still keep adhering to the idea that the Japanese financial system was bank-dominated while the U.S. was market-dominated. It is necessary to clarify each role of banks, bond market, and stock market in the early industrial finance in Japan and the U.S.A. The best way to do this may be to draw a rough, comprehensive sketch of the capital structure of corporations during early industrialization in both countries. A firm and big step for such a study was started by the Yamaguch-edited four volumes study, which casts light especially on industrial finance of the silk, spinning, and textile industries. This study has stimulated many other researches or studies about pre-War Japanese industrial finance. However, information is still too incomplete for us to draw a total, clear image of financial roles in early Japanese industrialization. We, for this purpose, need a corporate data-analysis covering much wider sectors and capital-scales than industry-level research done so far.

IV Data on Capital Structure in Japan and the USA

There are, so far, few studies of the capital structure of private corporations in the nineteenth century not only in Japan but also in the USA. The main obstacle is a lack of data. In order to analyze the capital structure of any industry, we need to gather general balance sheets of many firms. In the nineteenth century, when the regulatory system was still underdeveloped, we do not have a fully compiled data of private-corporations' balance sheets. Although many of joint stock companies were required to publish their balance sheets (in newspapers and so on) by the Civil Law or Stock exchange stipulations, not so many of them are available today.

One way for our study would have been to gather one by one balance sheets from advertisement on newspapers or historical documents held in various local archives. One alternative way is to use handbooks for investors compiled by rating agencies or securities firms. For our purpose, the latter is both useful and convenient, because information on balance sheets of many, various corporations are included in one volume. This paper mainly uses these kinds of data. Although all of the data are not systematic, we can get a rough overview about the capital structure in nineteenth century Japan and the USA. In advance of data analysis, we will give a little scrutiny about conditions and our selection of data.

Rating agencies developed an information-business through publishing various handbooks for investors or creditors both in Japan and the USA in the latter half of the nineteenth century. The U.S. rating agency was set up as a private concern such as Dun's or Poor's. On the other hand, rating agencies in Japan were regionally built up with full support or cooperation of newly born clearing houses in big cities such as Osaka, Tokyo, Kyoto after establishment of the national banking system in 1876. They were one of the institutional supports to mitigate an asymmetric information problem, which was more severe in the revolutionary transition involving the introduction of modern banking institutions and management from the Occident into a traditional agricultural society after the Meiji restoration. They gathered and delivered information on financial standing of business concerns in the region for the members in a form of annual handbooks.

The rating agencies in Tokyo and Osaka edited many volumes of handbooks in the pre-World War II era. Only a few volumes in the Meiji era or before the World War I remain for our use compared to the

post-World War II era. One series edited by the Tokyo Credit Agency (Tokyo Koshinsho) is useful for our purpose of analyzing corporate capital structure. In this series two volumes are now usefull for us: 1900 and 1913. It would be interesting to compare both data sets. We, however, use only the 1900 data here focusing on the early industrialization in the Meiji era. The reason is as follows.

The year of 1900 was the heyday of the early industrialization period beginning at the end of 1880s. Many private corporations were established through 1890's. The Japanese economy adopted many of modern economic institutions and technology from the Occidental countries taking advantage of being a latecomer during a couple of decades after the Meiji Restoration. Japan successfully ran on a compressed path of industrialization, from a cotton industry through the electric and chemical industry, for which the major Occidental economies such as the U.K. and the U.S. took much a longer time earlier over a century. A corporate consolidation movement in various industrial sectors began already during the decade, from the Russo-Japan War through World War I. The 1900 data, therefore, are better than the 1913 data to analyze capital structure in an industrialization process, because the former mirrors simply industrialization while the latter is a vague figure, mixing industrialization with a consolidation movement.

The 1900 investor's handbook compiles balance sheets on a couple of hundreds of corporations across the various industries, with full information or fragmentary one. In those data, only 211 sheets are available for our research, covering not only big companies but also many small companies. These cover miscellaneous sectors reflecting Japan's compressed, rapid economic development: bank, insurance, cotton, textile, railroad, marine transportation, gas, electric power, light, coal mining,

sugar, food, paper, shipbuilding, machinery, chemical industries etc.

Fewer U.S. balance sheets have been remained. Available data on the antebellum era are very rare and consolidated. In the post-bellum era, several securities dealers as well as Poor published handbooks for investors. The Poor handbooks contained the highest quality of information. Poor published the first volume of a series of annual handbooks on financial conditions of railroad companies in 1867 and began a new series on "investment securities" in 1890, which compiled information about newly emerging industrial securities. Therefore, financial data of industrial corporations other than railroad companies are not available for us until 1890 in this series.

What year's data in the U.S. series we should pick to compare with the Japanese? We have several options: from 1890 to 1900.

The first choice could be to select the same year's U.S. data as Japanese one's, namely 1900. However there is a problem to take into account. While it was the heyday of the early industrialization in Japan, the year 1900 in the U.S. economic development fell within the era of corporate consolidation rather than the early industrialization era. A consolidation movement could, in general, change the capital structure of big corporations from that during the early industrialization (Doyle (2000), Dewing (1914), and the U.S. House Representatives (1901)). The year 1900 in the American economy might correspond to the year of 1913 in the Japanese one as the era of consolidation.

The second choice of the benchmark year is to go back to an earlier year before or around the middle of the nineteenth century taking into account a period of the early U.S. industrialization. This selection has, however, another problem in terms of data's sector coverage as well as of scarcity of data. Since main sectors leading antebellum industrializa-

tion were the cotton and transportation industries, the antebellum data did not include new industrial sectors such as the electric, steel, and chemical ones, which developed around the end of the century in the U.S.A. The U.S. economy had gradually developed by several steps from a cotton industry in the early half of the nineteenth century, to a railroad industry in the middle of the century, to an electric, chemical, or steel industry in the end of the Century. It is hard to compare the U.S. antebellum data consisted mainly of the old industrial sectors with the 1900 Japanese data, which included not only the old industrial sectors but also the new ones.

It might be the second best choice under these severe limitations for us to pick the year 1890 up, when Poor published the first edition of the *Handbook of Investment Securities.* The year of 1890 is a subtle time between the early industrialization and the second industrialization accompanied by the consolidation movements. The consolidation movement's influence upon the capital structure was far less, if any, in the 1890 data than in the 1900 data. In the data compiled in the 1892-93 *Poor's Handbook of Investment Securities,* which is now available for us, the balance sheets available for our study cover only 66 corporations.

Their sector distribution is so uneven that we find many sectors there are too few observations to make a meaningful comparison with the Japanese data. One example was the cotton industry. As they were selected from an investor's point view, the companies may not mirror well average companies' financial conditions in the U.S.A. Although the data have several shortcomings, I will use mainly the 1892-93 *Poor's Handbook of Investment Securities* as the American data in this paper, supplementing it with several data from *"Annual Report of Major*

Table 1 : Number of Sample Corporations: U.S.A. and Japan

Industrial Sector	Japan	U.S.A.
Utility	14	7
Transportation	9	3
Telecommunication		2
Rail Road	23	
Land & Construction		3
Mining	14	14
Oil	8	
Metal		5
Cotton Spinning	9	
Paper Mill	5	
Electrical Machine	4	8
Machine	8	5
Construction Materials	18	
Printing	5	
Food	23	6
Brewery	3	3
Textile	18	4
Silk	7	
Chemicals	9	3
Warehouse	15	
Fertilizer-Trade	7	
Trade	6	
Miscellaneous	6	3
Total	211	66

Source: *The Poor's Hand Book of Investment Securities 1892-3,* and Tokyo Koshinsho, *Ginko Kaisha Yoroku,* 1901

American Corporations," Commercial & Financial Chronicle: Investors' Supplement, and the Baker Library Historical Collection. Although the fact that *Poor's Manual of Railroads,* which includes the balance sheets of many railroad firms, is available, we do not use it as a main data source so as to keep a balance of data among sectors. We focus rather on industrial sectors other than the cotton spinning or railroad industry. Thus the number of the U.S. firms is relatively small, only 66. Table 1 shows a distribution of these companies by sector in both countries.

Due to analytical and data constraints, we adopt only one year data

in the 1892-93 edition. Therefore this paper can not examine a time series change over a couple of decades, but merely compare a cross section of a capital structure of both economies: the U.S.A. in 1891 and Japan in 1900. This may cause one serious problem in the analysis of industrial funds sources. In comparing balance sheets at one point of time, we can not distinguish the financial source of subsequent investments after the firm's establishment as compared with the financial sources of the original investment. Consequently our analysis may not be as precise or detailed one as the Davis (1957) did but still gives a broad overview about the original investment sources in the both countries' early industrialization.

V At a Glance-Comparing the U.S.A. and Japan

How did early business corporations raise funds in the industrialization process? Are there some notable differences between Japan and the U.S.A. in the late nineteenth century? This section casts light on general characteristics of the capital structure from both economies. Table 2 is a comparative summary of our data samples between both countries, which will give an average image of the capital structure of the sample corporations. (Yen and the U.K. pound sterling are shown to convert to dollar in the par exchange rate: ¥1= $ 0.505 and Pound Stering1= $ 4.85).

Sample sizes are 211 for Japan and 66 for the USA. The aggregate total assets of these corporations is $ 93 million in Japan and $ 795 million in the U.S.A. Average total assets per corporation indicates much more striking differences between the countries: the American ($ 12.0 million) is about twenty-four times the Japanese ($ 0.4 mil-

Table 2 Summary of Capital Structure in Japanese and the U.S.Firms

($1000, %)

	U.S. 1891	Japan 1900
Number of Sample Companies	66	211
Total Assets	795003	92558
Paid-in Capital	550246	65238
Average per corporation		
Total Assets	12046	438
Paid-in Capital	8337	309
Equity/Assets Ratio	69.3	73.3
(Reserve/Assets Ratio)	1.2	4.0
Bonds/Assets Ratio	14.4	0.5
(Equity+Bonds)/Assets Ratio	83.8	73.8
Loan&Advance/Assets Ratio	3.4	9.8
Bill Payable/Assets Ratio	4.7	5.9
Account Payable/Assets Ratio	2.0	4.1
Fixed Capital/Assets Ratio	60.8	46.5
FC-Adequacy Ratio(1)	9.5	26.8
FC-Adequacy Ratio(2)	23.9	27.3
Bonds/Equity Ratio	34.8	0.7

Source: *The Poor's Hand Book of Investment Securities 1892-3, Commercial & Financial Chronicle,Investors' Supplement 1892, Annual Report of Major American companies, 1980,* and Tokyo Koshinsho, *Ginko Kaisha Yoroku, 1901*

lion). This difference may be attributed to several reasons. The first one is a data-bias — the Japanese samples might include many more small capital corporations than the U.S samples. The second is a real difference — the average capital scale of Japanese industries was smaller than the American. Table 2 includes several ratios of main items of assets and liabilities to total assets. We will overview the capital structure of both economies on an average base.

The ratio of stockholders' equity to total assets in Japan and the U.S.A were both far higher than 50%. A more interesting fact is that the Japanese ratio (73.3%) was a little higher than the U.S. ratio (69.3%). This fact is quite different from the idea accepted thus far

mainly by many people in both Japan and the U.S.A., that the Japanese financial system has been heavily bank-depended to the contrary of the U.S market-oriented system.

Stockholders' equity is broken down between paid-in capital and earned capital. Surprisingly enough, the ratio of earned capital to total assets in Japan was higher than in the U.S.A (4.0%, 1.2%, respectively). This fact seems to contradict the hypothesis that earned capital increases with years in business. The Japanese industries were still in their infancies while the U.S. industries were already reaching maturity at the end of the nineteenth century. It might be rather a paradox of industrial infancy, which may have caused higher earned capital in Japan than in the U.S.A. because the Japanese big modern companies enjoyed an oligopoly position in an infant market. Interestingly enough, taking earned capital out of account, both countries' ratio of stock capital to assets were almost the same number (69.3%, 68.1% respectively) That means the Japanese corporations depended heavily on stock markets for their industrial financing as well as the U.S. ones did.

The second feature is related to debt financing: bonds and loans. We can find a clear contrast between Japan and the U.S.A., with regard to relative financial role of bonds and loans. The U.S. corporations depended relatively heavily on bond financing (14.4%) rather than on loan financing (3.4%), while the Japanese corporations depended more on loans (9.8%) rather than on bonds (0.5%). These facts are consistent with the widely accepted idea which emphasizes a contrast between Japan's bank-driven system and the U.S. market-driven one. However, this consistency should be merely accepted when considering a narrow range of debt financing and never when considering the whole range of capital structure.

Another issue is on the role of bond finance in nineteenth century U.S. industrial corporations. According to studies by Davis (1957) or McGouldrick (1968), the New England textile industry, a leading sector of the U.S. economy, depended more on loans than bonds. The image of the U.S. corporations' capital structure drawn from our 66 sample data is quite different from the textile industry's one and rather similar to the railroad industry's one (Chandler (1954)). The high bond ratio in our U.S. sample shows propagation of bond finance in industrial corporations, although it might mirror a little the early consolidation movement at the end of the century.

The third factor is about inter-firm trade credit (Bill payable+ Account payable). Japan's ratio was higher than the U.S. one (10% and 6.7% respectively). A ratio of trade credit to total assets was the same as, or more than, the ratios of loan to assets in both economies. Such a relatively high ratio of trade credit in both countries comes from a fact that their industrialization developed on the firm base of their earlier, active merchant trading and credit activity.

The inter-firms trade credit consists mainly of two types: bills-payable and accounts-payable (namely book credit). The difference between them is related to whether or not a borrower (or a buyer) could issue commercial bills to a lender (or a seller) for his payment. While the accounts-payable is illiquid due to a lack of issuing negotiable bills, the bills-payable is liquid through a bank's discount window. It is through loans or bills-discount that banks provide their credit to the customers.

The fourth feature is related to fixed capital financing. The first observation is that the U.S.A surpassed Japan in terms of the ratio of fixed capital to total assets (60.8% and 46.5% respectively). It means

a pressure of demand for a fixed capital on corporations in the U.S. industrialization might have been much more severe than in the Japanese. How much did a corporation fill its fixed capital well with its stockholders' equity? We indicated a fixed capital adequacy ratio so as to measure a degree of imbalance between a demand and a supply for the long-term funds. That is calculated by deducting a fixed capital/total assets ratio from a stockholder's equity/total assets ratio. The ratio of (a fixed capital−a stockholder's equity)/total assets is negative when a company could not cover well the demand for a fixed capital by equity finance. That, called a fixed capital adequacy ratio (1), was positive both in Japan and the U.S.A. (26.8% and 9.5% respectively). In other words, the average Japanese company floated far more than stock shares sufficient to fill its fixed capital demand. (Partially because many newborn companies, whose investments had not completed yet, are included in them.) On the other hand, American companies covered their fixed capital narrowly with equity finance. It was merely by using bond finance well for them to have kept as much long-term funds in the hand as the Japanese did. That is, in the Table 2 shown as a fixed capital adequacy ratio (2), which is calculated by deducting a fixed capital ratio from a (stockholder's equity + bonds)/total assets ratio. It is an index of financial stability in terms of a relationship between disposable long-term funds and long-term fixed capital. A corporation relying heavily on short-term funds such as bank loans or commercial paper to raise long-term fixed capital may be vulnerable under a credit crunch in a recession (see p.311). That adequacy ratio (2) in Japan and the U.S.A. was both over 20% (27.3% and 23.9% respectively). That means both countries' corporations as a whole were affordable to prepare much money for a financial trouble in a recession

or retained surplus funds for working capital or financial investments still after paying the cost of fixed capital.

Furthermore, they had a last resort of funds in a form of unpaid-in capital, which is the difference between the chartered capital and the actually paid-in capital. A company reserved a right to demand its stock-subscribers to pay the unpaid-in capital if necessary for fund raising. The stock-installment payment was a common method in both Japan and the U.S. joint-stock companies at that time.

In short, an average industrial corporation in both Japan and the U.S.A. raised the necessary funds for the late-nineteenth century industrialization mainly from the securities market. Secondly, the Japanese firms depended heavily on stock markets, while the U.S. firms employed stock markets as a main source of funds and bond markets as a secondary source. A crossroad separating both economies hinged on whether a bond market developed or not. In Japan a bond market had not developed keeping step with a stock market unlike the U.S.A.

Then, what was the role of banks in industrialization? Banks could help finance industrialization mainly through granting loans to corporations or discounting bills issued mainly among inter-firms. Banks do not necessary discount all of the bills issued by firms to other firms or merchants. Banks' contribution is shown by the aggregate of loans and advances and a part of bills payable on a balance sheet. A ratio of bills discounted by banks to all bills issued by corporations could extend in a range from 0% to 100%. Taking 50% as a trial example between them, the banks' contribution in Japan and the U.S.A is estimated 12.8% and 5.7% respectively. It was never more than 15.7% and 8.1% respectively at the most. These numbers suggest that bank credit played only a minor role in financing of industrialization compared to a big role of

securities market both in the nineteenth century Japan and the U.S.A.

VI Analysis of Capital Structure

What factors affected capital structure in nineteenth century Japan and the U.S.A? We will examine this issue using the same dataset of balance sheets. Four variables are relevant: capital scale, business age, number of stockholders, and diversification of stockholding. Unfortunately three kinds of data other than the capital scale are not available enough to study in the U.S., while all four ones are available in the Japanese. This section focuses, therefore, mainly on the Japanese case, instead of the U.S. case. It could provide some suggestions to a future study on the U.S. case.

The first issue is a capital scale. An industrial revolution involves to the rapid increase of capital, especially fixed capital, in various modern industrial sectors. Industrial entrepreneurs need to raise large amount of long-term capital, which causes a serious financial hardship to them. They raised some funds internally from their own savings, and some funds externally, from the stock market, the bond market, or borrowings from banks or others.

Figure 1, 7 indicates a relationship between paid-in capital and an equity/assets ratio in both countries. Two figures are quite different. We find a very weak relationship that the equity ratio rises slightly, step by step, toward the highest range, 80%-100%, as capital increases in both cases. There could be another interpretation more meaningful than a linear co-relationship in these tables. We, here, focus on the change in the spread of the rates' distribution as the capital scale increase: convergence and diffusion. In the U.S. case it consists of two

movements, refracting between ten and twenty million dollars. It enters into a relatively stable range (60-100%) at larger capitals than twenty million dollars, after rapidly narrowing from a wide range (20-100%) toward a smaller range (60-100%) at smaller capitals. In the Japan's case (whose data are more random scattered than the U.S. one), the change is much more drastic from a width of 20%-100% toward of 80 -100%. Pay attention, in these tables, on the movement of the lowest bottom of the ratios' extent. We can observe the fact that that highly leveraged firm decreases steeply the leverage ratio as the capital increases. These "convergence-triangle" figures suggest the development of stock markets contributed to a decrease of the leverage ratio in the industrial corporations' capital structure, especially highly leveraged firm's, in late nineteenth century Japan and the U.S.A. The difference between the countries might come from the statistical bias where the Japanese data might cover more small capital-corporations than the U.S. data did.

The larger capitals (and the tiny ones) tended to have higher equity ratio than the middle ones did. On the other hand, medium (and small) size companies were more familiar with debt finance than the larger ones were. This is consistent with the debt data in Figure 2, 3, 4, 8, and 9 (although the component of debt finance was different between Japan and the U.S).

In Japan, medium size companies enjoyed more loan finance than the larger or the tiny ones did. The majority of these loans may have been borrowed from banks rather than from individual persons. Hence banks lent mainly to middle or relatively small size companies rather than to the big or tiny ones, which raised most of their funds from the stock market.

Figure 1: U.S. Equity Ratio and Paid-in Capital

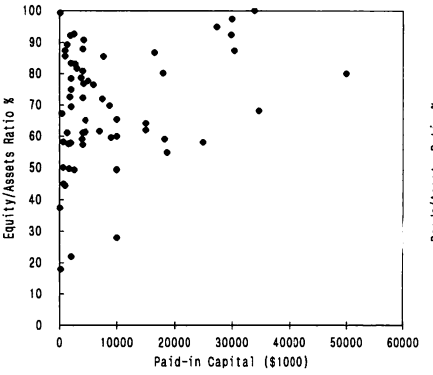


Figure 2: U.S. Bonds and Paid-in Capital

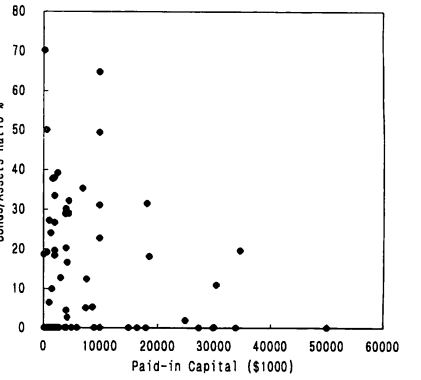


Figure 3: U.S. Loan and Paid-in Capital

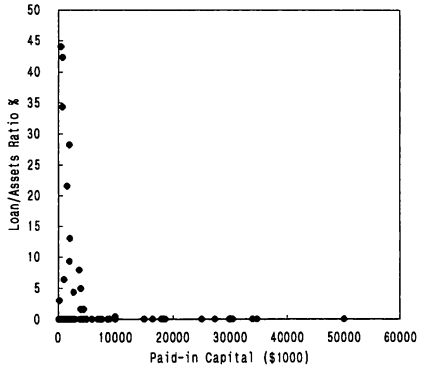


Figure 4: U.S. Equity and Bonds

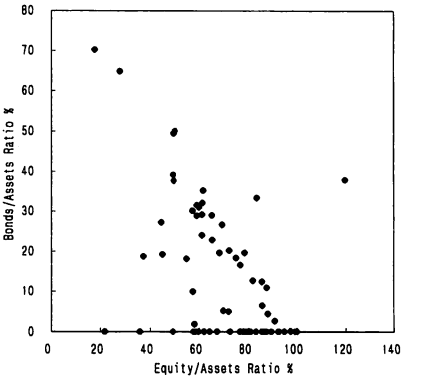


Figure 5: U.S. Fixed Capital Adequacy Ratio (1)

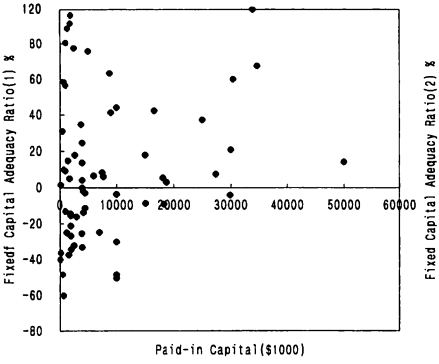


Figure 6: U.S. Fixed Capital Adequacy Ratio (2)

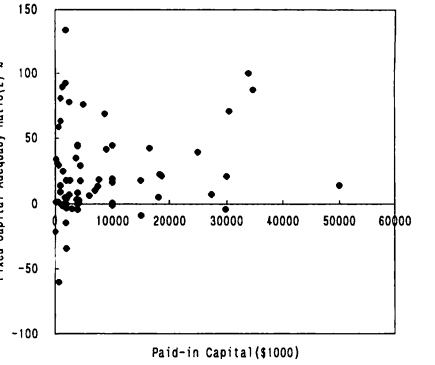


Figure 7: Japan's Equity Ratio and Paid-in Capital

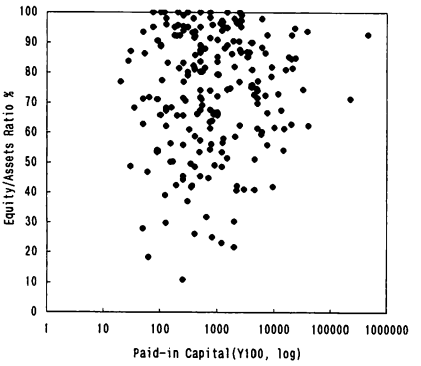


Figure 8: Japan' Loan and Bond

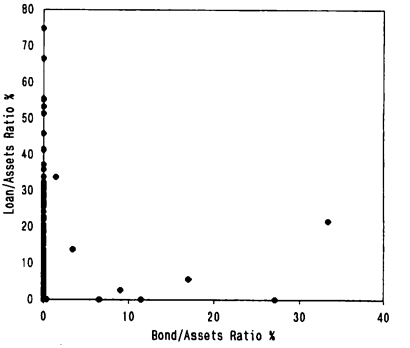


Figure 9: Japan's Loan/Assets Ratio and Paid-in Capital

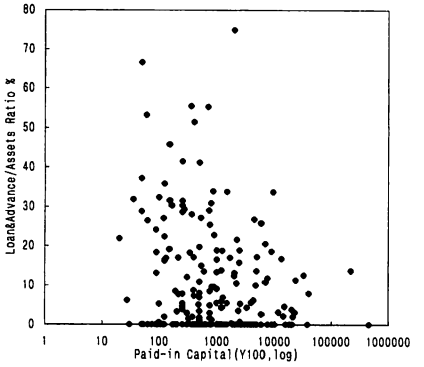
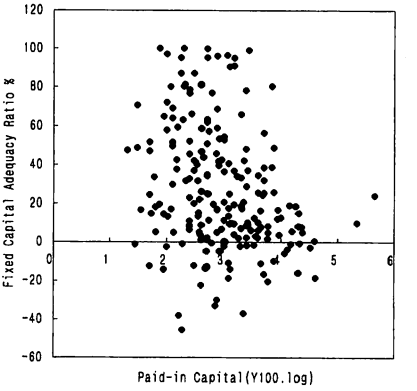


Figure 10: Japan's Fixed Capital Adequacy Ratio (1)



In the U.S.A., loan-familiar companies were limited to those with the smaller than five million dollar capitals. Relatively medium and smaller one in more than five million dollar capitals tended to prefer bond finance to loan finance. Large companies preferred equity finance to bond finance (There is a negative co-relationship between a bonds/ assets ratio and an equity /assets ratio, Figure 4).

The second issue is about how much money banks provided for financing a company's fixed capital. That is indicated indirectly by a

fixed capital adequacy ratio. The negative ratio, "deficit" means probably how much the company's fixed capital was financed by loans, especially bank loans, most of which were short-term. Figure 5, 6 and 10 illustrates the relationship between the fixed capital adequacy ratio and paid-in capital in all sample companies in both economy. All of them look like to a random scatter. We find hardly any clear linear co-relationship in either case. That means "fixed-capital-deficit" companies diffuse regardless of the capital scale.

The number of "deficit" companies in terms of the fixed capital adequacy ratio (1) is 30 of 66 samples in the U.S.A. compared to 39 of 211 in Japan. Taking availability of bond finance into account, it is reasonable in terms of long-term financing to compare the fixed capital adequacy ratio (2). The number of the U.S. "deficit" companies decreases remarkably from 30 in the ratio (1) to 13 in the ratio (2). The U.S. (13 of 66-20.0%) is higher than the Japanese (39 of 211-18.5%), in spite of taking into account not only equity but also bonds in the U.S, namely the ratio (2). This fact suggests that the U.S. companies depended on loans, mainly bank loans, at least as much as the Japanese to raise funds for fixed capital in the late nineteenth century. This is a very striking fact. It is very possible that U.S. banking in the late nineteenth century was largely involved not only in working capital finance but also in fixed capital finance as Davis (1957) had suggested in his study of the New England textile industry.

The third issue is the relationship between capital structure and years in business. Davis (1958) clarified the relationship between bank's involvement with corporate finance and firm's age or historical date in the textile industry during three decades in the early nineteenth century. Loans increased in importance during the first few years of the

Table 3: Age of Japanese Corporations

Years	Number	%
less 1	33	15.6
1-2	45	21.3
3-5	53	25.1
6-10	31	14.7
11-15	40	19.0
16-20	4	1.9
21-	5	2.4
Total	211	100

Source: Tokyo Koshinsho, *Ginko Kaisha Yoroku,* the 5th edition, May 1901

firm's life and then declined. It is very interesting to apply this Davis's bank-access hypothesis to other industrial sectors. However, our U.S. data are seldom useful with regard to years in business, because of inappropriate for this purpose as well as a lack of information in the Poor's Handbook. The book includes not a few merged companies whose former companies' original business years were not noted. Therefore we focus on just the Japanese firms. In this case we have one limitation, that our data are not a time-series but just cross-section. We, therefore, focus on the relationship between the equity ratio and firm's age in 1900 rather than pursuing the change of each company's financial structure over time as Davis did.

Table 3 shows an age-distribution of Japanese companies. It extends from 1 month to 28 years. The age structure is very young. The proportion of young companies less than 5 years is over half (62%). Even newborn firms less than 12 months amount to 15.6%.

Figure 11, 12 shows the relationship between the equity ratio or the loan ratio and business ages for 211 sample companies. The longest age is 28, while the shortest one is zero (that means within 12 months). We find, in both tables, a rough tendency of converging the range of the

Figure 11: Japan's Equity/Assets Ratio and Years in Business

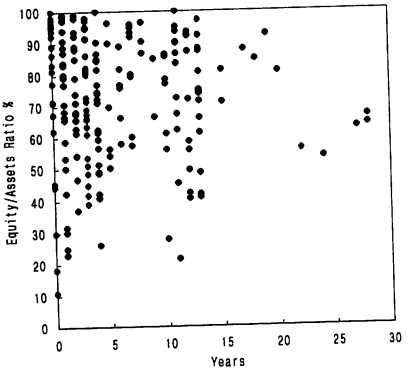
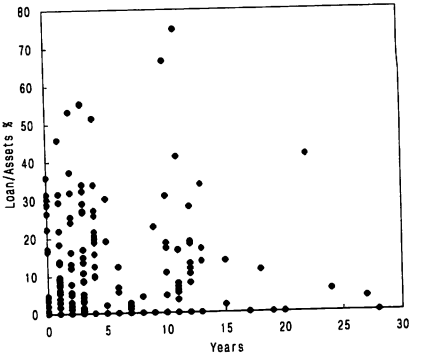


Figure 12: Japan's Loan and Years in Business



data points' distribution narrows step by step as years in business increase during three decades. In other words, Japanese banks lent much more widely, and deeply to newborn industrial companies than to matured companies. On a closer view, the trend consists of two small movements of convergence: a more distinct one during the first decade and a subtle one during the early second decade. In other words, banks seem to have lent much more both to newborn companies and to ten-year old companies. Thereafter, banks in each movement weakened rapidly year by year a loan-relationship with industrial companies. These movements, especially the second one, could be hardly explained by Davis's bank access hypothesis. They reflect the business cycle rather than the corporation's maturity years. Banks relaxed their lending policy in a boom (1890 and 1897) and tightened it in the consequent slump. Two convergence movements about corporation' age probably mirrored the change of the bank's lending policy over the business cycle.

These figures in the Japanese case seem to argue against Davis's bank-access hypothesis. It, however, is not certain yet whether or not

this trend could be found in company time-series data. And the hypothesis should be re-examined by the U.S. industries' cross-section data as well as the Japanese case in this research. Lacking such kind of data, we need to be cautious in comparing the result of this Japanese case with the Davis hypothesis.

With this reservation, we could come up with an idea that Japanese banks serviced newborn industrial companies earlier and more widely than the U.S. banks did. It, however, is important to make sure before further discussion that this idea is just supporting the facts that securities market in both countries was the main source of industrial corporations' capital.

The last issue is stockholder structure: the number and concentration of stockholding. Japanese and U.S. industrial developments were led mainly by modern joint-stock companies in the late nineteenth century. How many stockholders owned these companies? What was the structure of their stockholdings? Did these factors affect their capital structure? In this regard, we have also little information on the U.S. corporations, but have two kinds of data on 195 Japanese companies: the number of stockholders and the concentration rate of the top five large holders. We will overview the Japanese firms' structure of stockholders and examine their contribution to capital structure. The issue is whether or not the capital structure was influenced by the highly concentrated structure of stockholding that used to be common in a family business such as Zaibatsu.

Table 4 shows the distribution of stockholders' numbers in Japan. It extended from 5 to 4844. Small joint-stock companies with less than 25 stockholders, de-facto partnerships, accounted for 15.4% of 195 companies. The middle scale companies owned by 25 to 250 stockholders

Table 4 : Number of Stockholders in Japanese Companies

Number of Stockholders	Number of Companies	%
1-25	30	15.4
26-100	63	32.3
101-250	67	34.4
251-500	22	11.3
501-1000	8	4.1
1001-2000	1	0.5
2000-	4	2.1
Total	195	100

Source: Tokyo Koshinsho, *Ginko Kaisha Yoroku*, the 5th edition, May 1901

Table 5: Concentration Ratio of Top 5 Stockholders in Japanese Companies

Top 5 Concentration ratio %	Number of Companies	%
less 0	27	13.8
20-40	88	45.1
40-60	44	22.6
60-80	28	14.4
-100	8	4.1
Total	195	100

Source: Tokyo Koshinsho, *Ginko Kaisha Yoroku*, the 5th edition, May 1901

occupied 66.7%. Large companies with more than 500 stockholders were only 13 of 195. These figures should be underlined rather than be undermined: such many corporations had such many stockholders in the early industrialization era.

Table 5 shows companies' distribution by a concentration ratio of the top five large stockholders. Companies that the top fives owned more than 60% of total stocks totaled only 36 (18.5%). The largest was a group, which owned 20 to 40%: 88 of 195 sample companies, 45.1%. These figures suggest the Japanese corporate stockholders diversified widely, contrary to the widely accepted interlocking ownership in

Figure 13: Japan's Stockholders and Equity Ratio

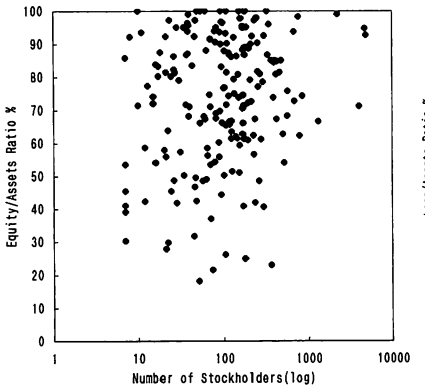


Figure 14: Japan's Loan and Stockholders

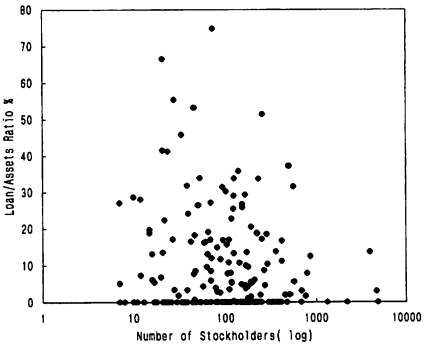


Figure 15: Japan's Equity and Stockholder Concentration

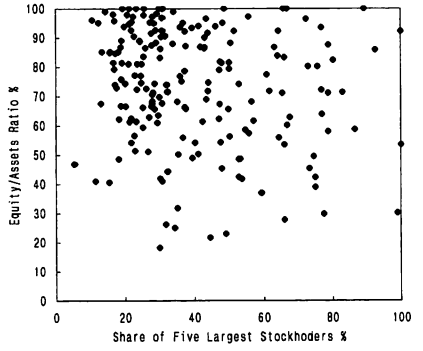
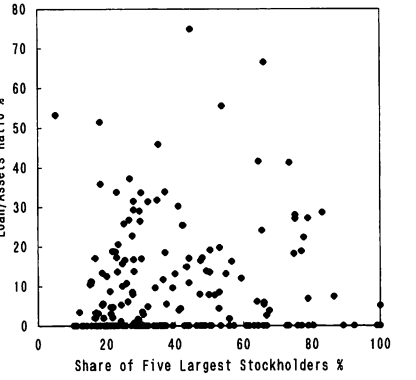


Figure 16: Japan's Loan and Stockholder Concentration



Zaibatsu.

First of all, we made pictures of the relationship between the number of stockholders and several financial ratios: paid-in capital, fixed capital adequacy, equity, loan, and bill. Their data trends, however, are close to flat in very random manner. All pictures give little statistical meaning except paid-in capital, which co-relates closely to the number of stockholders. The higher a corporation's number of stockholders is, the larger its paid-in capital. That is reasonable. The number of stock-

holders, however, has seldom a close co-relationship to not only the equity ratio but also the fixed capital adequacy ratio. These facts suggest that the number of stockholders has little direct effect on the capital structure, such as the equity ratio or the loan ratio, of Japanese industrial corporations in the late nineteenth century (Figure 13, 14).

Secondly, we examine effects on the capital structure by the stock-holding concentration, that is, here, shown by the share of the top five large stockholders. The concentration rate of the top five large stock-holders co-relates negatively with number of stockholders. As the number of stockholders increases, the concentration rate decreases. The issue is whether or not the stock concentration ratio affects the equity ratio or the loan ratio. Pictures give little or at most subtle statistical meaning in this regard (Figure 15, 16). We could see a little negative co-relationship between the stock concentration rate and the equity/assets ratio in a very vague manner. However, the co-relationship between a loan/assets ratio and a concentration ratio is also too vague and random to read any meaning from it.

In short, we could find no strong evidence that either the number of stockholders or the share of the top five large stockholders affected the capital structure of Japanese industrial corporations in the late nine-teenth century. Many scholars have, so far, emphasized family business groups based on an "insider lending" as the main characteristic of industrial finance in the pre-war Japanese economy. The so-called Zaibatsu was the typical case. It is noteworthy that many small, local industrial groups characterized mainly by insider lending, close stock-holding, and family business. This study, however, suggests otherwise. Equity finance played a more critical role than bank credit in Japanese industrial finance.

VII Sector Analysis

The purpose of this section is to supplement the above-mentioned aggregate analysis with a sectoral analysis. How were the other industrial sectors characterized compared with the famous sectors of the textile and railroad industry in the U.S.A.? Were there any differences in Japanese bank's involvement with newborn firms across sectors? We will deal with the U.S. case in the first half and the Japanese case in the latter.

Our main data on the U.S. industrial corporations are the balance sheets of 66 major joint-stock companies. They can be roughly divided into 13 industrial sectors (including a miscellaneous one, Table 6). The main sectors are mining, electrical machinery, utilities, food, metal, and machine industry etc. The numbers of observations within sectors are not so many. Its mean and median are only 5 and 3 respectively. The largest three are the mining, electrical machinery, and food industries (respectively 14, 8, and 6). Furthermore the number of companies in some industries was too small to create a separate sector. For instance rubber, soap, and soda companies are included here in the chemical industry. The textile industry consists of various types of companies including a cotton mill, cordage, and hats, while the food industry also includes diverse manufacturers such as tobacco, sugar, vegetable oil, and flour. Another problem might be lacking enough observations in some important sectors to compare to the Japanese case: cotton spinning, railroad, and textile industries.

These 13 industrial sectors can be classified roughly into three groups by paid-capital per corporation scale. The largest was the food industry

Table 6: U.S. Capital Structure by Sector-1891

($1000, %)

	Food	Electrical Machine	Mining	Metal	Utility	Textile	Transpo-rtation	Chemicals	Misce-llaneous	Machine	Telecom-munication	Brewery	Land & Constraction	Total
Number of corporations	6	8	14	5	7	4	3	3	3	5	2	3	3	66
Total Assets	159800	145592	105761	85976	62298	58151	55113	40529	24958	24039	17887	11515	3384	795003
Paid-in Capital	133271	105243	57042	65951	36650	36349	33010	35624	15719	12044	10251	6040	3052	550246
Average per Corporation														
Total Assets	22829	20799	15109	12282	8900	8307	7873	5790	3565	3434	2555	1645	483	12046
Paid-in Capital	19039	15035	8149	9422	5236	5193	4716	5089	2246	1721	1464	863	436	8337
Equity/Assets Ratio	77.5	582	72.9	64.2	61.4	68.4	63.8	79.5	57.3	67.4	67.4	44.9	92.3	69.3
(Reserve/Assets Ratio)	0.3	0	2.2	0.1	0.1	0	0	0	0	3.3	12.7	1.1	0	1.2
Bonds/Assets Ratio	6.4	31	24.6	11.2	29.9	7.9	17.1	9.6	0	2	25.8	33	0	14.4
(Equity+Bonds)/Assets Ratio	83.8	613	97.6	75.4	91.2	76.3	80.9	89.2	57.3	69.4	93.1	77.9	92.3	83.8
Loan&Advance/Assets Ratio	1.1	0	0.7	6.9	0.1	12.1	2.2	3.2	14.1	6.9	0	10.4	0	3.4
Bill Payable/Assets Ratio	8.8	46	2.7	4.5	2.4	12.9	0	1.8	8	1.7	1.5	13.7	0.9	4.7
Account Payable/Assets Ratio	2.1	26	0.9	1.8	0	5.8	1	1	12	0.6	0.2	1.6	0.1	2
Fixed Capital/Assets Ratio	67.2	86	83.4	57.1	77.1	76.1	54.4	69.4	61.6	24.6	80.4	70.4	58.1	60.8
FC Adequacy Ratio(1)	10.3	497	-10.5	7.1	-15.7	7.6	9.4	10.2	-4.3	42.8	-13.1	-25.5	34.2	9.5
FC Adequacy Ratio(2)	16.6	528	14.2	18.3	14.1	15.5	26.5	19.8	-4.3	44.8	12.7	7.5	34.2	23.9
Bonds/Equity Ratio	12.7	44	45.1	25.2	52.9	13.3	26.3	14.8	39.3	15.3	50.8	191.1	0	34.8

Source: *The Poor's handbook of Investment Securities* 1892-3,
Commercial & Financial Chronicle,Investors' Supplement 1892,
and Annual Report of Major American Companies, 1980

(average, $ 22 million), which consisted of 5 (of 6) large capitals more than $ 30 million (two tobaccos, two vegetable oils, and one sugar refining). The second group ($ 10-15 million) includes 5 sectors (metal, electrical machinery, textile, chemical, and transportation). Another 6 sectors (utilities, telecommunication, mining, machine, land & construction, and brewery) floundered in the lowest group (less than $ 6 million). The newly emerging industries such as electrical machinery or chemicals were in the middle group, while the utilities and mining were in the lowest.

The first observation is about the equity ratio, that is the ratio of stockholders' equity to total assets. The U.S. average ratio of the 13 sectors was 69.3%, which is low by modern standards. The higher sectors than the average were the land & construction, chemical, food, mining, and electrical machinery industries, some of which were newly emerging industries at the end of century. Below the average were 8 sectors, among which the brewery was remarkably low (44.9%), while another 7 sectors held on to 60-70%. It is noteworthy that public utilities sectors such as the utilities, telecommunication, and transportation were below the average, as were as metal, textile, and machine sectors.

The second observation is about debt finance by sector in the U.S.A. Bond finance played an even bigger role than other instruments such as loans, bills or book credits in the debt finance of U.S. corporations. The brewery, utilities, telecommunication, mining, and transportation industries depended highly on bond finance, many of which were a mortgage bond. No bonds were issued in the land & construction or machine sector. At the same time, the brewery was also loan-dependent. Except for the brewery sector, there are few sectors dependent both on bonds

and loans in the same time.

The third observation is about fixed capital finance by sector. The U.S. average ratio of the fixed capital to total assets across all 13 sectors is not so high, 60.8%. Sectors above the average were the mining, telecommunication, and utilities, while the electrical machinery and machine industries were below enough.

How much fixed capital was covered by equity capital in these sectors? The fixed capital adequacy ratio (1) was negative in 6 of 13 sectors. The worst were the brewery (-25.5%), utilities (-15.7%), telecommunication (-13.1%), and mining industries (-10.5%). The sectors, however, could fill their fund shortage for fixed capital mainly by floating bonds. The fixed capital adequacy ratio (2) rose into the positive range in all sectors except for the miscellaneous one (-4.3%), the main contributor of which was the dock company (among three companies belonging to the miscellaneous sector). It is noteworthily that the dock company and all 3 breweries were not registered in the U. S. A. but instead in London.

The U.S. sectors with a high proportion of the "deficit" in terms of the ratio (1) were the brewery (3 of 3), mining (11 of 14), utilities (5 of 7), textile (2 of 3), and food industries (3 of 6). Bond floating contributed to improvement of fixed capital finance. The most remarkable case was the following three sectors: brewery (2 of 3 turned from "deficit" to "surplus"), utilities (4 of 7), and mining (7 of 14). Despite the support of bond financing, two sectors still remained a high proportion of the "deficit": mining (4 of 14) and the food industry (2 of 6). The two "deficit" food companies were both tobacco companies. The other sector had one "deficit" firm: gas, transportation (tunnel), iron & steel, machine, brewery, textile (cordage), and dock. A serious "defi-

cit" firm among them was the dock, machine, iron & steel, brewery, and cordage companies. Importantly enough, all the 13 "deficit" companies in the U.S.A. had less than five million dollars in their paid-in capital base. Many firms of the large capitals, more than five millions dollars, seem to have been able to raise easily their necessary funds from the securities market.

These 13 sectors could be classified into several groups on the base of the leverage ratio, the ratio of bonds to equity. According to several earlier studies in the textile industry the leverage ratio was very low, while that of railroads was high. We, here, prepare two classifications.

The first classification is based on a location of corporate registration: London or the U.S.A. The London registered firms were far more highly leveraged than the U.S ones. The London registered firms constitute 7 of the 66 in our sample data and consisted of three breweries, an iron, a cotton spinning, a construction, and a dock company. The average leverage ratio of the London registered firms was 109.8%, while the average ratio of 66 samples was 35.3%. The salient example is a contrast between two cotton-spinning companies registered in London and the U.S.A (the leverage ratio 53.0%, 0 % respectively). This fact suggests the U.K. companies may have enjoyed much more bond finance than the U.S. at that time. Such a big difference is attributed to the U.S. regulations on corporate bond finance. Even in 1870s, many of the states in the U.S.A. had rigid regulations about corporate finance of bonds: a leverage ratio, pricing, or consent by stockholders' majority. Table 7 is a list of state regulations on railroad companies' bond finance in the 1870s.

The second classification groups the U.S. registered corporations by the leverage ratio. The first, higher leveraged group includes the

Table 7: State Regulations on Corporate Bonds

41 states	General Railroad Law	Upper Amount of Issue %	limitation Interest Rate %	Issue Pupose	Par Value Price $100	Terms Year	Mortgage or Pledge Aprove	Collateral	Selling Price UnderPar	Stock Holders' Consent	Right to Convert to Stock	Exempt from UsuaryLaw	Guarrantee to Another
Alabama	O		7	<1acs	less 1		O	p,i					
Arkansas	O	100	7	<1acs	5 or 10		O	p,i					
California	O	100	10	<1cs	less 5		O	p,f					
Colorado	O	100		<1/3	less 1		O	p		O		O	
Dakota	O		10		less 5				O				
Delaware	*												
D.C.	O	O/50paid		<c&e		15			parvalue				
Florida	O												
Georgia	*												
Illinois	O	O		<c&e			O	p,f		M-2/3			
Indiana	O	O		<c&e			O	p,f					
Iowa	O		10,(8pref)		less 0.5		O	p,f	O	D-2/3		O	
Kansas	O	O		<c&e			O	p,f					
Kentucky	*								O				
Louisiana	O					10	O	p,f	O			O	
Main	O				less 1								
Maryland	O	100		<1acs	less 1		L	p,I					
Masschusetts	O	100	7	<1cs	less 1	20			O				
Minnesota	O	O	10	<c&e					O		O	O	O
Michigan	O	O	10	<c&e			O	p,f			O		
Minnesota	O	O	10	<c&e	less 5		O		O			O	
Missippi	*	O		<c&e									
Missouri	O												
Montana T.	O	100		<1acs	less 1		O	p,I				O	
Nebraska	O	O	10	<c&e	less 5		O	p,I	O				
Nevada	O	100/O	15	<1cs,c&e	less 10					D-2/3	O		
New Hampshire	*		5				L					O	
New Jwesey	O	O		<c&e			O	p,f				O	
New Mexico	O	100/O	10	<1c,c&e	less 5								
New York	O	O		<c&e						D-2/3	O		
North Carolina	O	O		<c&e							O		
Ohio	O	100	7	<1acs	less 1		O	p,I					
Oregon	*		7	"									O
Pennsylvania	O			<1subc,<2paid		50	O	p,f					
South Carolina	*												
Tenessee	O	2e	6,10income		less 1		O	p,f		D-2/3	O		
Texas	O	O							O				
Vermont	O	O	7	<c&e	less 1	3<y<20							
Virginia	O	100sub		<c&e							O		
West Virginia	O	O					O						
Wisconsin	O			<c&e			O	p,f					

Source; Leonard A. Jones *Law of Railroad and other Corporate Securities, Including Municipal Aid Bonds,* 1879, Houghton, Osgood and Company,Boston, pp.26-49

Note; A sign "O" means that the state had a regulation on corporate bonds.

utilities, mining, transportation, and telecommunication industries. The second, middle leveraged one consists of the metals and chemical industries. The third, lower leveraged one consists of the land, electrical machinery, machine, and food industries. Some newborn industries, such as electrical machinery and machine, were seldom familiar with bond finance. It seems that the railroad industry was the representative of the first group, while the textile industry was a typical case of the second group. These facts suggest that bond financing was not necessarily confined to the railroad industry but was used by corporations in many other industries, not only several utilities industries including the transportation and telecommunication but also the mining, metal, and chemical industries.

There are another data showing industrial companies' wide use of bond finance in 1890. John L. Williams & Sons, who ran a securities firm in Richmond, published a handbook for investors (*Manual of Investors regarding Southern Investment Securities*), which compiled the balance sheets of industrial companies located in the southern states. The information is incomplete for general balance sheets but includes numbers of paid-in capital and bonds, from which we can calculate a leverage ratio. We can get such information for only about 32 of the many companies listed in this handbook (Table 8). The 32 companies' total paid-capital was 45.6 million dollar. The paid-in capital per company was small, 1.4 million dollars. They consisted largely of four sectors: 11 railroads (mainly horse car), 7 utilities (mainly water), 4 lands, and 8 iron & steels. 25 of the 32 companies floated bonds amounting to 21.2 million dollars. The average leverage rate of 32 firms was 46.6%. The main beneficiaries of bond finance were the iron, railroad, utilities, and land companies. Their leverage ratios were 40.0,

Table 8: Leverage Ratio in Southern Securities

($1000, %)

	Number of Companies	Total Paid-in Capital	Total Bonds Outstanding	Share %	Per Company	Leverage Ratio Capital/Bonds %
Railroad	11	6085	5661	26.6	515	93
Utilities	7	4550	2845	13.4	406	62.5
Land	4	7200	2150	10.1	538	29.9
Iron&Steels	8	26425	10562	49.7	1320	40
Others	2	1350	25	0.1	13	1.9
Total	32	45610	21243	100	2655	46.6

Source: John L. Williams & Son, *Manual of Investments,Important Facts Figures Regarding Southern Investment Securities,* 1890, Richmond

93.0, 62.5, and 29.9% respectively. Only one other company, an, architecture one, floated bonds. These facts indicate that the propagation of bond finance in Southern local companies was not so different from the situation of bond finance shown by Poor's manuals.

How did capital structure by sector among the Japanese firms differ from those in the U.S.?

This research is based on sample data of 211 joint-stock companies in Japan compared to only 66 in the U.S.A. The Japanese data are much more diverse than those for U.S. in terms of not only the capital scale but also of the sectoral distribution (Table 9). The 211 Japanese companies were spread over approximately 20 sectors while the U.S ones extended over 13 sectors. 20 sectors in Japan consisted of various industries reflecting its compressed economic development: not only the early modern ones such as spinning, railroads, but also the late modern ones such as the electrical machinery, chemicals, and indigenous ones such as textile or silk. The last indigenous ones include also non-manufacturing firms such as a warehouse or fertilizer trade industry. The mining sector in Japan includes 3 stone mining companies in

Table 9: Japan's Capital Structure by sector-1900

($1000, %)

	Transportation	Railroad	Paper Mill	Spinning	Machine	Brewery	Utilities	Textile	Mining	Chemicals	Electrical Machine	Food	Ware	Construction Materials	House	Oil	Miscellaneous	Printing	Trade	Fertilizer Trade	Silk	Total
Number of corporations	9	23	5	9	8	3	14	18	14	9	4	23	15	18	8	6	5	6	7	7	211	
Total Assets	23467	34349	4316	7203	2904	991	3793	4535	2282	1276	474	2445	1511	1466	545	364	280	208	84	65	92558	
Paid-in Capital	13608	29961	2411	4759	1923	521	2914	2747	1558	608	177	1345	653	915	478	270	134	143	65	48	65238	
Average per Corporation																						
Total Assets	2607	1493	863	800	363	330	271	252	163	142	118	106	101	77	68	61	56	35	12	9	438	
Paid-in Capital	1512	1303	482	529	240	174	208	153	111	68	44	58	44	48	60	45	27	24	9	7	309	
Equity/Assets Ratio	76.1	85.3	59.4	72.0	66.6	79.2	80.7	68.5	76.5	58.8	57.6	72.7	63.0	68.0	87.2	80.6	68.1	66.4	81.5	81.4	73.3	
(Reserve/Assets Ratio)	10.5	2.1	5.3	2.6	5.2	11.5	5.4	6.8	2.4	3.5	1.5	3.2	1.2	3.7	1.0	11.0	7.5	1.0	3.2	1.0	4.0	
Bonds/Assets Ratio	0.4	2.2	0	3.0	0	0	0	0.4	1.5	0	0	0	0	0	0	0	0	0	0	0	0.5	
Loan & Advance/Assets Ratio	2.9	6.8	15.1	6.4	5.6	3.7	11.8	13.8	12.3	11.4	7.3	8.4	19.9	12.1	3.6	9.6	6	8.7	6.8	7.6	9.8	
Bill Payable/Assets Ratio	0	1.6	19.5	14	15.6	6.9	0.8	8.2	2.7	20.5	21.3	4.7	0	8.1	0.3	1.3	10.7	10	0	0	5.9	
Account Payable/Assets Ratio	6.4	0.3	2.7	2.7	6.8	2.6	2.5	4.2	4.6	3.2	4.2	9.3	0.4	3.1	6.8	5.5	1.7	8.1	7.6	0.5	4.1	
Fixed Capital/Assets Ratio	51.9	57.4	67	56.8	30.5	51.2	57.1	47.9	57.6	32.2	39.3	36.6	23.1	50.8	70.5	45.7	65.5	17.6	7	62.8	46.5	
F C Adequacy Ratio(1)	24.3	27.9	-7.5	15.1	36.1	27.9	23.6	20.7	18.9	26.6	18.3	36.1	39.9	17.2	16.7	35	2.6	48.8	74.5	18.6	26.8	
F C Adequacy Ratio(2)	24.6	30.1	-7.6	18.2	36.1	28	23.6	21	20.4	26.6	18.3	36.1	39.9	17.2	16.7	34.9	2.6	48.8	74.5	18.6	27.3	
Bonds/Equity Ratio	0	4.9	0	0.1	0	0	0	0.7	0	0	0	0	0	0	0	0	0	2.6	0	0	0.7	
Business Years	11.3	6.7	16.8	7	6	6.3	6.7	7.8	8.6	4.4	2.3	3.3	2.8	5.2	1.1	5	12	2.2	2.7	1.1	6.0	

Source: Tokyo Koshinsho, *Ginko Kaisha Yoroku,* the 5th edition, May 1901

addition to 14 coal-mining ones in spite of the fact of the capital structures were quite different from each other. Furthermore, within sector-diversification is quite different between countries. The American data are poorer in cotton spinning, railroad, and textile industries while the Japanese dataset has few balance sheets of land corporations. It is merely on the utilities, mining, and electrical machinery industries that we are able to get a relatively large number of observations in both countries.

These 20 sectors could be divided roughly into three groups by the paid-capital scale, for the sake of convenience. The largest contains huge modern industries such as transportaion, railroad, cotton spinning, and paper (above about 1 million yen). The middle group includes 8 big modern industries such as machines, utilities, brewery, textile, mining, chemicals and so on (from 0.5 to 0.1 million yen). The lowest group contains the other 8 industries, many of which are modern but indigenous industries, such as construction materials, electrical machinery, warehouse, trading, and silk.

We will infer the following features about the capital structure of the Japanese industries (Table 9).

The first observation regards the ratio of equity to total assets by sector in Japan. The sectors higher than the average (73.3%) are oil, railroad, trading, silk, and utilities. They were a mix of large capitals (railroad and utilities) and small capitals (oil, trading, and silk). The lower ratio groups were composed of firms from newly emerging industries such as an electrical machinery, paper, and chemicals. Interestingly enough, the equity/assets ratio of the newly emerging industries in Japan may have stood lower than the U.S. ones. It may suggest that the Japan's newly emerging industries were financed less by stock

markets, and more by banks, than the U.S. ones were.

The second observation regards debt finance. One of the distinct differences between the U.S. and Japan is whether bond markets and stock markets were available or not as a major source of corporation finance. The railroad industry was the main bond issuer among the Japanese industrial sectors. Many other sectors, instead, depended on loan markets rather than bond markets. The warehouse, paper, textile, mining, construction materials, and chemicals industries borrowed from banks above the Japanese average (9.8%). Japanese companies' average bill to total assets ratio was as large as that in the U.S. In regard to the bill ratio, in Japan, far above the average ratio (5.9%) were modern big industries such as the electrical machinery, chemical, paper, machine, and cotton spinning ones, many of whose bills were probably discounted by banks. On the other hand, firms in sectors with small capitals, such as the warehouse, fertilizer trade, and silk (many of which were non-manufacturing), had zero in the bill payable account.

The third observation is about fixed capital by sector. The ratio of fixed capital to total assets in the oil, paper, printing, silk, and mining was far above the average (46.5%). The former three sectors, oil, printing, and silk, surpassed 60.8%, the U.S. average. The ratio of non-industrial sectors such as a fertilizer trade, trade, and warehouse was very low, less than 25%.

How much did company's equity capital cover the demand for fixed capital? In terms of a fixed capital adequacy ratio (1), the main sectors far below the average (26.8%) were paper (-7.5%) and printing (2.6%). The cotton spinning, oil, construction materials, electrical machinery, mining, and silk industry followed them, at between 10 and 20%. The ratio (1) scattered widely from the small capital to the large

one, between three thousand yen and four million yen among Japanese corporations. The high "deficit" sectors were the paper mill (4 of 5), oil (3 of 8), construction materials (6 of 15), mining (5 of 17), and railroad industries (4 of 23).

The machine industry and three non-manufacturing sectors, such as a fertilizer trade, trade, and warehouse, had enough equity capital to fill the demand for the fixed capital. As bond finance was seldom available even for Japanese big companies in those days, the fixed capital adequacy ratio (2) did rarely differe from the ratio (1). Only the paper mill industry could not fill the fixed capital demand through the securities market: stock and bonds. That "deficit" was just covered by a short-term credit source such as borrowing and bill finance. It is a very striking fact that all 19 sectors other than the paper mill industry in Japan were able to fill their fixed capital with the long-term funds. In this regard, there is not so much difference between Japan and the U.S.

The fourth discussion is about the relationship between two "deficits": the deficit on fixed capital adequacy and the balance sheet deficit. Japanese corporations suffered severely from a fierce recession in 1900. Not a few companies went into the red. We have income-information on 199 firms in the 211 samples. 45 of the 199 companies, 22.6%, were in the red in 1900. Sectors with the high proportion of "red" companies included trade (3 of 6), cotton spinning (4 of 9), foods (8 of 23), construction material (5 of 18), and oil (3 of 8). On the other hand, "deficit" companies in terms of the fixed capital adequacy ratio numbered 34 of 199, or 17.1%. "Deficit" firms in both were 15 of 199 (7.5%). Did the "deficit" on the fixed capital adequacy ratio have some relationship with the "deficit" on balance sheet? One third of 45 b/c "deficit" companies were both "deficit" ones, while 44 % of the 34 fixed capital

"deficits" were both "deficits". This difference means that a fixed capital "deficit" company was inclined to go into the red much more often than a "surplus" one.

VIII Financial Development and Capital Structure

We here review briefly several salient characteristics of financial development in each country: stock market, bond market, and credit market.

The stock market was a main source of the early industrialization finance in both the U.S.A. and Japan. This fact accords well with the results of the Singh (1995)'s research about current listed corporations in many developing countries. The importance of the stock market in industrialization is supported not only by Singh (1995)'s current research but also by our historical study of two major developed countries. There are few theoretical frameworks that are able to explain this fact well. First of all, there were few policy measures causing tax-distortion of capital structure argued vis-à-vis the Modigliani and Miller theorem in late nineteenth century Japan and the U.S.A (Friedman (1907)), although several state's regulations on bond financing or usury laws on interest rates still remained in the U.S.A. (see Table 7). Secondly, this result on the importance of stock markets in industrial finance seems to be negatively on the pecking order hypothesis: from internal funds, to bank loans, to stock shares. It seems to reflect partly the long-term change of corporations' capital structure in the U.S.A. However, the latter order from loans to stocks is doubtful even in the U.S. case. Moreover, the high contribution of stocks and bank loans to the Japanese industrialization does not support at all the

pecking order theory. Funds necessary for industrialization were too large for modern corporations in a catch-up, developing economy such as Japan to fill with only internal funds. Such companies were apt to adopt a form of a joint-stock company from the beginning in order to gather money from as many investors as possible.

Then, from where did the stock market attract such large amount of money? Three sources could be possible. The first one is foreign money invested by Europeans. The second is old money, capital accumulated before industrialization's start, while the third is newly born money in an industrialization process. The first, the possibility of foreign investment, was quite different between the U.S.A and Japan. The Japanese economy was isolated, far from European investors, before the victory of the Russo-Japanese War (1904-5), while investments into the U.S. industries seemed to be assessed as if extension of domestic investments for the European investors. Europeans made large investments, in a direct or portfolio form, into the U.S. modern industries such as railroad, brewery, mining, and so on (Davis & Cull (1994)).

In regard to domestic funds, the U.S.A. and Japan seem to have been contrasts. Having been a colony, the U.S. industrialization could not help beginning with little "old money", which was deprived by the Europe and partly returned there from in the form of investment to the U.S.A. The "new money", which welled up in the process of rapid economic development after independence, financed bulk of industrialization. On the other hand, Japan at the beginning of its industrialization was able to make use of "old money" accumulated in a prosperous feudalist society in the pre-restoration era. Once the industrialization spurted, "new money" welled up and was reinvested. Much of the new or old money in both economies was invested into the emerging stock

market. Innumerable stockholders emerged all over the nation. A study on this issue is just recently coming out (Wright (2002)).

The most remarkable difference of corporation capital structure between the U.S.A. and Japan is in bond finance. Japan had no effective bond market, while many American companies depended on it as well as on the stock market to finance fixed capital. Why didn't the bond market develop in Japan as well ?

It seems as a very difficult task for a developing economy to establish an industrial bond market. It develops gradually step by step. The first prerequisite base for an industrial bond market is establishing a government bond market. The U.S. and Japanese governments both successfully stabilized their huge debts accumulated from the civil or independence war by transforming them into long-term bonds (Sylla (1999)). As the newborn, revolutionary government's credibility increased, investors, mainly financial institutions, became willing to trade and hold government bonds, and a secondary market developed.

Establishment of a government bond market is a necessary condition but not a sufficient one for the development of an industrial bond market. A private corporate bond ranked lower in terms of creditworthiness compared to a government bond. Especially in the early industrialization era, industrial corporations' creditworthiness was still underdeveloped. Some financial devices were necessary for investors to be willing to trade and hold early private companies' bonds as well as government bonds: credit-reinforcement or guarantee.

In the U.S.A., a guarantee by a person, state, or collateral was introduced as a device for credit-reinforcement. While investors sometimes demanded that a company attach a personal guarantee to bonds to supplement its credibility, many states often provided a guarantee

for public-purpose companies, such as the canal, in the early nineteenth century. Since these devices, however, were incidental and limited, another device, the mortgage bond, was invented to promote the more common use of bond finance for railroad and other industrial corporations in the U.S.A. A trustee was introduced as the third person independent from a debtor and a lender to secure the right of bondholders in case of corporation's bankruptcy. The other hand, the trust deed was, for modern industrial firms, very suitable, lumping in a comprehensive mortgage several different kinds of their own properties such as real estate, fixed equipments, and so on. Owing to this device, mortgage bonds spread remarkably from railroad companies to the other industrial sectors in the decades across the Civil War and developed into an important source of industrial finance supplementing equity finance. The trust deed played a crucial role for the early industrial corporations in financing the huge fixed capital during the transition period, about half a century, until the establishment of a full-fledged industrial bond market at the end of the nineteenth century (Stetson (1917), Smith (1927), Draper (1930), and Maclelland & Fisher (1937)).

In Japan, bond markets other than that for governments did not develop very successfully. State-bond or state-guarantees were not so common before the World War I, because local governments had not as much independence from the central government as in the U.S.A. Furthermore, it was not until 1893 that bonds were clearly stipulated to be different from stock capital. And the Japanese law system lacked a distinct regulation about corporate bonds untill the new business code was carried out in 1899. Before the 1899 code, corporations needed authorization from the financial authority to float bonds. The law on comprehensive mortgage bond and trust deeds was enacted in 1905.

That act aimed to introduce foreign capital into Japan's big industrial corporations from the Occidental economies under a gold standard system established in 1897 (Shimura (1980)).

In such a vague legal circumstance in the early Meiji era, a business custom of non- collateral corporate bonds had spread. A few big industrial corporations such as the Osaka Railroad Companies, which enjoyed such a reputation as to need no collateral or guarantee to float bonds, introduced bond floating. The 1905 Comprehensive Mortgage Bond and Trust Law could have opened a possibility to break through this limitation on a bond market development. It, however, contributed little. The non-collateral custom in corporate bond floating held on firmly after the legislation up to the 1930s, when the financial authority introduced *de facto* a regulation to forbid non-collateral bond floating.

Why, in Japan, did not the device of mortgage bonds with a trust deed promote the development of a bond market as it did in the U.S.? The first answer involves the stock market. Many Japanese industrial corporations, not only the big ones but also the middle or even small ones, were able to raise the greater parts of necessary fund, mainly fixed capital, from the stock market. They did not necessarily need to procure money from other long-term capital markets, except in a financial predicament time such as a business startup or a recession, when they did not rely on the bond market but the credit market.

The second answer is that credit market overwhelmed the bond market. The 1905 Comprehensive Mortgage Bond and Trust Law assumed only big banks would be the only institutions carrying out trustee business. Many of them preferred direct lending to being partly involved in a bond trustee business. Interestingly enough, the Japanese banks had a source of funds for a long-term finance: paid-in capital and

term-deposits. Commercial banks, both national banks and private banks, held not only current account deposits but also time or saving deposits from the beginning, although Matsukata, the first Minister of Finance, established a modern banking system under the idea of a division of labor between commercial banking and long-term banking, Furthermore, over half of bank's loanable funds came from paid-capital. Thanks to the two sources, they were able to hold sufficient resources enough to participate deeply in the finance of the early industrial corporations. At the same time, the wide ranging business of commercial banks impeded the development of other financial institutions, such as trust companies, saving banks, or investment banks.

The U.S. commercial banks did not begin a time deposit business until the end of the nineteenth century. This difference between the time-deposit business of commercial banks in Japan and the U.S.A. in early industrialization may have considerably affected bond market development in two countries. This difference in the debt market in turn had an effect on the capital structure of industrial corporations in the two countries.

IX Conclusion

By analyzing the balance sheets of 211 Japanese and 66 U.S. corporations, we come to several important conclusions regarding the capital structure of industrial firms in late nineteenth century, which are;

(1) Modern industrial companies raised most of their necessary funds from stock markets.

(2) In regard to debt finance, the U.S. corporations employed both bonds and bank credit while the Japanese depended on bank

credit.

(3) In regard to the adequacy ratio of long-term funds to fill fixed capital, there was little difference between the Japanese firms and the U.S. ones.

(4) The Japanese banks provided loans much more widely to relatively small and middle industrial companies, particularly to the newborn ones, than the U.S banks did.

The results are very interesting, and suggestive and convincing. However, this study has some weak points in terms of the size of the data set. 66 sample data is too small to reflect the reality of the U.S. corporations' capital structure. Our U.S. data could have a bias toward large companies. We need to enlarge the coverage of small and medium firms in the U.S. dataset. At small capitalization loan finance could play an important role. As capital size increases, this gives way to bond finance. And at every larger firm size, equity finance dominates. Furthermore earlier in the nineteenth century, the availability of bond finance decreases for industrial companies and consequently their equity ratio increase. Thus the U.S. capital structure earlier in the century may have moved closely resemble that of Japan, which relied on stock markets supplemented or supported by commercial banks.

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Financial Development and Capital Structure in 19_{th} century Japan and the USA

Masayoshi TSURUMI

《Abstract》

This paper composes the capital structure of private corporations in the latter half of the nineteenth century in a comparative study of Japan and the USA. What was a role of banks or capital markets in this process? How is different between both economies? We analyze 1891 balance sheets of 66 U.S. corporations and 1900 dataset of 211 Japanese corporations. The results are very interesting and suggestive. The first result is that modern industrial companies raised most of their necessary funds from stock markets in both economies. The second is that the Japanese banks provided loans much more widely to relatively small and middle industrial companies, particularly to the newborn ones, than the U.S banks did.