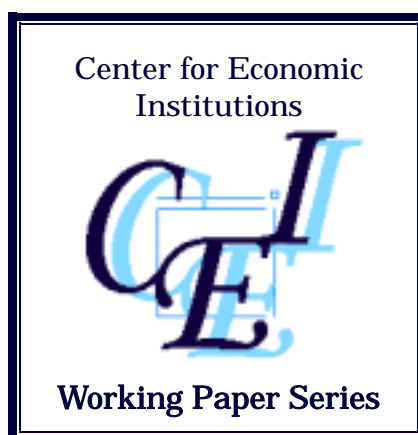


Center for Economic Institutions
Working Paper Series

CEI Working Paper Series, No. 2001-12

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Japan's Postwar Experience?*

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This paper was presented at the conference on *Designing Financial Systems in East Asia and Japan: Toward a Twenty-First Century Paradigm*. This two-day conference was co-organized by the International Monetary Fund and the CEI. It was held during September 24-25, 2001 at Hitotsubashi Memorial Hall in Tokyo, Japan. A select group of academics, researchers and policy makers from around the world gathered to examine the timely issue of how the financial systems and corporate governance in East Asia and Japan should be redesigned in order to achieve sustainable economic development. The conference included six sessions with 17 papers. All the presented papers were added to the CEI series of working papers. The series, as well as the contents of the conference, can be reached at <http://cei.ier.hit-u.ac.jp>.

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October 2001

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* This paper is a revised version of Hanazaki and Horiuchi (2000) and was prepared for the 8th APFA Annual Conference held in Bangkok on July 22-25, 2001, NBER/CIRJE/EIJS/CEPR Japan Project Meeting held in Tokyo on September 14-15, 2001, and IMF/CEI conference held in Tokyo on September 24-25, 2001. The authors wish to thank Sanae Kawaguchi for her valuable statistical assistance. They appreciate Jenny Corbett, Noel Gaston, Yuzo Honda, Takeshi Yamada and Yishay Yafeh for their constructive comments.

Abstract

While the Japanese banking sector seems to have disciplined borrower firms for inefficient management in the high growth era, its fragility was revealed by the serious non-performing loans since the early 1990s. According to ‘the financial restraint hypothesis’ advocated by Hellmann, Murdock and Stiglitz (1996), the comprehensive competition-restricting regulation was effective in motivating banks to prudently monitor their client firms by giving the banks excess profit opportunities. The financial deregulation started at the beginning of the 1980s undermined banks’ profitability and induced the banks to shirk monitoring. Thus, according to the financial restraint hypothesis, the Japan’s bank crisis in the 1990s was a consequence of the financial deregulation in the 1980s. This paper criticizes the financial restraint hypothesis, and proposes the alternative hypothesis that the banking sector was potentially fragile even before the 1980s because the government was unable to penalize inefficiently managed banks in credible ways. The manufacturing firms, which were disciplined by competitive pressures from abroad, reduced their reliance on bank credit in the late 1970s, and non-traded good industries such as real estate became major borrowers of bank credit in the 1980s. This structural change in the bank credit market revealed the potential fragility of the Japanese banking sector. The empirical analyses based on more than 1,600 manufacturing firms supports the alternative hypothesis this paper proposes.

1. Introduction

While the Japanese banking sector seems to have disciplined borrower firms for efficient management in the high growth era, its fragility was revealed by the serious non-performing loans since the early 1990s. The sharp contrast between the banks' admirable function in mediating ultimate lenders and borrower firms in the high growth period and their miserable performance since the early 1990s is a puzzle to those who are interested in the contribution of the financial system to industrial development. Can we explain the up-and-down the Japanese banking sector experienced in the postwar period?

One possible way to answer to this question is to resort to 'the financial restraint hypothesis' advocated by Hellmann, Murdock and Stiglitz (1996). According to the hypothesis, the competition-restricting regulation is effective in motivating banks to prudently monitor their client firms by giving the banks excess profit opportunities. In the high growth era, the Japanese government imposed comprehensive competition-restricting regulation on the financial system to protect existing banks and other financial institutions from fierce market competition. The regulation seemed to be successful in effectively disciplining banks for efficient monitoring.

However, the government started the financial deregulation at the beginning of the 1980s. The deregulation undermined profitability in the banking and induced the banks to shirk monitoring. The bank crisis that occurred in the 1990s was a consequence of the financial deregulation in the 1980s. Thus, according to the financial restraint hypothesis, the successful financial regulation in the high growth era, and deregulation since the 1980s can explain the up-and-down of the Japanese banking sector.

This paper criticizes this financial restraint hypothesis, and proposes the alternative hypothesis that the banking sector was potentially fragile even before the 1980s. The reason why the banking sector was fragile was that the government was unable to penalize inefficiently managed banks in credible ways under the competition-restricting regulation and the safety net. The fragility of the banking sector was not revealed until the 1980s because the major clients of bank credit were those

firms belonging to the manufacturing industries, which were disciplined by competitive pressures from abroad.

The manufacturing firms reduced their reliance on bank credit in the late 1970s, and instead non-traded good industries such as real estate became major borrowers of bank credit in the 1980s. Banks should have monitored the non-traded good firms because the firms were not disciplined by competitive pressures from abroad. But banks were not well prepared for monitoring borrower firms. The structural change in the bank credit market concentrated bank loans to the sector that were not monitored, and consequently revealed the potential fragility of the Japanese banking sector. The empirical analyses based on more than 1,600 manufacturing firms refutes the financial restraint hypothesis and supports the alternative hypothesis this paper proposes.

The organization of this paper is as follows: section 2 explains the conventional view regarding the function of the Japan's bank-centered financial system in postwar period. In particular, we discuss how the financial restraint hypothesis helps the conventional view explain the up-and-down of banks' performance before and after the financial deregulation of the 1980s. Then, section 3 criticizes the financial restraint hypothesis. Section 4 proposes a hypothesis alternative to the financial restraint hypothesis to explain both the banks' apparently excellent performance in the high growth period and their miserably poor performance after the late 1980s. Here, we stress the importance of the disciplinary influence of competitive pressures from abroad, and the structural changes in the bank credit market since the late 1970s. Section 5 statistically tests which is relevant in explaining the manufacturing firms' managerial efficiency, the main bank relationships or competitive pressures via international trade. If the financial hypothesis were true of Japan, the main bank relationship would have significantly explained higher efficiency of borrower firms in the high growth period. We would have also observed a significant decline of the main banks' contribution to borrower firms' managerial efficiency after 1980 when Japan started financial deregulation. However, our test does not find the positive influence of the main bank relationship on firms' management but a significantly positive influence of competitive

pressures from abroad on firms' efficiency in the high growth period. Our test does not either support the hypothesis that the positive influence of the main bank on firms' management decreased after the early 1980s when Japan started financial deregulation. Thus, statistical analyses in section 5 refute the financial restraint hypothesis. Section 6 summarizes discussions of this paper.

2. The Conventional View regarding Japan's Financial Mechanism

Banks mobilize financial resources from savers via bank deposits that are liquid stores of value functioning as an essential instrument of the payment system. Banks also allocate funds to fund-users (mainly firms) by examining or monitoring their credibility. They realize economies of scale both by pooling funds from a large number of savors and by diversifying loan portfolios. Banks are regarded as being delegated by a large number of small savors to economize on monitoring costs (Diamond (1984)). No doubt, they play an important role in a market economy. In particular, at the early stages of industrial development where efficient monitors are badly needed, banks are believed to stimulate rapid industrial developments (Gerschenkron (1962)).¹ This is true of Japan in the postwar era (i.e., the so-called high growth period from the late 1950s to the early 1970s). Postwar Japan apparently achieved a 'miraculous' industrial development under the bank-centered financial system.

(i) Banks in the corporate governance structure

It is widely argued that banks were important in postwar Japan not because they constituted an efficient conduit between ultimate savers and investors but because they were essential to the corporate governance. This view concerning functions of the

¹ Gerschenkron (1962) established the conventional view regarding the relationships between industrial developments and the role of financial system in the 19th century Western Europe. According to his analysis, while banks played only a limited role in Britain, the industrially advanced country at the time, their strong function helped Germany, the then industrially backward country, to achieve the rapid catch-up to Britain. It should be noted, however, that some recent historical studies criticize this

bank-centered financial system has been so prevalent that we will call it the conventional view. The voluminous book edited by Aoki and Patrick (1994) contributes to circulation of the conventional view.² According to this conventional view, banks monitored and disciplined management of borrower firms via intimate long-term relationships with the firms. This long-term relationship is often called ‘the main bank relationship.’ The main bank relationship is based not only on a standard loan contract but also on a cross shareholding between banks and their client firms. Banks sometimes dispatched officers to borrower firms, particularly when they were in financial difficulty. The bank officers would intervene in the management and play an active role in restructuring of these firms (Aoki, Patrick, and Sheard (1994)). The main bank relationship could be regarded as a sort of state-contingent contract under which corporate managers are allowed a lot of latitude in controlling business when business shows normal profitability, but the control right would be swiftly transferred from managers to banks in the case of financial distress.

Grossman and Hart (1982) and Jensen (1986) argue that debt disciplines borrower firms for efficient management via threats of liquidations. The managers of the borrower firms will lose their positions when they fail to repay debt. Thus, their hypothesis implies larger debt will exert a stronger disciplinary effect on borrowers’ management. On the other hand, according to the conventional view, the amount of debt does not necessarily matter to the disciplinary effect of main bank relationships. Rather, main banks tend to mitigate the disciplinary effect of debt because banks can actively

Gerschenkron’s proposition. See, for instance, Collins (1998) and Fohlin (1999).

² Kester (1993) concisely summarizes the main point of the conventional view as follows: “The role of financial institutions in Germany and Japan, banks in particular, is more than that of efficient providers of capital, and their equity ownership in industrial clients represents far more than a mere portfolio investment. Through their activities as main banks or Hausbanks, they play a vital, multifaceted role in the governance of industrial enterprise in their respective countries. [...] They function effectively as centers of information gathering about client companies, and their responses to virtually any aspect of their client companies’ activities represent important signals to other corporate stakeholders, As significant equity owners, they enjoy direct or de facto board representation through which they may exercise an active voice in the governing of corporations in which they invest (Kester (1993: 77).”

intervene to rescue borrower firms in financial distress.³ In spite of this mitigating effect, the main bank relationship precisely monitors borrowers' management and can be regarded as having exerted the same disciplinary influence on Japan's corporate management as the capital market has done in the U.S. corporate governance framework (e.g., Prowse (1995)).

(ii) Who monitors the monitor?

The conventional view regards banks as a monitor of their client firms' management. But banks are themselves corporations to be monitored and disciplined for efficient management. Thus, the conventional view must answer the question who monitors the monitors (i.e., banks). Here, as Aoki (1994) suggests, the conventional view can resort to the financial restraint hypothesis advocated by Hellmann, Murdock, and Stiglitz (1996). The financial restraint hypothesis claims that to suppress full-scale competition in financial markets and thereby to give the banks excess profits would be effective in motivating them to efficiently monitor borrower firms. Provided that the existing banks are rationally managed, they do not shirk monitoring borrowers because the shirking will lead to loss of profit opportunities.⁴

In postwar Japan, the government heavily regulated the domestic financial system. The purpose of the regulation was to protect banks and other financial institutions. The regulation suppressed competition in respective fields of the financial services industry, and gave existing financial institutions including banks excess profits. The banks appeared to effectively monitor borrowers and played an essential role in the corporate governance framework of their clients firms. Thus, the postwar Japan seems to be the successful case evidencing the relevancy of financial restraint hypothesis that

³ In contrast to this, the US banks tend to be passive to intervene into borrowers' restructuring due to the legal principle of 'equitable subordination.' See Prowse (1995: 41).

⁴ Originally, the financial restraint hypothesis was advocated by Hellmann, Murdock and Stiglitz (1996) to refute the neoclassical approach to developmental policy of giving priority to liberalizing domestic financial markets at the earlier stage of economic development. Hellmann et al. (1996) emphasize advisability of protecting domestic banks from full-scale competition to enhance their capability of financial

the bank-centered financial system protected by counter-competition regulations could contribute to industrial development.

(iii) How to explain the current bank crisis in Japan

The financial restraint hypothesis explains not only how the bank-centered financial system effectively promoted industrial development in postwar Japan. It also explains why the Japanese financial system abruptly became fragile since the late 1980s, and suffered from the inefficient banking sector symbolized by the huge amount of non-performing loans.

Obviously, the miserable performance of banks observed during the last decade is a serious challenge to the conventional view that stresses banks as excellent corporate governance monitors. For example, we cite the case of *jusen* as an example of dramatic failure of the main bank relationship. The *jusens* were non-bank finance companies specializing in mortgage loans. These companies were established by groups of major banks. The major owners of those companies were big Japanese banks. Moreover, these companies borrowed a large amount of funds from their mother banks to supply mortgage loans related to real estate developments and housing. Quite intimate personnel relationships existed between *jusen* and their mother banks. Thus, the mother banks were nothing but the main banks of the *jusen* companies. Nevertheless, the banks failed to discipline the managers of those companies. All the *jusen* companies were liquidated in 1995 due to the huge amount of non-performing loans. Public funds were injected in the liquidation process to dispose their non-performing loans. Unfortunately, the *jusen* trouble is just an example of malfunction of banks' monitoring. We have a lot of evidence showing that the current bank crisis was caused by the lack of effective banks' monitoring of borrower firms. This seems to contradict what the conventional view has assumed regarding banks' monitoring in the Japanese financial system. Can the conventional view explain the current bank crisis in a consistent way?

We could explain the current bank crisis by resorting to the financial restraint

hypothesis in the following way. Since the beginning of the 1980s, Japan started to deregulate its financial system in keeping pace with other developed countries. The financial deregulation heightened competition in the financial system reducing profitability of the incumbent financial institutions.⁵ As the financial restraint hypothesis argues, the loss of profit opportunities deprived the existing banks of incentive for monitoring borrowers. The lower monitoring led to excessive risk taking on the side of banks under the comprehensive financial safety net during the late 1980s. The inefficient bank management was revealed at the early 1990s in the form of serious non-performing loan problem.

Thus, the financial restraint hypothesis seems to explain the ups and downs that Japan's bank-centered financial system experienced during the postwar period. Specifically, it seems to explain both the excellent performance of the bank relationships during the period of pre-deregulation and the fragility of the banking sector revealed in the post deregulation period after 1980.⁶

3. A Criticism against the Financial Restraint Hypothesis

Can the financial restraint hypothesis really explain the postwar experience of the Japan's financial system? We are skeptical about it. There are two major reasons for our skepticism. First, the comprehensive safety net provided by the financial system and the financial regulation to protect incumbent financial institutions during the high growth

⁵ Aoki (1994: 135) argues in the following way. "Since the mid-1970s, however, two pillars of the regulatory framework supporting the regime, regulation of interest rates and of bond issue requirements, have been gradually removed. As a result, firms have increasingly to rely on bond issues, at home and abroad, while non-competitive rent opportunities for banks have been squeezed. [...] Thus, the coherence and integrity of the regulatory framework, which was so effective in the heyday of the main bank system, have been impaired."

⁶ The view rather widely prevailing among scholars is that the world wide financial deregulation in the 1980s deprived incumbent banks of profit opportunities and decreased their "franchise value", and thereby induced them to take excessive risk. Thus, the 1980s movement of financial deregulation resulted in the bank crisis in many countries. For example, see Keeley (1990), Lindgren, Garcia and Saal (1996), Allen and Gale (1999).

period prevented realization of banks' effective monitoring envisaged by the financial restraint hypothesis. Second, although the Japanese government started to deregulate domestic financial markets at the early 1980s, it was far from being a thorough liberalization. Rather the government hesitated to introduce full-scale competition in the Japanese financial system. Thus, the financial deregulation did not so deeply influence behavior of incumbent banks and other financial institutions as the some economists argue to support the conventional view.

(i) Lack of credible penalties

The financial restraint hypothesis assumes that the excess profits conferred by the counter-competition regulations on incumbent banks motivate the banks to prudently monitor their client firms. In order for this assumption to be realized, the managers of inefficient banks must be penalized in a credible manner. Without the credible penalties for bad performance, the protective regulation is most likely to induce to inefficient monitoring and excessive risk-taking on the side of bank management.

In reality, as Hanazaki and Horiuchi (2001) discuss, the financial system did not prepare credible penalties for inefficiently managed banks in postwar Japan. The *de facto* financial safety net implemented by the government protected not only all of bank depositors but also other holders of debt issued by banks, and investors into banks shares. Furthermore, the government rescued virtually managers of the banks in trouble through its scheme of covert operation to promote merger of the distressed banks with sound banks. Due to this safety net mechanism, the capital market was unable to effectively penalize inefficient management of the incumbent banks.

At least until the early 1980s, the market competition in the Japanese financial system was heavily regulated. As has just explained, the comprehensive safety net in the financial system suppressed the capital market's function to penalize inefficiently managed banks. Thus, a remaining method to penalize bad performing banks was the role of regulatory authorities responsible for supervising bank management. The regulatory authorities are delegated by the capital markets an essential role of

supervising bank management precisely because the function of financial safety net to protect depositors and investors from bank failures undermines the effectiveness of market discipline (Black, Miller and Posner (1978)). In place of the capital market, the regulatory authorities supervise banks' management to discipline them for effective monitoring of their clients.

However, as Kane (1995) argues quite convincingly, the public's delegation of the role of supervising bank management does not necessarily results in banks' prudent monitoring, because there remains another agency problem between the public (or tax payers), the regulators, and regulated banks. Under the imperfect information regarding the regulatory behavior, it is difficult for the public to monitor the regulators lest their behavior should diverge from the purpose of the regulation, i.e., to discipline banks for prudent management. Thus, there exists some room for the regulators to abuse their discretionary power for their own benefits at the expense of the public.

There is some evidence showing that the Japan's regulatory authorities did not utilize their power to achieve prudent management in the banking sector. For example, the Ministry of Finance allowed banks to increase their leverage ratios substantially during the 1980s, thereby making the banking sector more and more fragile. Horiuchi and Shimizu (2001) statistically test the assumption that the regulatory authorities (the Ministry of Finance) and regulated banks collude via *amakudari* practices (the practice that regulated banks offer important managerial positions to officers retiring from the regulatory authorities), and undermining effectiveness of regulators' supervision. Their test does not reject this assumption for the sample of more than 120 regional banks.⁷

⁷ Aoki and Patrick (1994) recognize this danger associated with the *amakudari* practice. However, they argue that the danger is prevented cleverly by the bureaucratic mechanisms. They argue, "[a]n obvious danger of such [*amakudari*] practice is that it could induce a moral hazard problem if bureaucrats promote their own ties with specific banks and financial institutions for possible personal (post-retirement) advantage. The system places checks on such behavior (although it may not completely eliminate the tendency) by minimizing individuals' discretion in arranging post-retirement jobs: the job is arranged by the Personnel Division of the MOF (or the BOJ), not by the individual concerned, unlike the revolving-door practice in the United States. Thus the incentive for individual bureaucrats to develop ties with particular institutions during their bureaucratic tenure is curbed." They, thus, conclude that "[t]he practice of *amakudari* seems to play an important role in providing" bureaucrats with incentives to

To sum up, the counter-competition regulations did not motivate banks to effectively monitor borrowers in postwar Japan, because there existed no credible penalty on their inefficient management. The lack of effective monitoring suggests that the Japanese banking sector was potentially fragile even in the high growth period. This is in a sharp contrast with the financial restraint hypothesis that assumes banks were efficient monitors in the high growth period.

(ii) Delayed financial deregulation

The conventional view based on the financial restraint hypothesis argues that the financial deregulation started in the 1980s heightened competition in financial markets, and thereby depriving the incumbent banks of excess profits opportunities. The disappearance of excess profits in the banking industry forced banks to shirk monitoring activities and to take excessive risk in the later half of the 1980s. Their excessive risk-taking culminated in the serious non-performing loan difficulties that surfaced at the beginning of the 1990s. However, we are skeptical about this assumption regarding the influence of the financial deregulation on banks' risk-taking behavior.

Although the Japanese government started to deregulate the domestic financial system at the beginning of the 1980s (Takeda and Turner (1992)), its fundamental strategy was to mitigate the competitive pressures that the deregulation would exert on the incumbent banks and other financial institutions. Thus, the government gradually proceeded to financial deregulation to protect the vested interests of the existing banks and financial institutions (Hamada and Horiuchi (1987)). For example, the liberalization of deposit interest rates was started at 1979 when banks were for the first time permitted to issue the negotiable certificates of deposit (NCDs). But the government strictly controlled banks' issuing NCDs in order to prevent banks' competition for the NCDs from destabilizing financial markets. The government took fifteen years to fully liberalize interest rates on time deposits from the late 1970s to mid 1990s.

monitor banks management effectively. Horiuchi and Shimizu (2001) statistically reject their argument.

The government kept intact the policy of segmenting the financial services industry into various specialized fields to prohibit competition crossover those fields from the immediately after World War II until the beginning of the 1990s. It was just 1992 when Japanese financial institutions were for the first time permitted to enter neighborhood businesses by establishing their subsidiaries. Obviously, this regulation suppressed competition in the Japanese financial system. Japan's end-users of financial services complained about low quality of services provided by domestic financial institutions even in the mid-1990s. This end-users' complaint and the fragility of the financial system revealed by the non-performing loans forced the government to announce the so-called "Big Bang" financial reform plan to totally liberalize the domestic financial system in 1996 (Horiuchi (2000)). The conventional view, which stressed impacts of financial deregulation proceeded in the 1980s on the existing financial institutions, could not explain why the Japanese government was criticized for its policy of delaying financial liberalization.

The gradual process of the 1980s financial deregulation kept Japan's domestic financial services industry far from being contestable. Thus, the deregulation did not seem to undermine the profitability of the banking industry. Chart 1 describes a time series of the return on equity (ROE) of all banks from 1968 to 1997. The ROE was higher during the 1980s than during the 1970s. It sharply dropped only after 1990 due to the increasing costs of coping with the large amount of non-performing loans. There was no evidence to show that the financial deregulation reduced banks' profitability as the financial restraint hypothesis suggests.⁸

4. An Alternative Hypothesis

In the previous section, we criticized the financial restraint hypothesis regarding the postwar Japan's banking sector. We emphasized that Japanese banks were

⁸ We should be careful not to take accounting profits so serious. Banks could rather easily manipulate accounting profits. In particular, some sorts of perquisite expenditure

insufficiently disciplined for efficient monitoring even in the high growth period. Our argument implies that the potential fragility existed in the Japanese banking industry before the 1980s. The fragility, however, was not revealed until the late 1980s. Could we explain why the banks' fragility was revealed just in the late 1980s? In this section, we propose an alternative to the financial restraint hypothesis to explain this.

(i) Importance of competitive pressures from abroad

Firms that face fierce market competition are forced to pursue efficient management in order to keep their presence in their markets regardless how the financial markets influence their management. Even if the financial system were powerless in disciplining firms' management for some reasons, those firms in highly competitive markets will pursue efficient management. However, the conventional view emphasizing banks' role in corporate governance often disregards the disciplinary influence of market competition on corporate management.⁹

It is noteworthy that the Japanese government adopted the policy of liberalizing international trade as early as at the beginning of the 1960s. Under the General Principle of Liberalizing International Trade and Foreign Exchange determined in June 1960, the government aimed at raising the "trade liberalization degree" (defined by the relative share of freely importable goods in the total amount of imported commodities) from around 40% in 1960 to 90% until 1963. Actually, the trade liberalization degree rose very quickly to 92% of August 1963.¹⁰

Some economists, particularly foreign scholars, criticized that the apparent trade liberalization did not necessarily mean removing various non-tariff barrier based on the so-called *keiretsu* relationships and on the implicit intervention by the government into

by managers and employees tend to disguise true profitability in the banking industry.

⁹ Theoretically it is impossible to prove that competition in product markets definitely contributes to managerial efficiency. However, Allen and Gale (2000: 108-110) suggests that, in dynamic markets with constantly changing prices, products, and markets, where outsiders may have difficulties of saying ex ante which management will succeed and which will fail, competition can be important in disciplining managers.

¹⁰ See the Ministry of Finance, Monthly Report on Financial and Monetary Statistics (*Zaisei Kinyu Tokei Geppo*), No. 244, June 1972, 48-49.

free trade (for example, Bergsten and Noland (1993)). Nevertheless, Japan's traded good industries represented by the manufacturing had to cope with the fierce competitive pressures from abroad as early as the 1960s. We assume the competitive pressures through the international trade have disciplined Japanese companies belonging to the traded good industries for efficient management.

During the high growth period from the 1960s through the mid-1970s, the major borrowers of bank credit was the manufacturing firms which we assume were most effectively disciplined by competitive pressures from abroad (Table 1). In this situation, the banks' monitoring capacity did not matter so much. Even if the banks were not motivated to efficiently monitor borrower firms as we suggested in the previous section, the potential fragility of the banking sector was not revealed during the high growth period because the major part of bank credit was directed to manufacturing firms.

(ii) Structural changes in the bank credit

The relative share of bank credit directed to manufacturing firms began to decrease in the second half of the 1970s just before the government started the financial deregulation.¹¹ The share of bank loans supplied to manufacturing firms declined from the level of around 50% to 30% in the late 1970s. Table 2a shows the compositions of fund-raising by major companies in the manufacturing surveyed by the Bank of Japan. According to this table, the major manufacturing firms reduced their reliance on bank credit sharply in the late 1970s from higher than 30% level to lower than 10%. In particular, since the late 1980s the manufacturing firms have decreased borrowing from banks substantially. In contrast to this, non-manufacturing firms kept depending on bank credit in the late 1980s (Table 2b).¹²

¹¹ Table 2a shows that the manufacturing firms increased the relative importance of bond financing during the 1980s. This was an undeniable result of deregulation in the domestic corporate bond market. However, it is noteworthy that manufacturing firms started decreasing reliance on bank credit as early as the mid-1970s.

¹² One reason for the reduction of the manufacturing firms as bank credit borrowers is that those firms increased financing by internal funds as they financially matured. Another reason is the substantial appreciation of Japanese Yen in real terms since the early 1970s (Chart 2). From 1971 to 1995, the real exchange rate of Japanese Yen

Thus, after Japan's miraculous economic growth stopped in the mid-1970s, the major part of bank credit was directed from manufacturing to non-manufacturing industries such as construction, real estate, finance and various services which are not disciplined by competitive pressures from abroad. It was those non-manufacturing firms that banks should have monitored and disciplined for efficient management. According to our hypothesis, however, Japanese banks were not prepared for being efficient monitors in the corporate governance structure. The rapid increase in bank credit directed to non-manufacturing firms during the late 1980s uncovered the weak point of the Japanese banking sector: i.e., the lack of monitoring capacity. The serious non-performing loan problem surfaced at the early 1990s was a consequence of this weak point of the banking sector.¹³

5. Which Hypothesis is Supported by Empirical Tests?

In the previous sections, we explained the conventional view regarding the effective role of Japanese banks in promoting postwar industrial development. After criticizing the conventional view, we proposed an alternative view regarding the relationship between banks' function and industrial development. Our hypothesis denies the effectiveness of banks' monitoring emphasized by the conventional view, and instead stresses the disciplinary effect of competitive pressures that manufacturing firms faced after the international trade liberalization adopted in the early 1960s. This section investigates which hypothesis was supported statistically.

The purpose of the following investigation is to confirm which factor contributed

appreciated by 2.5 folds against US Dollar (McKinnon, Ohno, and Shirono (1996)). This real exchange rate appreciation caused reduction of traded goods industry and expansion of non-traded good industries in the Japanese domestic economy. For instance, while the real output of the manufacturing account for 34.8% of real GDP at 1970, it declined to 23.5% at 1994.

¹³ The non-performing loans held by the 'big four' financial groups (i.e., Mizuho F.G., Sumitomo-Mitsui, Tokyo-Mitsubishi F.G., and UFJ) amounted to ¥10.7 trillion at September 2000, 86% of which were for firms belonging to construction, retail and wholesale, real estates, finance, and other services. This shows how intensively the non-performing loans concentrate at those non-traded good industries.

to efficient management of Japanese manufacturing firms in the postwar period, main bank relationships or competitive pressures from abroad. We follow Lichtenberg and Pushner (1994) by using total factor productivity (TFP) to measure firms' managerial efficiency. Specifically, we examine what factors significantly explain individual firms' TFP growth. The explanatory factors include not only variables related to financial markets such as the sample firms' ownership structure and their relationship with banks, but also market competition variables such as competitive pressures from abroad.¹⁴

(i) Productivity growth in manufacturing

The following empirical analyses are based on financial statistics from 1,661 manufacturing firms from 1970 (fiscal year) to 1990 (fiscal year). All firms are either listed on stock exchanges or registered in the OTC market. We exclude from our sample those firms whose financial statements include abnormal figures for various reasons. Since the time span of a sampled firm depends on when the firm was listed on a stock exchange or registered in the OTC market, the number of sampled firms changes over time. Due to its huge size, it was impossible to analyze the data set as a whole by the PANEL method. We divide the sample period into two sub-periods: i.e., 1971-1980, and 1981-1990. The number of sampled firms in each period is presented in Table 3.

Table 3 shows that the real value-added (RVAD) of the sampled manufacturing firms grew at 8.7% per year in the first and at 6.6% per year in the second periods respectively. On the input side, labor is estimated to have decreased in the first period and have increased slightly in the second period. On the other hand, estimated capital stock grew nearly at 6% during the both periods.¹⁵ These suggest that the total factor

¹⁴ Nickell, Nicolitsas, and Dryden (1997) conclude that market competition contributes to efficient management in the U.K. industry. We follow them to include factors representing the degree of market competition in our empirical analysis in addition to the factors related to the financial-capital market.

¹⁵ The real capital of a firm is estimated in the following way. First, we estimate real investment I_t of each firm by deflating its nominal amount of investment expenditure by the nonresidential investment deflator provided by the EPA's national income statistics. The obsolescence rate of real capital d_t for each industry is estimated from the data in the EPA's Annual Report on Capital Stock of Private Enterprises. Assuming that the obsolescence rate of real capital is common to all the firms in an industry and also

productivity of the Japanese manufacturing industry grew substantially in the first period, but only slightly in the second period. To which factor is this development in growth rate attributable, financial factors such as the main bank relationship or the market competitive pressures? This is the question to be addressed in the following analysis.

A basic production function: A firm i is assumed to produce RVAD $V_i(t)$ at t -year following a Cobb-Douglas type production function:

$$V_i(t) = T_i(t) K_i(t)^{a_i} L_i(t)^{(1-a_i)}, \quad (1)$$

where $K_i(t)$, $L_i(t)$, and $T_i(t)$ are respectively real capital input, the number of employees, and the total factor productivity (TFP) at the t -year. The technological parameter of the production function is represented by a_i , which is assumed to be variable cross industry but common for firms belonging to the same industry. The growth rate of per capita RVAD $[d(V_i(t)/L_i(t))/dt]/(V_i(t)/L_i(t))$ can be represented by the growth rate in the capital-labor ratio $[d(K_i(t)/L_i(t))/dt]/(K_i(t)/L_i(t))$ and the growth rate in TFP $[dT_i(t)/dt]/T_i(t)$ in the following way:

$$\begin{aligned} & [d(V_i(t)/L_i(t))/dt]/(V_i(t)/L_i(t)) \\ & = a_i[d(K_i(t)/L_i(t))/dt]/(K_i(t)/L_i(t)) + [dT_i(t)/dt]/T_i(t). \end{aligned} \quad (2)$$

In the following, we investigate how various factors related to the capital markets and market competition influence efficiency of a firm's management that is measured by the growth rate of TFP.

(ii) Factors of corporate governance

assuming that real capital of initial year for each firm is equivalent to book value of the capital, we estimate a time series of real capital for each firm by making use of both I_t and d_t . This method produces estimated growth rates in real capital lower than those estimated by the EPA. For example, the EPA estimates the annual average growth rate in real capital to be 5.3% for the period of 1978-1986, whereas according to our method the corresponding figure is 3.5%. Thus, our method seems to underrate the real capital growth. However, the EPA's estimate may be overrated, because the average annual growth rate in real capital estimated by Hayashi and Inoue (1991) for the same time period is 3.1% much lower than the EPA's estimate. We do not think our method of estimating real capital distorts the following analysis in this paper.

We assume the TFP growth of a firm to depend on its managerial efficiency. Then, we look at candidate variables that, according to the standard theory of corporate governance, are supposed to influence on management efficiency.¹⁶ Specifically, we note the ownership structure of a firm, the debt burden, and the degree of market competition to which the firm is exposed.

Capital market factors: The theory of corporate governance emphasizes the importance of the existence of large shareholders who are motivated to monitor management of their firms. The diversified shareholding deprives investors of an incentive to monitor management, and thereby reduces the disciplinary effect of the capital market. We present the degree of ownership concentration by the proportion of shares held by the largest twelve shareholders, $OWNER_i$. The standard theory predicts that $OWNER_i$ will be positively related to the efficiency of corporate management. Financial institutions including banks are regarded as important monitors of corporate management due to their specialty of analyzing information and data concerning management. We may assume that the proportion of shares held by financial institutions, $FINST_i$ is positively correlated to the efficiency of corporate management measured by the growth rate of per capita RVAD. We also add the proportions of shares held by non-financial companies, $CORP_i$, by foreigners, $FOREIGN_i$, and by private personals, $PERSON_i$.

Some scholars argue that the cross shareholding prevailing in the Japanese corporate sector is effective in mitigating agency problems associated with transactions between firms (Berglof and Perotti (1994)). Some others claim that the cross shareholding works to enhance the autonomy of corporate managers from capital market discipline and endangers efficient management (Lichtenberg and Pushner (1994)). We add $CORP_i$ to the set of explanatory variables to examine which argument is empirically supported. Foreign ownership in the Japanese companies increased

¹⁶ In particular, we consulted Allen and Gale (2000: Chapter 4) for relevant variables related to corporate governance.

gradually but steadily during the decade from the mid-1970s. And after a short break during the bubble period of the late 1980's foreign investment has regained this upward trend. Foreign investors are sometimes regarded as having different investment targets than domestic investors in the sense that foreigners tend to give priority to profitability over the size of the business or relationships with other companies. If it is true, the relative shares held by foreign investors are expected to positively influence managerial efficiency.

Grossman and Hart (1982), and Jensen (1986) argue that debt has a disciplinary impact on corporate management, because managers are forced to pursue efficient management in order to repay debt constantly. If freed from the debt burden, they will indulge themselves in seeking perquisites. Jensen (1989) suggests that the Japanese firms were effectively disciplined during the high growth period because they maintained a high level of leverage. He went so far as to predict that the declining tendency in firms' dependence on debt financing (Table 1 and 3) would endanger efficient management in Japan. However, as has been explained in section 2, the conventional view does not stress the importance of outstanding debt as an instrument of disciplining corporate management. According to the conventional view, not the amount of debt, but the persistent relationship between banks and borrower firms does matter to corporate governance. By adding the debt-total asset ratio $DEBT_i$ to the set of explanatory variables, we can test which argument is relevant to Japan's corporate governance, the Grossman-Hart-Jensen view or the conventional view.¹⁷

The main bank relationship: Since the long-term relationship between firms and banks is mostly based on implicit contracts, it is not always easy to identify a main bank for a specific firm. The multi-dimensional function of Japanese banks makes the identification more difficult. This paper classifies the sampled firms into the group of those that keep 'stable main bank relationships' with banks. We consulted the *Keizai*

¹⁷ $DEBT_i$ includes not only outstanding bank loans but also all other debt such as corporate bonds.

Chosa-kyokai's Study on the Keiretsu to identify the names of main banks for individual firms. The group of firms with stable main bank relationship is defined as those firms that did not change their main banks from 1975 to 1996. On the other hand, we define the firms with 'an unstable main bank relationship' as the firms that changed their main banks more than three times during the period or whose main banks cannot be identified.

As has been explained, our sample excludes some firms due to the abnormality of their financial statistics, and sample spans of individual firms are variable in the original data base. Thus, the numbers of firms belonging to categories of those with 'stable main bank relationship' and those with unstable main bank relationship are changeable over the sample period (Table 4). For instance, 474 firms are defined as firms with stable main bank relationships and 283 firms are defined as firms with unstable main bank relationships in the first period (1971-1980). Other firms are ambiguous with respect to the main bank relationship. It is a little surprising how many firms have ambiguity in their main bank relationships.

Table 4 compares averages of relevant variables of the firms with stable main banks relationship with those of the firms with unstable main bank relationship in two time periods: i.e., 1971-1980, and 1981-1990. The annual growth rate in real value added ($RVAD_i$) is a little higher (but not significantly so) for the 'unstable main bank firms' than for the 'stable main bank firms.' While financial institutions' ownership was larger in the case of firms with a stable main bank relationship than in the case of firms with an unstable main bank relationship, non-financial firms hold larger stakes in the latter firms than in the former firms.

The $DEBT_i$ figures show that the firms with an unstable main bank relationship were less dependent on debt than those with a stable main bank relationship. As has been explained, however, the standard theory of corporate governance predicts that debt is likely to have the disciplinary effect on borrower firms' management. We discern the influence of main bank relationships on corporate management from this disciplinary effect of debt in the following statistical test.

Market competition: We try to measure the degree of market competition a firm faces by two indexes. The first one is the proportion of sales occupied by the top five firms ($SALE_i$) in a specific industry. Thus a lower $SALE$ implies a higher degree of market competition in the industry. However, the contestable market hypothesis shows that the higher market concentration of sales does not necessarily mean a higher degree of monopoly (Baumol, Panzar, and Willig (1982)). Thus, it is ambiguous whether $SALE_i$ is a reliable measure of monopoly in a specific industry.

An alternative to $SALE_i$ is the degree of exposure of firms to global competition. The Japanese government started the policy of liberalizing trade for manufacturing in the early 1960s. The Japanese manufacturing firms had to face fierce competition from abroad due to this policy. We define the degree of exposure to global competition of a specific industry by the sum of the import penetration ratio (imports/(domestic production + imports – exports)) and the export ratio (exports/domestic production + imports)). $EXIM_i$ presents this competition index.¹⁸

(iii) Results of Statistical Tests

We test some hypotheses regarding the influence of the main bank relationship on managerial efficiency of individual firms by the PANEL analysis (the random effects method). Specifically, the following three questions are examined:

- (1) Was the main bank relationship effective in raising the efficiency of corporate management as measured by growth rates in TFP?
- (2) Was the main bank relationship a substitute for the various disciplinary factors of the capital market that have often been reported to be observed in the United States and the United Kingdom?

¹⁸ Articles investigating the relationship between the import penetration rate in an industry and the productivity of a firm belonging to the industry include Nickell, Wadhvani, and Wall (1992), Nickell, Nicolitsas, and Dryden (1997), Harrison (1994), and MacDonald (1994).

Did main banks enhance managerial efficiency in manufacturing? :Our first

model to explain the growth rate in per capita RVAD is

$$\begin{aligned} & [d(V_i(t)/L_i(t))/dt]/(V_i(t)/L_i(t)) \\ & = a_i [(dK_i(t)/dt)/K_i(t) - (dL_i(t)/dt)/L_i(t)] + b_i X_i(t) + c_i Y_i(t) \\ & \quad + d_i \text{MAIN}_i + e_i \text{DI}(t) + u_i(t), \end{aligned} \tag{3}$$

where $X_i(t)$ is a vector of explanatory variables related to market competition in the industry to which this firm belongs, $Y_i(t)$ is a vector containing explanatory variables related to capital market discipline, $\text{DI}(t)$ is a diffusion index to control cyclical movement in the growth rate in $(V_i(t)/L_i(t))$, and MAIN_i is a dummy variable taking one if the firm has the stable main bank relationship and taking zero otherwise. Assuming the technical parameter a_i is invariant across firms within the same industry, we use cross terms of $[(dK_i(t)/dt)/K_i(t) - (dL_i(t)/dt)/L_i(t)]$ and industry dummies in our PANEL analysis. We are mainly interested in whether MAIN_i has a significantly positive coefficient, and whether there are any variables related to either market competition or capital market discipline that significantly account for the growth rate in per capita value added. In order to economize space, we present t-statistics of relevant explanatory variables (i.e., $X_i(t)$, $Y_i(t)$, and MAIN_i) in Table 5.¹⁹

As many empirical analyses regarding the US capital market functions, our empirical tests suggest that the ownership structure of corporations would influence efficiency of their management to some extent. The relative importance of foreigners' ownership (FOREIGN_i) was positively related to TFP growth in the two sample periods. And the concentration of shareholdings (OWNER_i) has a significantly positive coefficient in the first period. Ownership by financial institutions (FINST_i), however, did not show a significantly positive influence on TFP growth.²⁰

Table 5 shows that MAIN_i did not positively influence the growth rate of per

¹⁹ The variables of ownership structure are closely related with each other. In order to avoid multicollinearity, we separately estimated an equation containing only one variable of ownership structure.

²⁰ Lichtenberg and Pushner (1994) find positive influence of ownership by financial institutions and negative influence of non-financial firms' ownership on managerial efficiency. However, our analysis did not produce the same results.

capita real value added (or TFP) at all for both of the sample periods. On the other hand, the debt-asset ratio ($DEBT_i$) has significantly positive coefficients in both of the two periods, being consistent with the Grossman-Hart-Jensen argument that debt disciplines borrower firms for efficient management. These results suggest that debt played a disciplinary role, while the main bank relationship did not enhance the managerial efficiency of manufacturing firms. In contrast to this, $EXIM_i$ positively correlated with TFP growth for the two periods. In sum, our PANEL analysis of equation (3) provides no support for the financial restraint hypothesis and supports the alternative hypothesis that stresses the disciplinary influence of competitive pressures from abroad.

Was the main bank a substitute for the capital market?: The conventional view claims that the main bank relationship has been a substitute for the capital market in disciplining corporate managers. For example, according to this view, hostile takeovers often observed in both the United States and the United Kingdom is unnecessary in Japan, because banks have exerted similar disciplinary pressures on managers of client firms via long-term relationships. In the following, we test the validity of this view.

Specifically, we estimate the following equation of the growth rate in per capita RVAD for two groups of the sampled firms: those with a stable main bank relationship and those with an unstable main bank relationship:

$$\begin{aligned}
& [d(V_i(t)/L_i(t))/dt]/(V_i(t)/L_i(t)) \\
& = a_i [(dK_i(t)/dt)/K_i(t) - (dL_i(t)/dt)/L_i(t)] + b_i X_i(t) + c_i Y_i(t) \\
& \quad + e_i DI(t) + u_i(t).
\end{aligned} \tag{4}$$

Notation is the same as equation (3). We have already compared some performance variables of the two groups in Table 4. We test whether the estimated parameters b_i 's and c_i 's are significantly different between these two groups of sampled firms. In order to avoid the difficulty of heteroscedasticity between the two groups, we make use of a two-stage estimation method. First, we estimate equation (4) for the two groups separately to obtain variances of disturbance $u_i(t)$ of the respective sample groups. Then, after adjusting the data by utilizing the estimated variances of the disturbance terms of

the two groups, we estimate the following equation for the pooled sample of the two groups:²¹

$$\begin{aligned}
 & [d(V_i(t)/L_i(t))/dt]/(V_i(t)/L_i(t)) \\
 = & a_i [(dK_i(t)/dt)/K_i(t) - (dL_i(t)/dt)/L_i(t)] + (1+b_i \text{MAIN}_i) c_i X_i(t) \\
 & + (1+d_i \text{MAIN}_i) e_i Y_i(t) + f_i \text{DI}(t) + v_i(t), \tag{5}
 \end{aligned}$$

If, as the conventional view argues, the main bank relationship disciplines borrower firms for efficient management taking the place of capital market factors, MAIN_i itself would have positive and the cross terms between MAIN_i and capital market factors would have negative coefficients.

Table 6 summarizes results of the estimation. The figures in the lowest line show F statistics of the null hypothesis that all the coefficient of cross terms $\text{MAIN}_i \cdot X_i(t)$ and $\text{MAIN}_i \cdot Y_i(t)$ are zero. According to the F statistics, the null hypothesis is not rejected for all cases except for the estimation result with the variable of individuals' shareholdings (PERSON_i) in the second period. In particular, DEBT_i positively influenced managerial efficiency of borrower firms. But we cannot discern any significant difference in the influence of DEBT_i between the firms with stable main bank relationships and those with unstable main bank relationships for the two periods. Overall, the F-statistics support the null hypothesis that the main bank relationship did not change relation between the other factors of corporate governance and the growth rate in per capita RVAD.

Thus, the statistical test regarding substitutability between the main bank relationship and the capital market mechanisms with respect to corporate governance leads to a rather negative conclusion regarding the conventional view. We have been unable to find consistent evidence supporting the view that the main bank relationship has been able to replace capital market discipline and has a positive influence on management efficiency of client firms.

²¹ This method is justified only if the disturbance $v_i(t)$ in equation (5) follows the normal distribution. We assume this is the case in this paper.

Did the financial deregulation influence governance mechanisms?: The Japanese government started to deregulate the financial system at the beginning of the 1980s. The conventional view argues that the financial deregulation undermined efficient inter-mediation the banking sector had attained in the high growth period. However, we doubt the validity of this proposition, because the government continued to intervene in financial markets mainly in order to keep the financial system's *status quo* established in the high growth period. In the last part of our empirical analyses, we test whether we can find significant changes in the influence of the main bank relationship on manufacturing firms' management in the 1980s.

The statistics summarized in Table 5 and 6 show that the contribution of the main bank relationship to managerial efficiency has not been observed since the 1970s, and therefore that it was not eclipsed since the 1980s when the financial deregulation was started. In order to confirm this, we formally test structural changes over the sample period in estimated production functions such as equation (3). Unfortunately, the huge size of the database prevents full-scale tests. Here, we take up the three truncated sample periods of the early 1970s (1971-74), the early 1980s (1981-84), and the late 1980s (1985-1989), and test whether there existed any significant structural changes in estimated functions over the first period (the early 1970s) and the latter two periods (i.e., the early 1980s and the late 1980s). Due to limitations on data availability, the estimated equation has only limited number of explanatory variables related to the ownership structure. The results are summarized in Table 7.²² The F-value in each column presents a result of F-test of the null hypothesis that the structure of the estimated equation is invariant between the two truncated sample periods. We can confirm which explanatory variable changes its explanation power significantly over the two periods by using t-statistics for the cross term between the variable and a dummy variable assigned to a specific sample period.

We may relate this result to non-linearity of the disciplinary influence of debt in

²² In order to avoid difficulty of heteroscedasticity, we adopted two-stage PANEL estimation.

the following way. At higher levels of debt-asset ratio $DEBT_i$, managers of borrower firms are seriously concerned with repayment of debt so that the marginal disciplinary effect of debt is large. On the other hand, at the range of medium or lower levels of debt-asset ratio, the disciplinary effect of debt on managers is weak. Its marginal effect can be negligible at the range of lower $DEBT_i$. As has already been explained, manufacturing firms significantly reduced their dependence on debt financing, particularly borrowing from banks (Table 2a and Table 3) since the mid-1970s. Thus, their debt-asset ratio decreased from the range where the marginal effect of debt is large to the range where it is small or almost negligible. We need to introduce this non-linearity of debt effect into our estimations in order to test the validity of our interpretation. This is a remaining task for us.²³

6. Concluding Remarks

Japanese manufacturing achieved remarkably high productivity growth in the postwar period. According to our empirical study, neither growth in productive inputs nor factors related to the financial system can fully account for this good performance. Our empirical analysis did not find clear-cut evidence to support the conventional view that the main bank relationship has enhanced efficient management in the Japanese corporate governance framework. Instead, this paper found that the market competition measured by the degree of exposure of an industry to global markets has consistently contributed to efficient corporate management in Japan's manufacturing.

Thus, we conclude that the conventional view supplemented by the financial restraint hypothesis cannot explain the postwar experience of the Japan's bank-centered financial system. The conventional view failed because it neglected the fact that the Japanese financial system did not provide inefficiently managed banks with credible

²³ As the footnote 13 suggests, the predominant proportion of non-performing loans is occupied by those directed to non-manufacturing firms such as construction and real estate firms. Thus, this result cannot directly explain the fragility of the Japanese banking sector surfaced in the 1990s.

penalties, which were indispensable to discipline the banks for efficient monitoring, under the comprehensive counter-competition and the financial safety net. It fails also because it neglects the disciplinary influence on Japanese manufacturing firms coming from competitive pressures from abroad. As Frankel and Romer (1999) show, international trade stimulates economic growth. Our analysis suggests that this positive impact of international trade may also contribute to a disciplinary effect on corporate management.

What lessons can we derive from this paper's analyses regarding the financial restraint hypothesis? This hypothesis argues for the competition-restricting regulation in the financial system in order to motivate banks to prudently monitor borrowers. However, the government would have to prepare penalties for inefficiently managed banks to realize what the financial restraint hypothesis expects. The Japan's postwar experience shows that it would be rather difficult for the government to do so.

Chart 1: ROE in the Japanese banking industry

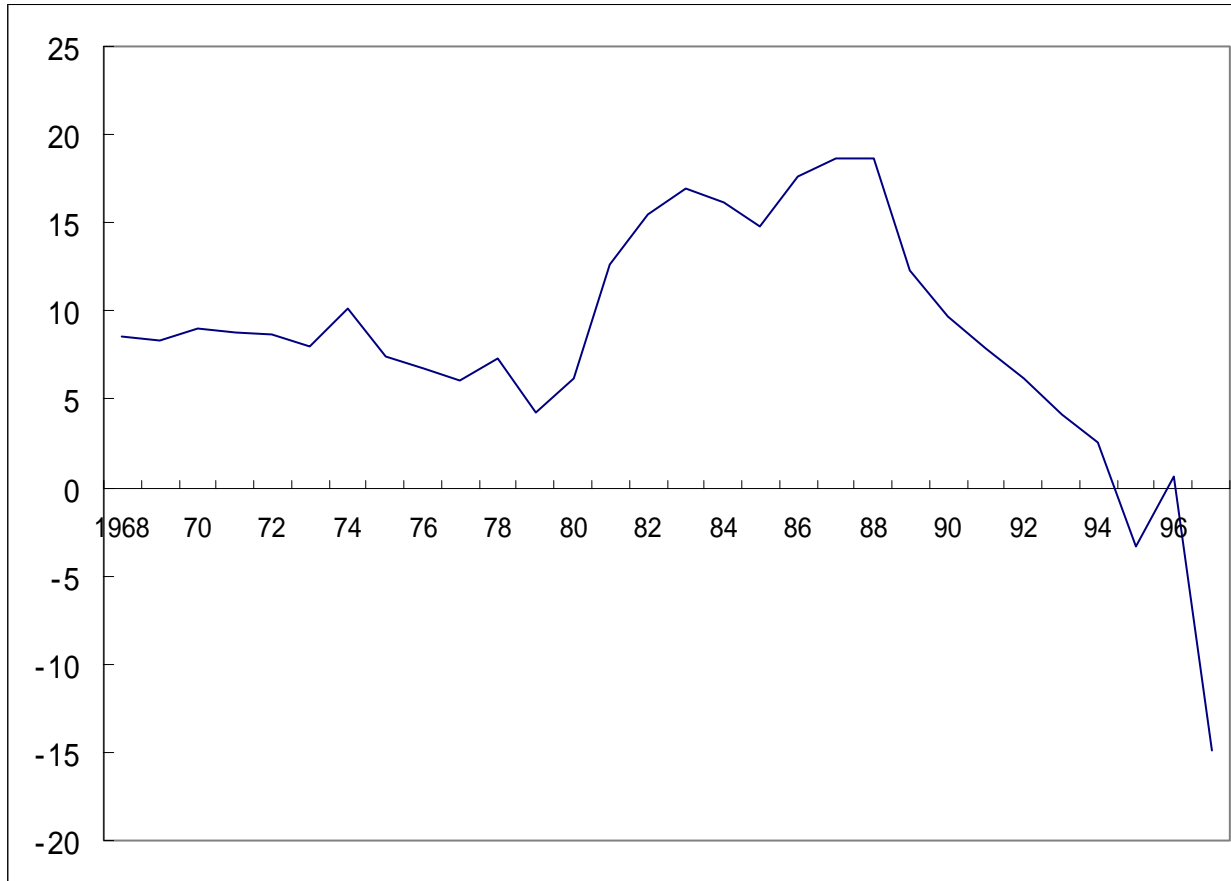


Chart 2: Movements in Japan's exchange rates (1980=100)

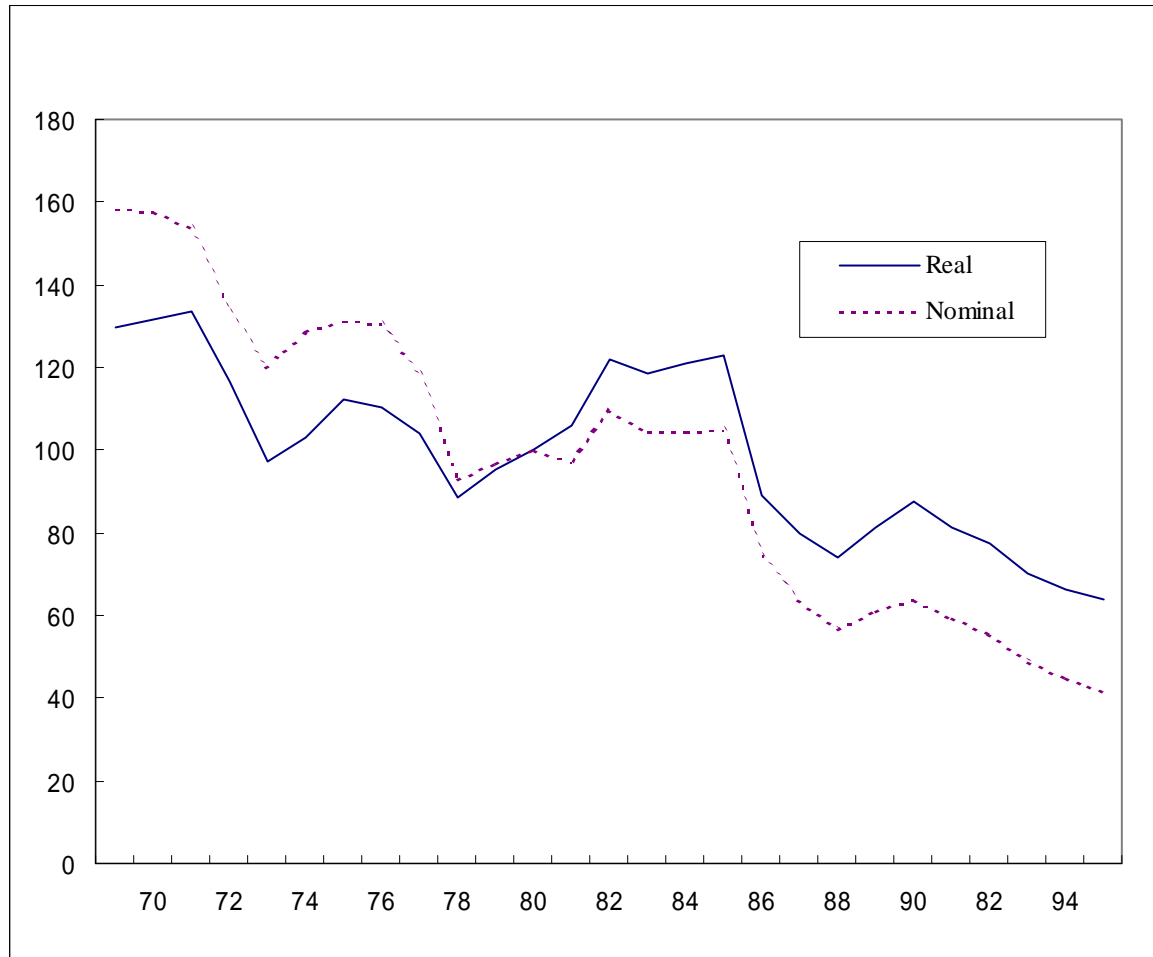


Table 1: Distribution of bank credit to industries (%)

	1960	1970	1980	1990	1995
Manufacturing	49.7	44.7	32.0	15.7	14.9
Construction	2.7	4.7	5.4	5.3	6.4
Real estate	0.8	3.8	5.6	11.3	15.3
Finance	1.5	1.2	3.3	10.0	10.2
Wholesale & retail	28.9	28.8	25.5	17.4	16.1
Other services	2.3	4.5	6.8	15.4	15.5
Others	14.0	12.4	21.3	24.8	21.6
Total (trillion yen)	100.0	100.0	100.0	100.0	100.0
	(8.1)	(39.2)	(134.6)	(376.0)	(486.7)

Source: Bank of Japan

Table 2a : Compositions of fund raising by major firms (Manufacturing : %)

Period (F.Y.)	Internal funds	Corporate bonds	Borrowing	Stocks	Others
1961-65	27.1	2.8	38.2	10.8	21.1
1966-70	33.7	3.0	30.4	3.2	29.7
1971-75	35.9	3.9	34.0	2.4	23.7
1976-80	54.3	1.0	9.5	7.8	27.4
1981-85	68.0	10.3	1.2	12.8	7.7
1986-90	53.9	19.9	-9.5	19.1	16.7
1991-95	98.2	2.0	-0.1	4.8	-4.9

(Note) Major part of 'others' is the trade credit.

(Source) Bank of Japan

Table 2b : Compositions of fund raising by major firms (Non-manufacturing: %)

Period (F.Y.)	Internal funds	Corporate bonds	Borrowing	Stocks	Others
1961-65	22.7	12.3	32.7	7.9	24.3
1966-70	46.3	10.3	65.9	6.8	-29.3
1971-75	29.6	12.9	59.0	7.0	-8.5
1976-80	44.9	19.3	39.1	8.5	-11.7
1981-85	51.8	10.8	26.1	9.5	1.8
1986-90	35.8	14.1	29.1	11.5	9.5
1991-95	107.1	16.2	6.3	-0.4	-29.2

(Note) The non-manufacturing industry includes public utilities such as the electric power, the railway companies which were favored in their bond issuing compared with other industries, Thus, the relative share of bond-issuing was larger in non-manufacturing than in manufacturing.

(Source) Bank of Japan

Table 3: Main statistics of sampled firms (annual averages per period)

	1971-1980	1981-1990
No of firms	994	1,330
RVAD	8.7 (23.6)	6.6 (16.2)
LABOR	-1.5 (7.4)	0.7 (5.5)
CAPITAL	6.5 (10.3)	5.8 (10.8)
SALE	54.6 (19.1)	59.8 (20.7)
EXIM	16.1 (9.6)	19.5 (11.9)
DEBT	73.6 (15.2)	63.7 (18.6)
OWNER	48.8 (15.0)	48.8 (13.8)
FOREIGN	2.9 (7.8)	4.7 (8.2)
FINST		30.8 (15.6)
CORP		30.7 (18.8)
PERSON		31.4 (15.0)

(Notes) **RVAD**: the annual growth rate of real value added. **LABOR**: the annual growth rate of employees. **CAPITAL**: the annual growth rate in real capital. (We estimate real capital stock of a firm at each year based on the depreciation rates published by the EPA.) **SALE**: the ratio of sales concentration by the biggest 5 firms in each industry. **EXIM**: The degree of international competition defined by the formulation $[\text{import}/(\text{domestic product} + \text{import} - \text{export}) + \text{export}/(\text{domestic product} + \text{import})]$. **DEBT**: the outstanding debt per total assets. **OWNER**: the proportion of shares owned by largest 12 shareholders. **FOREIGN**: the proportion of shares held by foreigners. **FINST**: the proportion of shares held by financial institutions. **CORP**: the proportion of shares held by non-financial companies. **PERSON**: the proportion of shares held by private persons. Figures in parentheses are standard deviations.

**Table 4: Comparison between the firms with stable main bank relationship and those with unstable main bank relationship
(%: Standard deviations in parentheses)**

		With stable main banks	With unstable main banks
1971-1980	NO Firms	474	283
	RVAD	8.5 (23.2)	9.2 (22.5)
	CAPITAL	5.8 (9.2)	7.6 (11.5)
	LABOR	-1.7 (7.1)	-0.9 (7.5)
	SALE	55.3 (18.2)	54.5 (19.4)
	EXIM	16.6 (10.1)	15.0 (8.2)
	DEBT	75.7 (13.3)	68.4 (16.9)
	OWNER	46.5 (15.0)	51.1 (14.7)
	FOREIGN	2.7 (7.1)	3.0 (8.6)
1981-1990	NO Firms	517	324
	RVAD	6.0 (15.4)	6.3 (15.9)
	CAPITAL	3.7 (7.3)	5.1 (9.6)
	LABOR	0.2 (5.2)	0.8 (5.1)
	SALE	60.6 (20.1)	59.4 (20.5)
	EXIM	20.0 (12.6)	18.6 (10.0)
	DEBT	68.0 (16.3)	59.2 (19.1)
	OWNER	46.0 (13.2)	50.1 (13.9)
	FOREIGN	5.1 (8.1)	4.6 (8.6)
	FINST	35.9 (15.7)	28.3 (15.0)
	CORP	27.8 (17.3)	32.8 (20.1)
	PERSON	28.6 (13.3)	32.2 (15.0)

Table 5: Factors influencing on per-capita RVAD growth (t-statistics)

	1971-1980		1981-1990				
	(1)	(2)	(1)	(2)	(3)	(4)	(5)
SALE	0.64	0.64	-0.85	-0.60	-0.88	-0.86	-0.87
EXIM	5.31**	5.27**	5.39**	4.98**	5.42**	5.36**	5.31**
DEBT	1.97**	2.37**	6.51**	7.30**	6.68**	6.80**	6.49**
OWNER	1.65*		0.07				
FOREIGN		1.93*		4.72**			
FINST					0.90		
CORP						-1.52	
PERSON							-2.17**
MAIN	-0.53	-0.81	-0.39	-0.72	-0.68	-0.70	-0.74
Adst.R ²	0.026	0.025	0.067	0.069	0.067	0.067	0.067
SER	22.33	22.33	15.23	15.21	15.23	15.22	15.22
NOB	7,496	7,496	10,057	10,057	10,057	10,057	10,057
NO Firms	994	994	1,330	1,330	1,330	1,330	1,330

(Notes) The asterisks **, and * indicate the explanatory variables are significant at the 5%, and 10% levels respectively.

**Table 6: Growth in per capita RVAD and factors of corporate governance
(t-statistics in parentheses)**

	1971-1980		1981-1990				
	(1)	(2)	(1)	(2)	(3)	(4)	(5)
SALE	-0.132 (-0.41)	-0.017 (-0.52)	-0.005 (-0.37)	-0.005 (-0.38)	-0.006 (-0.40)	-0.006 (-0.42)	-0.007 (-0.47)
MAIN	0.036 (0.86)	0.041 (0.97)	-0.010 (-0.57)	-0.006 (-0.35)	-0.009 (-0.50)	0.009 (0.48)	0.007 (-0.40)
EXIM	0.222 (3.02)**	0.211 (2.86)**	0.114 (3.81)**	0.104 (3.48)**	0.114 (3.83)**	0.112 (3.77)**	0.116 (3.84)**
MAIN	-0.034 (-0.40)	-0.019 (-0.22)	-0.046 (-1.35)	-0.043 (-1.26)	-0.046 (-1.37)	-0.044 (-1.29)	-0.047 (-1.36)
DEBT	0.054 (1.51)	0.069 (1.95)*	0.041 (2.59)**	0.057 (3.70)**	0.045 (2.86)**	0.053 (3.27)**	0.045 (2.94)**
MAIN	0.010 (0.20)	-0.001 (-0.02)	0.033 (1.61)	0.027 (1.31)	0.034 (1.63)	-0.023 (-1.11)	0.033 (1.63)
OWNER	0.006 (1.15)		0.018 (0.82)				
MAIN	0.035 (0.66)		0.003 (0.11)				
FOREIGN		0.202 (2.88)**		0.128 (3.71)**			
MAIN		-0.204 (-2.16)**		-0.021 (-0.48)			
FINST					0.001 (0.05)		
MAIN					0.011 (0.45)		
CORP						-0.021 (-1.38)	
MAIN						0.024 (1.22)	
PERSON							-0.012 (-0.60)
MAIN							-0.052 (-2.06)**
CONST.	-0.063 (-0.35)	-0.109 (-0.69)	-0.724 (-6.23)**	-0.765 (-7.34)**	-0.681 (-5.95)**	-0.662 (-6.45)**	-0.640 (-5.57)**
MAIN	-0.211 (-0.89)	-0.099 (-0.46)	-0.094 (-0.66)	-0.084 (-0.65)	-0.125 (-0.87)	-0.110 (-0.86)	0.003 (0.02)
Adjusted R²	0.023	0.023	0.071	0.075	0.071	0.071	0.073
F Value	0.107	0.398	1.493	1.731	1.691	1.883	2.676+

**Table 7: Structural changes in the RVAD function between truncated sample periods
(t-statistics in parentheses)**

	Between period 1 and 2		Between period 1 and 3	
	(1)	(2)	(1)	(2)
SALE DUMT	-0.004 (-0.153) -0.004 (-0.155)	-0.004 (-0.173) -0.001 (-0.028)	0.005 (0.207) -0.010 (-0.394)	-0.008 (0.300) -0.015 (-0.573)
EXIM DUMT	0.084 (1.411) 0.017 (0.270)	0.084 (1.412) 0.007 (0.116)	0.110 (1.896)* -0.055 (-0.922)	0.094 (1.454) -0.040 (-0.658)
DEBT DUMT	0.186 (5.727)** -0.133 (-3.769)**	0.191 (5.845)** -0.125 (-3.537)**	0.169 (5.244)** -0.115 (-3.342)**	0.247 (7.104)** -0.163 (-4.653)**
OWNER DUMT	0.034 (1.239) -0.031 (-0.916)		0.032 (1.144) -0.019 (-0.587)	
FOREIGN DUMT		0.033 (0.602) 0.080 (1.297)		0.054 (0.914) 0.034 (0.556)
MAIN DUMT	-0.005 (-0.114) 0.020 (0.374)	-0.013 (-0.334) 0.016 (0.306)	0.004 (0.091) -0.025 (-0.519)	-0.009 (-0.212) -0.037 (-0.803)
Const. DUMT	-0.669 (-4.635)** 0.104 (0.602)	-0.608 (-4.528)** -0.036 (-0.231)	-0.704 (-4.941)** 0.048 (0.300)	-0.900 (-6.304)** 0.153 (1.043)
Adjusted R²	0.0748	0.0769	0.0716	0.0696
F-Value	23.632++	22.233++	31.116++	29.843++

(Notes) DUMT presents a cross term between each explanatory variable and the dummy for a specific sample period. Period 1, 2, and 3 are the early 1970s (1971-1974), the early 1980s (1981-1985), and the late 1980s (1985-1989) respectively

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