

## The recent economic role of bank-firm relationships in Japan

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## ABSTRACT

### **The Recent Economic Role of Bank-Firm Relationships in Japan**

by Tobias Miarka

Our analysis highlights central aspects of the role of Japanese bank-firm relationships in times of deregulation. Comparing our results with earlier findings, it becomes evident that financial deregulation has triggered dramatic changes concerning the position of banks in the financial market and their relationships with large manufacturing firms. Since deregulation has opened up domestic as well as foreign capital markets, easy access to capital is not limited to bank-affiliated firms. While in earlier years firms with close banking ties may have been more profitable or used their advantages to enhance their growth or the compensation of employees, now whether such a relationship benefits a firm or acts as an obstacle depends largely upon the nature of that relationship. Hence, there are two general points made in this paper. First, in order to assess the economic role of bank affiliations, it is of eminent importance to differentiate between the various ways of establishing and maintaining bank-firm relationships. Second, the rapid development of the Japanese financial market over the last two decades has reduced the monopoly power of banks in a wide range of areas, which has caused dramatic changes concerning the benefits and costs of bank-firm relationships.

## ZUSAMMENSETZUNG

### **Die derzeitige Rolle der Bank-Firmen-Beziehungen in Japan**

Im Mittelpunkt der vorliegenden Analyse steht die Rolle japanischer Bank-Firmen-Beziehungen im Zuge der Deregulierung des japanischen Finanzmarktes. Vergleicht man unsere Ergebnisse mit früheren Untersuchungen japanischer Bank-Firmen-Beziehungen, werden zwei Punkte unmittelbar deutlich. Zum einen löst die Deregulierung des japanischen Finanzmarktes außergewöhnlich starke Änderungen hinsichtlich der Position der Banken im nationalen wie auch internationalen Finanzmarkt aus. Zum anderen sind Art und Ausmaß der Beziehungen zwischen Banken und Firmen fundamentalen Änderungen ausgesetzt. Seit durch die Deregulierung der japanische wie auch internationale Finanzmarkt geöffnet wurde, ist der einfache Zugang zu Kapital in Japan nicht mehr beschränkt auf den Kreis von Firmen mit exzellenten Bankbeziehungen. Vor der Deregulierung waren Firmen mit engen Bankbeziehungen meist profitabler und konnten ihre Bankbeziehungen nutzen, um ihr Wachstum zu steigern. Eine enge Bank-Firmen-Beziehung galt als ein zentraler Wettbewerbsvorteil. Heute zeichnet sich ein differenzierteres Bild. Es ist mehr und mehr abhängig von der jeweiligen Art und dem Ausmaß der Bankbeziehungen, ob diese Beziehungen einen positiven Einfluß auf die Entwicklung der Firma haben, oder ob Bankbeziehungen die Firma in ihrer Entwicklung einschränken. Die Untersuchung unterstreicht dabei zwei grundsätzliche Erkenntnisse. Erstens ist es notwendig, bei der Analyse der ökonomischen Rolle von Bank-Firmen-Beziehungen zwischen den vielfältigen Arten möglicher Bankbeziehungen zu differenzieren. Diese Differenzierung wird in der vorliegenden Arbeit konsequent verfolgt. Zweitens ist festzustellen, daß die rasche Entwicklung des japanischen Finanzmarktes während der letzten zwei Jahrzehnte die Monopolstellung der Banken in vielen Bereichen vermindert hat. Mit Hilfe einer Vielzahl von Analysen wird gezeigt, daß diese Entwicklung fundamentale Änderungen bezüglich des Nutzens und der Kosten von Bank-Firmen-Beziehungen ausgelöst hat.

## 1. Introduction

The following analysis is motivated by theories of financial intermediation that accentuate the information advantages of financial intermediaries, through which they can (partially) overcome frictions such as information asymmetries and agency problems of managerial behavior (e.g. Leland and Pyle 1977; Campbell and Kracaw 1980; Diamond 1984, 1991; Ramakrishnan and Thakor 1984; Fama 1985; Boyd and Prescott 1986; Haubrich 1989; Rajan 1992). Especially in financial systems like those of Japan or Germany, banks may acquire information through their relationships with firms by continuously monitoring the performance of clients under credit arrangements, as well as through the provision of other services such as deposit accounts, cash management services, bankers' acceptances, credit card processing, pension fund management, factoring, or sales financing. Banks may enjoy economies of scale as well as comparative advantages in the production of information about borrowers. Being a debt holder as well as a shareholder that in many cases maintains personnel ties with a client firm, bank influence is not limited to indirect influence from information acquired for credit decisions. The banks' position enables them to influence the corporate behavior of a client firm directly, for example, by using their voting rights as a major shareholder or by implementing decisions via their representative(s) on the board of the firm.

Due to the banks' unique position, contracting in the bank loan market seems to differ substantially from contracting in other debt markets that offer arm's-length finance. In the last decade, empirical literature drawing from US as well as European<sup>1</sup> data has further examined the exceptional features of intermediaries in general, and bank-firm relationships in particular (e.g. James 1987; Lummer and McConnell 1989; James and Wier 1990; Wansley, Elayan, and Collins 1992; Shockley and Thakor 1993; Kwan 1994; Petersen and Rajan 1994, 1995; Berger and Udell 1995, Billett, Flannery and Garfinkel 1995; Elston and Albach 1995; Albach 1998, 1999b; Harhoff and Körting 1998a, 1998b; Berglöf and Sjögren 1998; Degryse and Ongena 1999; Yang 2000). Following the same strain of literature but examining Japanese competitiveness, Nakatani (1984); Hoshi, Kashyap, and Scharfstein (1990a, 1990b, 1991); Teranishi

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<sup>1</sup> German and Scandinavian data in particular.

(1993); Aoki, Patrick, and Sheard (1994); as well as Hoshi, Kashyap, and Loveman (1994), among others, claim that close relationships between firms and financial institutions are important to the international competitiveness of large Japanese firms. Regardless of whether Japanese, U.S. or European data is examined, most of these studies indicate, among other things, the advantages of relationships between banks and firms, especially when it comes to borrowing. In particular, the majority of the analyses agree that the primary benefit to a firm that builds close ties with one or more banks is an increase in the availability of financing<sup>2</sup>.

However, some of the analyses also reveal that these advantages are not without costs. Highlighting drawbacks of German bank-firm relationships, Albach (1998) suggests that it might be possible to overcome the lack of competition within the German financial system by strengthening the German capital market and by reducing the banks' influence on the supervisory boards of client firms.

Theory and empirical evidence seem to suggest that whether the advantages of bank-firm relationships outweigh the costs depends heavily on the economy's state of development, as well as the legal and institutional structure of its financial markets. Gerschenkron (1962) argues that initial stages of economic development can be better promoted by banking systems and controlled capital markets, whereas subsequent economic progress may benefit from more liberal securities markets. In an early analysis of Japanese growth between 1868-1940, Rosovsky (1961) applies Gerschenkron's framework to show the merits of developing close ties between manufacturing firms and financial institutions in order to overcome the "relative backwardness" of Japan's economy at that time. Only recently, an increasing number of scholars have started to argue that Japan held on to a highly regulated banking system and a controlled capital market for too long after it had already become a fully-developed economy.

Facing a most dramatic banking crisis and a troubled economy, the overwhelming majority of scholars as well as politicians seem to agree by now that, for the stage of development the Japanese economy has reached, the distortionary price for the provision of capital becomes a more troublesome source of inefficiency than during the

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<sup>2</sup> It should be noted, however, that there are a few theorists like Blackwell and Santomero (1982), who do not agree that stronger bank-firm relations will always increase the firm's access to capital.

early decades of high growth. Recent studies like that of Weinstein and Yafeh (1998) corroborate this view. They offer empirical evidence that “in the absence of contestable capital markets, large banks with close ties to industry siphon profits and restrict investment, and thus may inhibit rather than encourage growth“ (Weinstein and Yafeh 1998: 666). Japanese authorities have subsequently recognized the need to adjust the financial system in order to secure continued economic progress. Beyond doubt, there has been a considerable time gap between recognizing the need for change and implementing necessary adjustments. Nevertheless, by now it is considered common knowledge that opening up arm’s-length markets may make the most economic sense.

The following analysis is similar to the empirical studies cited above, to the extent that we examine both advantages and costs of bank-firm relationships. Our approach, however, differs from those of previous studies in that we emphasize differentiation between various ways of establishing and maintaining bank-firm relationships. Our unique data set (see Albach et al. 1997 for an in-depth description of the data set) allows us a closer look at whether corporate behavior can be influenced by the degree as well as nature of bank affiliations. It is possible to analyze ways in which close and continued interactions between banks and firms may provide firms with a competitive edge, and which aspects inhibit rather than encourage firm development. For this purpose, we do not want to restrict *a priori* the various possible interpretations. Hence, we refrain from using statistical selection processes that might eliminate specifications of bank-firm relationships from our regression models.

Most of the empirical analyses of Japanese bank-firm relationships have used data that include periods during which an underdeveloped Japanese capital market endowed financial institutions, especially banks, with a wide range of monopoly power. Hence, the impact of recent legal as well as institutional changes in Japan’s financial markets could not, at least to its full extent, be captured by previous studies. Using a data set that covers the period between 1985-1998, an additional contribution of this study to the existing literature is that it sheds more light on how the dramatic process of deregulation and liberalization since the 1980s may have changed the economic role of Japanese bank-firm relationships.

The following analysis of the recent economic role of bank-firm relationships comprises a variety of input as well as output factors that concern the development of



the firm. The rest of the analysis proceeds as follows: in chapter 1.2, we analyze whether bank affiliations increase the profitability of firms or are rather an obstacle to promoting profit. Chapter 1.3 observes the impact of bank-firm relationships on growth rates. We test whether bank affiliations enhance firm growth or are more likely to slow down further growth, especially of large, mature manufacturing firms. In chapter 1.4 we will look for empirical evidence that may support the view that bank-firm relationships are used to increase a firm's personnel welfare. The analysis proceeds with chapter 1.5 by analyzing whether bank-firm relationships may reduce firm risk. Chapter 1.6 discusses the impact of bank affiliations on the cost and stability of interest rates on borrowings. We first analyze whether bank affiliations may change the cost of bank loans. In a second step, we observe whether banks provide an insurance function by reducing interest rate fluctuations for client firms or rather offer incentives by monitoring and adjusting interest rates. The study closes with some concluding remarks in 1.7.

## **2. Profitability and Bank-Firm Relationship**

### **2.1 Introduction**

Set against firms without bank relationships, one of the often-cited competitive advantages of bank-affiliated Japanese firms is their easy access to capital (Aoki, Patrick, and Sheard 1994). Analyzing the impact of bank relationships on *keiretsu*<sup>3</sup> affiliated firms, Hoshi, Kashyap and Scharfstein (1991: 49) find that “the closer a firm moves to the group banks, the more easily a firm can attract funds to finance investment projects”, although they find no significant differences in investment levels. Note that analyzing U.S. data on small firms, Petersen and Rajan (1994) obtain similar results. In their study, they demonstrate that close relationships with a bank increase the availability of capital. However, bank relationships do not seem to reduce its costs.

The importance of bank-firm relationships in Japan becomes immediately clear when we reconsider the financial environment of corporate Japan until the 1980's. During most of the post-war period, firms could raise only limited amounts of capital

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<sup>3</sup> In the following, a *keiretsu* is perceived as a *kinyū keiretsu* i.e. a group of firms organized around a bank. Its formation is mainly based on financial aspects (provision of loans, mutual shareholdings, etc.) and opportunities to exchange information, rather than the transaction of goods.

through commercial floatation of debt or equity. Thus, firms mainly relied on internal and bank finance. In addition, Japanese capital markets were traditionally segmented, with the result that some firms had to cope with limited supply of capital while others enjoyed easy access to (bank) finance. Considering this environment, simple economic theory leads us to expect the bank-affiliated firms to outperform their unaffiliated, capital-rationed competitors.

However, as liberalization and with it the variety of financial sources other than bank debt have increasingly gained momentum since the early 1980's, the environment of corporate Japan concerning the supply of capital certainly has been changing. With financial liberalization facilitating access to a variety of outside financial sources, Miarka (1999) notes an increasing use of the capital market especially by highly valued firms, whether they are affiliated with banks or not. Being able to convince the capital market that it chooses the investment project with a high probability of success even without being forced by monitoring banks to act diligently, a firm does not necessarily need a bank relationship to secure easy access to outside capital. Since bank-affiliated firms have to compete increasingly with firms which can attract other sources of finance that are often cheaper than bank debt, we expect that the competitive advantage once claimed only by bank-affiliated firms now has to be shared with an increasing number of other firms. Firms that are highly valued by the capital market should be motivated to work profitably. Therefore a high market value should be positively correlated with profitability.

Even for the period between 1971-1982, however, when sources of outside finance other than bank finance were much more limited than in recent years, Nakatani's (1984) sample shows that despite easy access to capital, firms affiliated with a corporate financial group did not demonstrate higher rates of profit. He argues that the motivation for forming and maintaining a *kinyū keiretsu* must be found elsewhere than in profit maximization behavior. Using pooled data comprising the years 1977-1986, the OLS regression results of Weinstein and Yafeh (1998) confirm Nakatani's original findings for the case of main bank clients.

To summarize so far, we can state that bank-firm relationships have both advantages and disadvantages. The overall impact depends upon the prevailing type of bank-firm relationship and to what degree alternative sources of finance are available.

In the following, we analyze whether the popular hypothesis that bank-affiliated firms outperform their unaffiliated peers is still valid for the boom-bust cycle. Note that we do not limit our analysis to the impact of main bank affiliation or *kinyū keiretsu* affiliation. Rather, we test whether the hypothesis holds true for a variety of bank-firm relationships such as relationships based on bank-dispatched directors (DISPATCH), bank-held shares (SHARE), a *kinyū keiretsu* (KEILO) affiliation and main bank relationships (MAIN) (see appendix for definition of variables).

## 2.2 Empirical Analysis

In order to reflect the performance of relevant business activities for the period in question and to ensure that the measure is not subject to various artificial modifications which might not reveal the actual performance of the firms' activities, we follow Weinstein and Yafeh (1998), by measuring profitability as the rate of ordinary income over sales. In contrast to operating profits, this measure also includes receipts of interest and dividends as well as interest paid to financial institutions. It would be misleading to use only operating profits, since for many firms the receipts of interest contributed strongly<sup>4</sup> to the firm's overall profitability<sup>5</sup>, especially during the bubble period.

The results of the fixed effects regressions, which are based on our panel data set that comprises the period between 1985-1998 are summarized in table 1-1. Controlling for further factors that may affect accounting measures of profitability like growth rates, leverage, etc. (see Weinstein and Yafeh 1995, 1998; Fisher 1987), table 1-1 underlines that depending on the nature of bank affiliation, bank-firm relationships have, if at all, a mixed effect on profitability.

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<sup>4</sup> Schaede (1990) shows that using *zaiteku* ("high-tech financial management"), in the second half of the 1980s many manufacturing firms generated more than 50 per cent of their yearly profits from financial investment.

<sup>5</sup> Running regressions with other measures of profits, e.g. business profits over total assets (see Nakatani 1984), produces similar results. However, in order to compare our results with those of Weinstein and Yafeh (1998), we focused on interpreting the regression using ordinary income over sales.

**Table 2-1: Profitability, 1985-1998**

Dependent variable: ordinary income over sales

Fixed effects regression coefficients (T-values)

		(1)	(2)	(3)
Relationship Variables	KEILO	0.00101*** (3.559)	0.00099*** (3.548)	0.00096*** (3.456)
	DISPATCH	-0.00031 (-1.386)	-0.00037* (-1.687)	-0.00036* (-1.660)
	SHARE	-0.00028 (1.255)	-0.00039* (1.792)	-0.00038* (1.710)
	MB	-0.00277 (-0.861)	-0.00170 (-0.540)	-0.00253 (-0.805)
	Sig. relation ship variables	0.000	0.000	0.000
Control Variables	Bank debt/ total debt	-0.1607*** (-4.304)	-0.01202*** (-3.292)	-0.01338*** (-3.642)
	MV	0.00452*** (6.624)	0.00566*** (9.494)	0.00481*** (7.194)
	Sales growth	0.04028*** (5.837)	0.04581*** (6.807)	0.04334*** (6.403)
	Debt/sales	-0.02598*** (-4.959)		-0.01484*** (-2.770)
	Log (sales)	0.05208*** (10.215)	0.04612*** (9.166)	0.04290*** (8.329)
	GDP	0.00648*** (11.484)	0.00553*** (9.752)	0.00557*** (9.845)

Note: \*, \*\*, \*\*\*: Significance at the 10%, 5% and 1% level, respectively.

**Table 2-2: Profitability, 1985-1998 (Continued)**

Dependent variable: ordinary income over sales

Fixed effects regression coefficients (T-values)

		(1)	(2)	(3)
Control Variables	Firm risk		-0.45118*** (-8.330)	-0.40603*** (-7.197)
	Size	0.00451* (1.891)	0.00303 (1.322)	0.00438* (1.874)
	Year dummies	Yes	Yes	Yes
Statistics	N of observations	1288	1288	1288
	N of groups	92	92	92
	Obs. per group	14	14	14
	Sign. F	0.000	0.000	0.000
	$R^2$	0.4758	0.4947	0.4980
	DW <sup>6</sup>	1.8450	1.8546	1.8583

Note: \*, \*\*, \*\*\*: Significance at the 10%, 5% and 1% level, respectively.

To be more precise, the coefficient of the variable KEILO is positive and significant at the one per cent level. Similar to the analysis of Weinstein and Yafeh (1998), but unlike Nakatani (1984), the regression specifications in columns (2) and (3) include a measure of firm risk. We use the variance of the return on sales over five years

<sup>6</sup> For Durbin-Watson, here as well as for the analyses below, we followed Bhargava, Franzini, and Narendranathan (1982), who generalize Durbin-Watson type statistics to test the OLS residuals from the fixed effects model for serial independence.

(Geisen 1979)<sup>7</sup>. Hence, we can conclude that profitability differences between firms with a bank affiliation through *kinyû keiretsu* loan dependency and other firms cannot be due solely to differences in risk. Column (2) underlines that the results remain stable even when leverage is excluded from the regression (because it may be correlated with KEILO). Thus, other things being equal, a bank relationship that allows a strong usage of *kinyû keiretsu* loans appears to increase profitability.

However, the variables of all other measures of bank-firm relationships suggest a negative impact on profitability. The coefficients of the two variables DISPATCH and SHARE are both negative and in the regression specifications which include the measure for firm risk, they are both significant at the ten per cent level. This indicates that including a measure of risk in our specifications improves the explanatory power of our regression to describe the impact of bank-firm relationships on profitability.

The coefficient of the main bank dummy also shows a negative sign throughout all specifications. Even though the result is not significant at any acceptable level<sup>8</sup>, it does to some extent corroborate the findings of Weinstein and Yafeh (1998), that a main bank affiliation does not seem to improve profitability.

Turning to the control variables, we find that profitability is a decreasing function of the bank debt to total debt ratio. The coefficient of the variable is negative and significant at the one per cent level. It remains unchanged throughout the regression specifications, indicating that the relatively low profitability of firms which use banks as an important source of capital remains unchanged even when firm risk is added to the regression or a measure for leverage is excluded. The results underscore that the difference between firms for which banks are an important source of capital and firms that use mostly alternative sources cannot be due exclusively to different degrees of firm risk.

<sup>7</sup> Following Geisen (1979: 395), we define firm risk as the variance of the return on sales over five years at a time, so that

$$(1) \text{ Risk}_{i,t} = \sqrt{\frac{\sum_{m=0}^4 (x_{i,t-m} - \bar{x}_{i,t})^2}{5}};$$

$$\text{with (2) } \bar{x}_{i,t} = \frac{1}{5} \sum_{m=0}^4 x_{i,t-m} \quad \text{where } x: \text{ return on sales.}$$

<sup>8</sup> Accounting for the number of firms under investigation, the level of significance should be  $\leq 10$  per cent (Kennedy 1985: 62; Leamer 1978: 88 and 104).

Comparing the coefficient of the bank debt to total debt ratio with the coefficient of the variable KEILO, the result emphasizes that it is most important to differentiate between different sources of bank debt. While loans from financial institutions of the same *keiretsu*, which are most likely coordinated by the group's main bank, seem to help increase profitability, bank loans in general seem to do the opposite. Our interpretation of this finding is that when firms are allowed by their *keiretsu* banks to actually use *keiretsu* loans, the rents from this preferential access to capital do accrue largely to these firms. In other words, suppose the closeness to the group of banks of the same *keiretsu* can be described by the degree of access to *keiretsu* bank loans; it seems that once *keiretsu* affiliated firms have managed to establish a close relationship, they can actually enhance profitability. Hence, we cannot support the general statement made by Nakatani (1984) that firms affiliated with bank-centered corporate groups do not have higher rates of profit. Note, however, that in recent years not all *keiretsu* affiliated firms have had easy access to *keiretsu* loans. Taking this development into account, it rather seems to depend on whether or not firms affiliated with bank-centered groups manage to attract loans originating from banks of their group. Thus, the results do not suggest that a *keiretsu* affiliation itself is enough to enhance profitability.

Furthermore, the positive sign of the coefficient for firm size is quite surprising since it is widely believed that the rate of profits declines as firm size increases. Nevertheless, this finding is similar to the results of Nakatani (1984). Finally, as expected, profitability is positively correlated with GDP growth as well as with the ratio of market value to total liabilities.

## 2.3 Conclusion

To summarize, with regard to the significance of the vast majority of variables comprising different bank-firm relationships as well as accounting for the joint significance of these variables, we can observe that bank-firm relationships have an impact on the profitability of firms. However, depending on the nature of the relationship, the impact seems to differ in intensity as well as direction. While bank affiliations that lead to easy access to *keiretsu* loans enhance profitability, all other types of bank-firm relationships seem to have a negative impact on a firm's profit. Hence it seems most important to differentiate between different bank-firm relationships in order to ascertain their advantages and disadvantages.

## 3.1 Growth Rates

### 3.1.1 Introduction

According to numerous analyses on corporate behavior, firms with close bank affiliations use their easy access to capital to advance their growth record rather than being primarily concerned about profitability, even in the long term (e.g. Hoshi, Kashyap and Scharfstein 1991; Beason and James 1999). Hence, one might assume that for bank-affiliated firms, size and therefore growth rather than profitability are most important. Indeed, in the case of the German bank-centered financial market system, Gerschenkron (1962) argues that large German banks have been able to continuously accelerate growth of their large corporate customers, while profitability was of secondary concern. Without doubt, the bank-centered financial system was of central importance for Japan in helping its economy develop and flourish from Meiji Restoration until the beginning of the Second World War (Rosovsky 1961; Yabushita and Inoue 1993), as well as during the rapid growth period between the mid-1950's to the mid-1970's (e.g. Aoki, Patrick, and Sheard 1994). These were the periods when firms were growing rapidly and were hungry for investment funds, without being much concerned about profitability. Especially during the post-war era of high growth, where financial markets were heavily regulated in favor of existing banks, strong bank-affiliations were certainly the cornerstone of corporate financial strategy and virtually



essential for corporate success (Aoki, Patrick and Sheard 1994). At the end of this period, Japan advanced to become the world's second largest market economy, with European levels of per capita income.

Moreover, growth rather than profitability is often claimed to be of central interest for the employees of a Japanese firm, including the top management. To further understand this, note that under the Japanese seniority promotion system, faster growth leads to an increase in the probability of opportunities for faster promotions, hence more quickly raising salaries as well as status. Rapid growth furthermore strengthens the financing of the firm's pension scheme, since an employee of a fast growing firm will have many employees in that firm younger than himself (Komiya 1990).

However, analyzing the role of *keiretsu* affiliations, Nakatani (1984) finds no positive impact from *kinyū keiretsu* membership on the growth of firms. Furthermore, Weinstein and Yafeh (1998) show that annual growth rates of main bank clients are not much different from those of their peers. Considering the liberalization of the financial market, which gradually exposes Japan to a highly competitive environment where large firms especially have to compete for funds on an international level, it is hard to imagine that these firms can afford to be primarily interested in growth rather than safeguarding investors' interests.

### **3.1.2 Empirical Analysis**

In previous work (Miarka 1999, 2000) it has been argued that the ability of a bank affiliation to positively influence a firm's profitability depends largely on the nature of that affiliation. In fact, only the variable for KEILO indicated that bank-firm relationships seem to improve firm profitability. It is therefore worthwhile to examine whether during times of liberalized financial markets, when the interests of investors are increasingly stressed, the potential advantages of bank affiliations are still revealed in faster growth rates rather than in profitability.

To measure the growth of firms, we used a wide range of criteria in initial modeling attempts, including the growth of sales, total assets, equity, gross performance and property compensation. In order to compare our results with those of Nakatani (1984), and Weinstein and Yafeh (1998), in the following we will analyze the regression results when using the growth rate of sales (table 3-1). However, the

estimates based on the other measures of growth mentioned above are all very similar.

The joint significance of the relationship variables does not provide any evidence that bank-firm relationships have explanatory power for the firms' growth rates. Being negative and significant at the ten per cent level after including the measure for firm risk (column 2), though small, the coefficient of the variable DISPATCH indicates that growth rates of firms with bank dispatched directors are slightly lower than those of other firms. All other results for variables representing bank-firm relationships do not show significance at any acceptable level.

However, the coefficient of the bank debt to total debt ratio, being negative and significant at the one per cent level after controlling for the (log) level of firm sales lagged one period, underscores that annual growth rates of firms whose bank loans account for a high portion of total indebtedness are in fact lower than those of their peers during the sample period. It is furthermore interesting to note that, contrary to expectations, the growth rate of sales is positively correlated with the firm's size in terms of assets, whereas the coefficient of the risk variable suggests that a high level of firm risk leads to lower growth rates of sales.

**Table 3-1: Growth rate of sales, 1985-1998**

Dependent variable: Growth of sales compared to the previous year

Fixed effects regression coefficients (T-values)

		(1)	(2)
Relationship	KEILO	-0.00009	-0.00037
Variables		(-0.080)	(-0.330)
	DISPATCH	-0.00132	-0.00145*
		(-1.475)	(-1.649)
	SHARE	0.00081	0.00046
		(0.904)	(0.524)
	MB	0.00244	0.00111
		(0.191)	(0.088)
	Sig. relationship variables	0.2218	0.2218

Note: \*, \*\*, \*\*\*: Significance at the 10%, 5% and 1% level, respectively.

**Table 3-1: Growth rate of sales, 1985-1998 (Continued)**

Dependent variable: Growth of sales compared to the previous year

Fixed effects regression coefficients (T-values)

		(1)	(2)
Control Variables	Bank debt/total debt	-0.04537*** (-3.080)	-0.03766*** (-2.597)
	Log (lagged sales)	-0.27265*** (-15.664)	-0.30468*** (-17.185)
	Firm risk		-1.42526*** (-6.761)
	Size	0.03635*** (3.958)	0.03895*** (4.317)
	Year dummies	Yes	Yes
Statistics	Number of observations	1288	1288
	Number of groups	92	92
	Obs. per group	14	14
	Sign. F	0.000	0.000
	$R^2$	0.4257	0.4472
	DW	1.7943	1.8143

Note: \*, \*\*, \*\*\*: Significance at the 10%, 5% and 1% level, respectively.

### 3.3 Conclusion

All in all, concerning the impact of bank-firm relationships on growth rates of firms, our results are close in line with those of Nakatani (1984) and Weinstein and Yafeh (1998). Claiming a close bank relationship when a firm is affiliated with a *kinyū keiretsu* or a main bank respectively, they do not find annual growth rates of affiliated firms to be larger than those of independent firms. Hence, we can conclude that at least since the 1980's, the often-claimed advantage of a bank relationship is not manifest in faster growth.

In fact, our results tentatively suggest that, if it has any impact at all, an affiliation with a bank may be an obstacle rather than a benefit to increasing annual growth rates. This result may corroborate the findings of Houston and James (1996). Though they focus on different aspects of bank-firm relationships, they find that since the early 1980s, firms that have maintained a long-term relationship with a single creditor were likely to have weak opportunities of growth. The result can be furthermore interpreted to suggest that bank-firm relationships are more common for mature firms with low growth rates.

#### **4. Compensation of Employees**

##### **4.1 Introduction**

Nakatani (1984) argues that rather than maximization of profit or growth, an appropriate motive for a *keiretsu* affiliation is the pursuit of employee interests. Obviously, Nakatani does not subscribe to the argument of Komiya (1990) mentioned above, that advancing growth rates support the interests of employees. Instead, he claims that the advantages of having easy access to capital via a close *kinyū keiretsu* affiliation benefit personnel welfare much more directly. Taking advantage of easy capital access in order to enhance employee welfare rather than increase profitability or growth would certainly be an indicator of the priority of employee interests over the interests of other stakeholders, especially those of shareholders. Furthermore, it would provide empirical evidence for the often-claimed intention of Japanese top management to value employee interests above shareholder interests (Gerlach 1992; Komiya 1990). It would also therefore be in line with the popular belief that the objective of Japanese corporations contrasts sharply with Anglo-Saxon corporate attitudes. In order to draw a more complete picture of the impact of bank-firm relationships on corporate behavior, we therefore continue our analysis by examining each of the possible forms of bank affiliations under consideration, and determining whether the relationship supports employee interests in the sense of directly enhancing personnel compensation.

## 4.2 Empirical Analysis

In our analysis of employee compensation, which focuses on the impact of bank affiliations, the average compensation to employees is computed as the ratio of the firm's total labor cost (including salary, other compensations, contributions to fringe benefits and social security) to the number of employees at the end of each accounting period<sup>9</sup>. Table 4-1 presents estimation results of the determinants of employee compensation.

**Table 4-1: Average compensation to employee, 1985-1998**

Dependent variable: ratio of the firm's total labor cost to the number of employees  
Fixed effects regression coefficients (T-values)

	(1)	(2)	(3)
Relationship			
Variables			
KEILO	-0.00516 (-0.742)	-0.00409 (-0.592)	-0.00463 (-0.671)
DISPATCH	-0.00891* (-1.638)	-0.00894* (-1.657)	-0.00901* (-1.669)
SHARE	-0.00183 (-0.335)	-0.00355 (-0.652)	-0.00329 (-0.603)
MB	0.18995** (2.410)	0.17442** (2.227)	0.17709** (2.262)
KEIRETSU		-0.15310 (-1.283)	
Sig. relationship variables	0.0000	0.0000	0.0000

Note: \*, \*\*, \*\*\*: Significance at the 10%, 5% and 1% level, respectively.

<sup>9</sup> Note that concerning the data on employees for our analysis, the *yūka shōken hōkokushō* discloses only data on core employees known as *sha-in* (company members), that is, permanent or long-term employees who "entered the firm" (*nyusha* or *shushoku*) upon graduation from school, although a few hired later could also be included. This group includes both blue-collar and white-collar workers. Part-timers, temporary employees, *shokutaku* (non-regular staff members) and "outside" workers (those hired and dispatched by a subcontracting company) are not included.

**Table 4-1: Average compensation to employee, 1985-1998 (Continued)**

Dependent variable: ratio of the firm's total labor cost to the number of employees

Fixed effects regression coefficients (T-values)

		(1)	(2)	(3)
Control Variables	Bank debt/total debt	-0.12362 (-1.347)	-0.10039 (-1.100)	-0.10745 (-1.179)
	ordinary income/sales	1.98068*** (4.267)	1.02737** (2.010)	1.03005** (2.015)
	capital/employees	0.00698*** (5.142)	0.00724*** (5.368)	0.00722*** (5.349)
	RME	1.20627** (2.140)	1.18362** (2.114)	1.16029** (2.073)
	Log (employees)	-0.43888*** (-2.727)	-0.55683*** (-3.432)	-0.56078*** (-3.456)
	Firm risk		-6.02720*** (-4.258)	-6.07564*** (-4.292)
	Size	-0.02679 (-0.460)	-0.01008 (-0.174)	-0.01057 (-0.182)
	Year dummies	Yes	Yes	Yes
Statistics	Number of observations	1288	1288	1288
	Number of groups	92	92	92
	Obs. per group	14	14	14
	Sign. F	0.0000	0.0000	0.0000
	$R^2$ within	0.6643	0.6699	0.6695
	DW	1.9465	1.9548	1.9597

Note: \*, \*\*, \*\*\*: Significance at the 10%, 5% and 1% level, respectively.

As expected, the average compensation to employees is positively correlated with profit (income over sales), hence suggesting the existence of “profit sharing” between employees and other stakeholders in Japanese firms (Nakatani 1984; Komiya 1990). The bonus system, where the amount paid to employees varies according to the firm’s success, is one example for the channels frequently used to allocate additional payments so that employees participate directly in the firm’s profit (loss). Though not significant, the coefficient of the bank debt to total debt ratio tentatively suggests that the more dependent a firm is on rather costly bank loans as a source of outside finance, the smaller is its ability to pay high compensations for employees. Explanatory variables furthermore include measures like capital intensity that may affect accounting measures of employee compensation. It is no surprise that with an increasing ratio of capital per employee, employee compensation increases. Note that the coefficient of firm size in terms of assets has a negative sign but shows no statistical significance at any acceptable level, which suggests that for the firms included in our analysis, employee compensation is not a function of firm size. It is furthermore interesting to note that employee compensation is a decreasing function of firm risk.

Following Hadley (1970) and Nakatani (1984), we also include a ratio that reflects the age structure as well as the male-female composition of employees (RME). This is the ratio of male employees to total employees adjusted with respect to the age structure of the work force of each firm<sup>10</sup>. As shown in table 4-1, the coefficient of RME is positive and significant at the five per cent level. The positive correlation between the average compensation to employees and the age-corrected ratio of the male-female composition of employees shows that for the sample analyzed, the seniority wage system and the fact that male employees earn more than their female colleagues is still vivid. Thus, males counting among the core employees (*sha-in*) of large Japanese firms seem to be still largely protected by the umbrella of the lifetime employment and the seniority promotion system. In this respect, Nakatani’s (1984) findings from his 1971-1982 sample are corroborated by our 1985-1998 sample results.

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<sup>10</sup> The ratio of male employees to total employees adjusted with respect to the age structure of a firm’s work force has been computed as follows:

$$RME = \frac{ME \times AGM}{ME \times AGM + FE \times AGF}$$

with ME: number of male employees; AGM: average age of male employees; FE: number of female employees; AGF: average age of female employees (see Hadley 1970).

For the purpose of this analysis, however, the most important coefficients are those of the bank-firm relationship variables. Testing for the joint significance of our bank-firm relationship variables, we find that bank affiliations have an impact on the average compensation of employees. Nevertheless, the impact is heterogeneous in intensity as well as direction: The coefficient of the main bank dummy is positive and significant at the five per cent level. However, although the statistical significance is not high for most of the other relationship variables, the fact that they are all negative suggests that bank-firm relationships other than a main bank affiliation do not raise the average compensation of employees. Notice that the regression specification presented in column (3) includes (unlike Nakatani's (1984) experiment) the measure of firm risk, which has already been used above. Hence we can conclude that differences of employee compensation between firms with bank relationships and other firms cannot be due solely to differences in risk.

### 4.3 Conclusion

To summarize, only main bank affiliations have a positive impact on the compensation of employees, while all other types of bank-firm relationships under observation tend to have a negative influence. Our interpretation of this finding is that rents which may be due to bank dispatched directors, a high percentage of client firm share held by banks, or a strong use of *keiretsu* loans, do not enhance employee welfare at banks' client firms. To double check for any result that might support Nakatani's (1984) argument, we furthermore run a regression specification that includes a dummy for *keiretsu* affiliation called KEIRETSU. Column (2) of table 4-1 presents the estimation result. The coefficient of the *keiretsu* dummy shows a negative sign without being significant at any acceptable level. Thus, we cannot corroborate the findings of Nakatani (1984).

Concerning main bank relationships, neither profit maximization nor growth maximization was shown to be an appropriate motive for a main bank affiliation. However, the positive and highly significant coefficient of the main bank dummy suggests that, controlling for other factors, employees of firms with a main bank are better compensated than those of firms without a main bank affiliation. The results suggest that rather than increasing profitability or growth, gains from main bank



affiliations may be used to improve employee welfare. We do not have a straightforward explanation for this result. However, one of the reasons why only main bank affiliations seem to have a positive influence on the level of employee compensation may be their special position concerning the management of employee-related services. In order to maintain this lucrative position, the main bank may use its influence on the behavior of the firm to provide employee compensation. Recalling furthermore the benefits that accrue to a bank once it has become a firm's main bank (see Miarka 2000), a bank-firm relationship based on a main bank affiliation truly mutually benefits firm employees and the main bank.

## **5. Firm Risk**

### **5.1 Introduction**

Despite advantages of access to capital, bank-affiliated firms apparently do not have any significant advantage over their peers when it comes to growth rates (chapter 5.3). Trying to explain these circumstances, Weinstein and Yafeh (1998) suggest that in comparison with independent firms, banks may induce their client firms to be more risk averse when deciding about investment projects. Their finding is close in line with Miarka and Yang (1997), who show that in comparison to their peers, large Japanese manufacturing firms with a strong dependency on bank loans decide on more risk-averse investment projects. Furthermore, Montalvo and Yafeh (1994) claim that, having a voice in the firm's affairs, a main bank influences its client to decide on risk-averse ways to access new technologies. In their study they show that rather than acquiring knowledge of new technologies by developing them in-house, which would make risky investment in R&D more likely, main bank clients are more inclined to gain access to new technologies via licensing of relatively safe, proven foreign technologies. Corroborating this finding, Yafeh and Yosha (1999) show that bank-affiliated firms tend to spend less on R&D than unaffiliated firms. These observations, which all demonstrate that bank affiliations reduce firm risk, are also close in spirit with our findings discussed in Miarka 1999. We showed that close bank-firm relationships based on bank-dispatched directors (DISPATCH), as well as relationships based on a large percentage of client firm shares held by banks (SHARE) lead to increased monitoring,

which decreases the private benefits of risky behavior. Hence, when analyzing the impact of bank-firm relationships on firm risk, we expect bank affiliation to reduce firm risk.

## 5.2 Empirical Analysis

Table 5-1 presents the estimation results of the determinants of firm risk. For the measure of firm risk, we continue to use the variance of the return on sales over five years at a time (see chapter 2)<sup>11</sup>. MV is the firm's market value compared to its total liabilities. It is positively correlated with firm risk, which is consistent with basic investment theory: investments with higher risk should only be made if the risk is compensated by a higher expected rate of return. Furthermore, firm risk is negatively correlated with profitability, which we have measured once again as ordinary income over sales. This is consistent with our earlier finding showing that profitability is negatively correlated with firm risk (see chapter 2, Table 2-1). Note that in order to control for factors that may affect accounting measures of our risk variable, the regression specification furthermore includes the measurements debt over sales and log (sales). Moreover, we include a measure that controls for the general development of the Japanese economy during the boom-bust cycle: the coefficient of the annual growth rate of Japan's gross domestic product in real terms shows a negative sign and is significant at the one per cent level. Thus, as expected, risk increases with decreasing GDP growth.

More importantly, let us turn to the results of the bank-firm relationship variables. Similar to regression specifications that have been carried out in initial modeling attempts concerning bank-firm relationships and bank debt (Miarka 1999), the coefficient of the main bank dummy as well as the coefficient of the variable representing the dependency on bank loans originating from the affiliated *kinyū keiretsu* (KEILO) are not significant at any acceptable level.

However, the coefficients in which we are most interested are those of the variables DISPATCH and SHARE, as well as of the ratio of bank debt to total debt. The variables

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<sup>11</sup> Note, however, that further modeling attempts showed similar results when using the variance of the return on capital.

accounting for bank debt and the variables SHARE and DISPATCH are significant at the one, five, and ten per cent level, respectively. Observing the direction of the three variables, as expected, the coefficients of the two bank-firm relationship variables have a negative sign while the coefficient for bank debt is positive. Concerning the results for the bank-firm relationship variables, it allows us to assert that, controlling for other factors, close bank-firm relationships established by bank dispatched directors (DISPATCH) or based on a large percentage of client firm shares held by banks (SHARE), reduce firm risk. Given our model (Miarka 1999), the result of the bank debt ratio is not surprising either: In the model, we explained that firms have to overcome moral hazard problems in order to have easy access to (cheaper) capital market finance. A firm with a high need for finance compared to its market value may overcome the moral hazard problem by inciting banks to monitor its actions. By doing so, the firm may convince the dispersed investors in a competitive market that it behaves diligently. However, since monitoring is costly for the bank, the firm needs to ask for a sufficiently high amount of bank loans (which are costly for the firm) in order to be monitored adequately. We furthermore showed in previous work (Miarka 1999, 2000) that many bank-firm relationships have mainly historical origins and are therefore exogenous, reducing monitoring costs and therefore the amount of bank loans that are needed to incite the bank to monitor sufficiently. Nevertheless, as risk moral hazard is more difficult and therefore more costly to monitor in risky firms, everything else being equal, they have to take on a higher amount of bank loans than their peers. Hence, firm risk has to be correlated positively to the number of loans originating from banks.

**Table 5-1: Firm risk, 1985-1998**

Dependent variable: variance of the return on sales over five years at a time;

Fixed effects regression coefficients (T-values)

		(1)
Relationship Variables	KEILO	-0.00001 (-0.054)
	DISPATCH	-0.00210* (-1.774)
	SHARE	-0.00270** (-2.442)
	MB	0.003550 (0.222)
	Sig. relationship variables	0.0000
Control Variables	Bank debt/total debt	0.00497*** (2.653)
	MV	0.00114*** (3.307)
	Ordinary income/sales	-0.09604*** (-6.707)
	Debt/sales	0.02390*** (9.346)
	Log(sales)	-0.01601*** (-6.336)
	GDP	-0.00139*** (-4.866)
	Year dummies	Yes
Statistics	Number of observations	1288
	Number of groups	92
	Obs. per group	14
	Sign. F	0.0000
	$R^2$	0.3138
	DW	1.9452

Note: \*, \*\*, \*\*\*: Significance at the 10%, 5% and 1% level, respectively.

### **5.3 Conclusion**

Summing up, the findings of our analysis on bank-firm relationship, bank debt and firm risk fully support the results of our previous study on bank-firm relationships and bank debt, discussed in Miarka (1999). Furthermore, the results confirm the findings mentioned above, which all underline that bank affiliations may reduce firm risk. However, though being generally similar in spirit to Weinstein and Yafeh (1998), we are not able to corroborate their conclusion that a main bank affiliation is the particular form of bank relationship which induces the firm to decide for more risk-averse strategies. Our findings suggest rather that bank-firm relationships based on dispatched directors and a high percentage of bank-held shares are most effective at reducing risk.

## **6. Interest Rates on Borrowings: Cost and Stability**

We now turn to the issue of the costs of borrowing as well as the stability of these costs for bank-affiliated firms versus independent firms. We continue to focus on large firms in times of increasingly liberalized and deregulated financial markets.

### **6.1 The Cost of Bank Loans**

#### *6.1.1 Theories and Previous Empirical Results*

For large, reputable firms like those in our sample, the relative cost of bank borrowing is likely to be higher than the cost of borrowing from capital markets (see Diamond 1991; Rajan 1992). Since the bank monitors the firm and controls its investment decisions, it is in the position to alter the division of surplus between itself and the firm. Similar to Rajan's (1992) analysis on the consequences of ex post rent extraction, Sharpe (1990) also assumes that banks can extract rents from their closely affiliated client firms, because they have better information about the borrower's credit risk. However, Tröge (1999) shows that this effect may disappear if outsiders can observe the interest rates offered by the insider. He argues that the advantage of inside banks results from their ability to provide better corporate governance rather than their better knowledge of the client firm's quality.

No matter what the reasons for the advantage of inside banks and thus their ability to extract rents, we can generally agree with Rajan (1992) that especially for large, reputable firms, there is a fundamental trade-off between bank finance and arm's-length finance. With increasing choices between various sources of finance, this trade-off becomes more and more apparent. Examining the impact of competition on the cost of capital, in an extension of Diamond (1989), Petersen and Rajan (1995) suggest that in contrast to small firms, where a bank's competition comes mainly from other banks, the main source of competition for banks to fulfill the financing requirements of larger firms comes from arm's-length sources like bond markets. When competition is from arm's-length markets rather than from other banks, it seems even more difficult for banks to retain the business of successful firms. Hence, theory suggests that for banks, one possible consequence of the further liberalization of arm's-length credit markets is to have to lower the costs of bank borrowings in order to stay competitive.

Surveying the literature on empirical analyses of Japanese bank-firm relationships, it is widely claimed that banks are able to extract significant rents from their closely affiliated client firms (see e.g. Weinstein and Yafeh 1998).

However, analyses of Japanese bank-firm relationships also strongly underscore the benefits a firm may gain in return for higher interest rates. Credit from relationship banks goes along with a wide range of advantages that cannot be obtained from other sources of credit, e.g. arm's-length sources. As we have already pointed out in chapter 4, a sufficient fraction of bank debt can incite the bank to monitor the firm appropriately, which decreases the entrepreneurs' incentives for risky behavior and therefore increases the firm's access to additional sources of finance. Furthermore, having stable bank affiliations, many firms have been more or less able to count on their banks' willingness to lend to them. Especially in the case of routine investment, a substantial number of large Japanese firms simply inform their banks of the investment plans after company managers have already decided them. Also, it is claimed that in times of financial distress, bank-affiliated firms can generally count on the main bank as a lender of last resort and a source of competent managerial guidance. According to most empirical analyses (e.g. Aoki and Patrick 1994), this system of "give and take" has been relatively stable throughout the post-war period. However, we must note that most of the empirical analyses that support this view examine the advantages and costs

of bank-firm relationships in a period where Japanese financial markets were highly regulated and immature. At that time, the financial system largely favored already-existing banks, and competition from alternative sources of outside finance was limited.

With increasing financial liberalization on the one hand, and the position of banks as the major source of outside finance deteriorating since the 1980s on the other, easy access to financial sources seems to be an issue of declining importance, especially for highly valued firms. As mentioned above, the research results reported by Weinstein and Yafeh (1998) support the hypothesis that banks can extract higher rents from their affiliated firms. However, splitting up their observation period, they find evidence that the premium extracted by banks in return for improved access to capital declined during the later years of their inquiry, during which effects of the financial market liberalization and deregulation gathered momentum. Their results suggest that the premium banks could once easily extract from their dependent client firms via interest rates has been under pressure since their position as the only major source of outside finance began deteriorating.

Following Rajan (1992), a possible explanation for this development could be as follows: Suppose that a firm has to finance an investment project with external sources in order to obtain a stochastic payoff. In the case of a positive net present value, during the pre-deregulation period when the firm's source of finance was basically limited to bank debt, the firm may have shared a substantial portion of the surplus from the project with the banks in order to persuade them to continue lending. However, with the firm's freedom to diversify its sources of finance since the 1980's, the banks' ability to influence the division of surplus seems to have declined. As has been already pointed out in Miarka 1999, especially highly valued firms are usually able to easily obtain credit from sources other than banks. This leads to a diversification of financial sources, and thus to a decreasing capacity for the banks to extract high interest rates. In fact, Weinstein and Yafeh (1998), providing empirical evidence suggesting that banks seem to charge profitable clients less than unprofitable ones, are much in line with Rajan (1992), who argues that banks' ability to control and to influence the division of surplus are linked. In addition, evidence provided by Hoshi, Kashyap and Scharfstein (1990) shows that in the wake of increasing competition with arm's-length credit markets, firms with relatively high growth and high Tobin's  $q$  reduce their bank ties and borrow

from capital markets.

### 6.1.2 *Empirical Analysis*

In our empirical analysis we examine to what extent bank affiliations (still) had an impact on the cost of bank loans during the boom-bust period between 1985-1998. We then proceed in 6.2 by analyzing the influence of differing types bank-firm relationships on the stability of interest rates over the same period<sup>12</sup>.

When analyzing the cost of bank loans from the firm's point of view, ideally the actual interest rates on bank loans should be examined. Unfortunately, such data are not available. Instead, we follow Weinstein and Yafeh (1998) and use the average interest rate on nonbond liabilities, that is, interest payments and discount expenses divided by nonbond current and fixed liabilities. Though this measure includes some components in the denominator that do not bear interest, it is virtually impossible to correct for this due to the sometimes insufficient division of balance sheet positions. However, unlike the Weinstein and Yafeh study where the interest rate itself is taken as the dependent variable, we follow Berger and Udell (1995) in that we furthermore correct for underlying prime rates by considering the difference between the yearly average of a firm's interest rate and the average prime rate per year<sup>13</sup>. For our regression, we once again use a two-sided fixed effects model. In the model, the cost of borrowing is a function of variables describing different kinds of bank-firm relationships and control variables, including variables that account for firm characteristics.

Based on various theoretical rationales, our general expectations regarding the signs of the fixed effect coefficients are as follows: First, firms will have to pay higher interest rates as leverage increases. The same ought to be true for a high dependency on

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<sup>12</sup> Note that in contrast to Petersen and Rajan (1994, 1995) or Berger and Udell (1995), we do not use the duration of a bank-borrower relationship as a measure of its strength, but rather continue to utilize the same measures of bank-firm relationships as have been already used above. In their analysis, Berger and Udell (1995) impose a maximum limit of 30 years on the variables that account for the age of the firm as well as the continuous duration of a relationship. They claim that no additional relevant information is revealed after 30 years. Taking into account that the youngest firm in our sample was founded in 1970 and most Japanese relationships between large manufacturing firms and banks, if any, were established in the 1950s (many even in the pre-World War Two period), duration would not be an appropriate measure for analyzing large, reputable Japanese firms.

<sup>13</sup> Prime rates change dramatically over the observation period, peaking in 1985 with 5 per cent and reaching a low of 0,5 per cent in September 1995, which stayed stable until the end of the observation period (Economic and Financial Data on CD-ROM, Bank of Japan 1999).



bank-loans. The firm-risk variable ought to carry positive coefficients since lenders are likely to increase demand in the face of a high-risk firm. We suspect that more successful firms with greater bargaining power will be relatively more successful than less prosperous firms in avoiding high interest rates. It is equally plausible to us that this is also true for larger firms when compared to smaller firms.

As to the relationship variables, it is more difficult to hypothesize since the Japanese market has been changing a great deal in recent years. Theory (e.g. Diamond 1984, 1991) as well as recent empirical evidence (e.g. Weinstein and Yafeh 1998) underline that relationships lower the lender's cost of lending to client firms. However, it is far from clear to what degree, if at all, the lender is willing to pass along these positive effects to the borrower in the form of lower loan interest rates. As mentioned above, Petersen and Rajan (1994) note that whether the banks are forced to pass on the generated cost savings depends much upon the competitiveness of the capital market. The Weinstein and Yafeh (1998) study tentatively suggests a decreasing trend in the interest rate bank-affiliated firms had to pay in the first half of the 1980's. If this development is a result of deregulation and increasing competition between arm's-length and bank finance, we believe that this trend will have progressed much further during our observation period. However, though competition might further reduce the interest rates for bank borrowing, we do not necessarily expect that banks will pass on the savings. Supposing that the information generated by bank-firm relationships is (at least to some extent) private to the banks and not completely transferable by the borrower to others, relationship banks may reduce the interest rate by less than the true decline in cost (Greenbaum, Kanatas, and Venezia 1989; Sharpe 1990; Rajan 1992; Petersen and Rajan 1994).

The results from our fixed effects specifications are summarized in table 6-1. Similar to Harhoff and Körting (1998b), we introduce the exogenous variables in groups in order to observe how the correlation between some of them affects the results. Before turning to the role of relationships, it is important not only to take account of the underlying prime rate, but also to control for firm-specific characteristics that may influence the interest rate. Hence, we start with a model that only includes firm-specific characteristics and control variables.

Looking at the regression results presented in column (1), we find the following:

As expected, interest rates are an increasing function of the leverage ratio. The coefficient of the variable indicating the dependency on bank loans as the major source of finance is also significant at the one per cent level and shows a positive sign. Hence, our result gives some evidence that banks can extract higher interest rates, especially from firms that continue, despite financial liberalization, to be strongly dependent on bank finance rather than diversify their financial sources. The variable indicating firm risk is also positive, thus somewhat indicating that with increasing firm risk, the lender tends to ask for a higher interest rate. Larger firms seem to pay lower interest rates, possibly because they are perceived to be less risky. Note, however, that both the variable accounting for firm risk and the one representing size are not significant at an acceptable level. One can see that fast growing firms (in terms of sales growth as well as employment growth) seem to face lower interest rates than those with high returns on sales. Though showing a negative sign as expected, to our surprise the coefficient of the variable for the firm's market value over total debt is not significant at an acceptable level. Furthermore, we find that the coefficient estimates we obtain for the variable indicating the propensity to investment as well as for the variable accounting for the firm's ability to pay back its debt (profit/interest), are both negative and significant at the one per cent level. This suggests that fast growing firms which are willing to expend their investment, as well as firms which have no problem meeting their debt obligations, certainly have some bargaining power when it comes to interest rates on bank loans. We suppose that these firms are quite capable of using a large variety of financial sources other than bank debt. As a result, they have to pay lower interest rates on their liabilities than their peers.

**Table 6-1: Interest rates on borrowings, 1985-1998**

Dependent variable: average interest rate on borrowings

Fixed effects regression coefficients (T-values)

		(1)	(2)
Relationship Variables	KEILO		-0.01448** (-1.919)
	DISPATCH		0.01209** (2.030)
	SHARE		-0.00660 (-1.107)
	MB		-0.22267*** (-2.619)
	Sig. relationship variables		0.000
Control Variables	Bank debt/total debt	0.57583*** (5.869)	0.63586*** (6.396)
	MV	-0.01002 (-0.596)	-0.01234 (-0.737)
	ordinary income/sales	1.04044** (1.737)	1.09933** (1.836)
	Leverage	0.15900*** (5.618)	0.15188*** (5.352)
	Sales growth	-0.68135*** (-3.693)	-0.67139*** (-3.653)
	Propensity to invest	-0.39703*** (-5.017)	-0.39104*** (-4.958)
	Profit/interest	-0.01308*** (-6.923)	-0.01301*** (-6.901)
	employment growth	-0.37859 (-1.085)	-0.46271 (-1.325)

Note: \*, \*\*, \*\*\*: Significance at the 10%, 5% and 1% level, respectively.

**Table 6-1: Interest rates on borrowings, 1985-1998 (continued)**

		(1)	(2)
Control Variables	Firm risk	2.08686 (1.345)	1.99229 (1.285)
	Size	-0.09056 (-1.471)	-0.09394 (-1.529)
	Year dummies	Yes	Yes
Statistics	N of observations	1288	1288
	N of groups	92	92
	Obs. per group	14	14
	Sign. F	0.000	0.000
	$R^2$	0.8597	0.8614
	DW	1.9572	1.9738

Note: \*, \*\*, \*\*\*: Significance at the 10%, 5% and 1% level, respectively.

For the purpose of our analysis, however, the most important coefficients are those relating to bank affiliations. In column (2) we include the relationship variables among the regressors<sup>14</sup>. Comparing column (1) and (2), the exclusion of the relationship variables has virtually no effect on the coefficients in column (1). As for the variables indicating bank-firm relationships, the measure of joint significance already suggests that bank-firm relationships play a significant role in the pricing of loans. Asking for bank loans from banks of the firm's own *keiretsu* (KEILO) seems to enable the firm to access lower interest rates. As has been already mentioned above, Weinstein and Yafeh (1998) showed that interest rates for firms with a main bank affiliation decrease while liberalization and deregulation are gaining ground. Controlling for other factors, the coefficient of the main bank dummy in our specification underlines that this trend seems to have progressed substantially after the mid-1980s. In fact, given a coefficient that is negative and significant at the one per cent level, a main bank affiliation can be assumed to lower interest rates during the second half of the 1980s and most of the 1990s.

<sup>14</sup> As in previous analyses, we also tested for possible nonlinear relations: however, in none of the

Although statistical significance is not high, the coefficient for the variable accounting for the percentage of shares held by banks carries a negative sign as well.

However, the coefficient on the influence of dispatched bank representatives is significant and positive. One of the reasons for this result might be that sending a highly capable bank representative to the firm is exceptionally costly for the bank. Recall that bankers who take a high position in the firm's board of directors are especially often dispatched in order to carry out consulting and management assignments in order to improve the firm's position. It is also generally agreed that having a bank representative in a high-ranking position on the board increases credibility. Apparently, despite increasing competition from arm's-length finance, banks are still able to ask for the compensation of such services (which arm's-length finance cannot offer) via interest rates. In fact, our result corroborates reported evidence (Bank of Japan 1992) that firms which have chosen to maintain close bank-affiliations via dispatched directors can keep the banks' liquidity services and "bankruptcy insurance scheme" in exchange for a liquidity and bankruptcy insurance premium.

## 6.2 Interest Rate Fluctuations

### 6.2.1 *Theories and Previous Empirical Results*

Besides easing access to capital, Japanese bank-firm relationships are alleged to protect closely affiliated firms from various fluctuations in the cost of capital that would make investment decisions difficult. In a series of articles, Hoshi, Kashyap and Scharfstein (1990a, 1990b, 1991) show that Japanese firms closely affiliated with a main bank are less vulnerable to fluctuations in cash flow and have lower costs of financial distress than independent firms. Following the implicit long-term contract theory, under the assumption that the bank is risk neutral and the firm is risk-averse, it is to the benefit of both parties to fix the rate of interest over time (Teranishi, Goto and Serizawa 1975). In fact, for his 1971-1982 sample, Nakatani (1984) shows that for *keiretsu* firms which are affiliated with at least one *keiretsu* bank, the lending rate is more stable over time, thus providing evidence that supports the hypothesis of the implicit long-term contract theory.

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analyses could nonlinear relations be found.

Nevertheless, since liberalization in the 1980s and especially with the burst of the speculative bubble in the early 1990's, risks as well as competition among the various sources of debt have become larger and banks weaker. As banks may have been disciplined by this process to offer particularly better-performing customers tailor-made, "competitive" interest rates in order to be more competitive against other sources of finance, it is not clear anymore whether they can continue to keep the interest rates for their closely affiliated customers stable over time. In fact, anecdotal evidence suggests that banks increasingly have to make use of the "Material Adverse Change" clause<sup>15</sup> most credit contracts contain, thus often changing (increasing) interest rates and sometimes calling back credit<sup>16</sup>. This raises some doubt as to whether in a time of increasing competition and an overall weakened banking sector, banks are still able to provide the insurance scheme against the fluctuation of interest rates to the same extent as has been observed in earlier years. Also note that other insurance schemes like averting bankruptcy seem to erode as well (Financial Times 28.10.1998: 16). While the benefits of bank debt seem to decrease, a rising number of firms may prefer credit from arm's-length sources, which neither provides the benefits of bank debt nor incurs the costs.

Clearly, if creditors rely on interest rates as their only or at least primary source of revenues, and given that the creditors have to compete in a highly deregulated market, it seems hard to smoothen interest rates since abilities to spread interests over time or to compensate for lower-than-competitive interest rates with other revenues are few. The analysis by Petersen and Rajan (1995) already suggests that in a competitive environment, despite long-term relationships, it is difficult for creditors to charge a lower-than-competitive interest rate at any point in time over the life cycle of the firm. They emphasize that competition may continuously prevent the creditor from charging a higher-than-competitive rate that could compensate/anticipate the loss that will be or has been incurred by offering a lower-than-competitive interest rate. In other words, with increasing competition, the ability of the creditor to obtain surplus from a firm

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<sup>15</sup> Whereas the interest rate and the duration of a bond are fixed once for all, most credit contracts contain an unspecific "Material Adverse Change" clause (MAC) which gives the bank the discretion to call back the credit or increase the interest rate whenever this seems appropriate (Petersen and Rajan 1995; Tröge 1999). Though banks had been reluctant to invoke this clause in earlier years, the extreme conditions especially after the burst of the bubble forced the banks to invoke it more often (KPMG Peat Marwick 1993).

during one period, which could be used to offset losses obtained during another period is weakened. Consequently, it is difficult to accept lower returns up front.

#### 6.2.1.1 Empirical Analysis

In order to observe the stability of interest rates, as our dependent variable we once again take the difference between the average interest rate and the prime rate and then compute its variance over five years at a time for every sample firm and year between 1985-1998<sup>17</sup>. The variance is computed similar to the way we computed the variance of the return on sales. Hence, unlike Nakatani (1984), and Wakita (1983), we focus on the variance of the interest on nonbond liabilities rather than on all interest bearing liabilities, and we correct for underlying prime rates.

Table 6-2 presents estimation results of what determines our dependent variable. Explanatory variables include the same measures for variables describing different ways of bank-firm relationships and control variables, as had been used for our estimation on interest rates. Results of the control variables are as expected: The coefficients of variables like the firm's market value or the ratio of ordinary income over sales are all negative and significant. Hence, the variance of the difference between the interest rate and the prime rate is a decreasing function of measures that account for the quality of the firm. With increasing dependence on bank loans, the dependent variable also increases.

For the purpose of this chapter, however, the coefficients of our bank-firm relationship variables are more important: The dominant determinant of the variance of interest rates appears to be whether or not a firm maintains a main bank affiliation with a coefficient of -0.23 (standard error 0.038; significant at the one per cent level). Apparently, the lending rate of interest is more stable for firms affiliated with a main bank. This result is very much in line with Nakatani (1984: 242), who could show that „the lending rate of interest is made more stable over time for the firm involved in a *keiretsu* relationship with a bank.“

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<sup>16</sup> Interview with an anonymous director of Daiwa Shōken, London, 23.07.1997.

<sup>17</sup> Note that, of course, for constructing the variance of the difference between the interest rate and the prime rate over five years at a time between 1985-1998, in a first step we had to construct the

**Table 6-2: Stability of the interest rate, 1985-1998**

Dependent variable: variance of difference between interest rate and prime rate

Fixed effects regression coefficients (T-values)

		(1)
Relationship	KEILO	0.00210
Variables		(0.627)
	DISPATCH	0.00879***
		(3.334)
	SHARE	0.00684***
		(2.589)
	MB	-0.22900***
		(-6.081)
	Sig. relationship variables	0.000
Control	Bank debt/ total debt	0.14332***
Variables		(3.254)
	MV	-0.02582***
		(-3.481)
	ordinary income/sales	-0.46469**
		(-1.752)
	Leverage	-0.04965***
		(-3.950)
	Sales growth	-0.10003
		(-1.229)
	Propensity to invest	-0.08163**
		(-2.337)
	Profit/interest	-0.00002
		(-0.020)
	employment growth	0.19605
		(1.267)

Note: \*, \*\*, \*\*\*: Significance at the 10%, 5% and 1% level, respectively.

difference between the interest rate and the prime rate for the period between 1981-1998.



**Table 6-2: Stability of the interest rate, 1985-1998 (continued)**

Dependent variable: variance of difference between interest rate and prime rate

Fixed effects regression coefficients (T-values)

		(1)
Control Variables	Firm risk	-0.54778 (-0.798)
	Size	0.10455*** (3.842)
	Year dummies	Yes
Statistics	N of observations	1288
	N of groups	92
	Obs. per group	14
	Sign. F	0.000
	$R^2$	0.7364
	DW	1.9798

Note: \*, \*\*, \*\*\*: Significance at the 10%, 5% and 1% level, respectively.

However, combining this with our previous findings on the effect of a main bank affiliation on interest rates, we find the result quite surprising. Seemingly, main banks are able to reduce the risk of interest rate fluctuations for their clients without asking for higher interest rates from them. Our interpretation is that being the firm's main bank seems to be so valuable for the bank that it keeps on providing services, like protecting the client firm from the risk of strongly fluctuating interest rates, in order not to lose its overall highly profitable position. It seems plausible to us that in times where lending rates diminish in profitability, the main bank position, which includes attending to the firm's employee accounts as well as lucrative fee-based and commission banking, is of exceptional importance for banks (Scher 1997). Putting it differently, in contrast to other banks, the main bank manages much better to extract compensation for its services from privileges that are not directly related to the provision of loans. In contrast to the provision of capital, where competition increased dramatically, main banks have

obviously been able to defend other areas of banking where long term trust, inside information and firm-specific competence are more difficult to obtain. The rents which main banks can extract from these services seem to be high enough to allow for continued smoothening of interest rates, despite increasing competition in the credit market. Hence, in contrast to positions of other banks, a main bank position that insures access to lucrative services other than the provision of loans makes it much easier to spread the costs that might occur e.g. in the smoothening interest rates, over multiple products.

In fact, the coefficients of the other three relationship variables seem to further support this view: all of them describe different forms of bank-firm relationships which do not necessarily go along with the lucrative services a main bank is most likely allowed to offer. Therefore, these types of bank affiliation do not seem to have the ability to provide the same insurance scheme a main bank manages to offer. Hence, it is no surprise that none of the coefficients of the remaining three bank-firm relationship variables carry a positive sign. To be more precise, the results suggest that the types of bank-firm relationships represented by the variables KEILO and SHARE would neither allow the banks to fully remunerate potential losses through lucrative services as discussed above, nor would banks involved in these types of affiliations necessarily manage to compensate losses by extracting higher-than-competitive interest rates. As to the type of bank-firm relationship represented by DISPATCH, the results show that banks which have dispatched representatives to the boards use the revenue from higher-than-competitive interest rates in order to compensate the cost of dispatching, rather than to protect clients from interest rate fluctuations. To summarize, our findings are similar in spirit to Petersen and Rajan (1995): creditors in competitive markets, which are not compensated for their services and not able to spread possible costs that might be caused by the smoothening of interest rates over multiple products, have no assurance anymore of obtaining future surplus from the firm via interest rates. Thus they are unable to secure their clients against the risk of interest rate volatility.

### 6.2.2 Conclusion

Our analysis highlights the impact of bank-firm relationships on the cost of commercial bank loans and the stability of these costs after accounting for underlying prime rates. Once again, the evidence indicates that it is necessary to distinguish between the different forms of bank-firm relationships. Though relationships of all forms have effects on commercial bank loan contracting, they certainly do not always lead into the same direction. Bank affiliations formed by dispatched directors offer advantages that seem to secure to some degree the monopoly power for the bank; thus these banks can continue to extract higher-than-competitive interest rates on borrowings. The remaining three kinds of bank-firm relationships we examined, however, have submitted to competition. The analysis of the stability of interest rates shows an equally heterogeneous picture. While main bank affiliations remain able to protect the client firm from fluctuations of interest rates, the remaining three types of bank-firm relationships seem unable to do so.

Comparing our results with previous findings, the analysis further supports the view that the degree of competition in credit markets is an important determinant of the value and effect of bank-firm relationships. As has been already suggested by others (e.g. Kobayashi et al. 1993), the liberalization process seems to make banking relationships more businesslike and therefore more clearly driven by market factors like profitability. Since risk is not significant when included in either of these regressions and overall firm demand for liquidity is declining over the period observed, the evidence most likely suggests a decline in bank monopoly while liberalization proceeds, rather than a declining implicit bankruptcy insurance premium. While a relationship reduces the lender's expected cost, the lender only shares this cost reduction with the firm when competition encroaches upon the lender's informational monopoly. We have shown that the position of banks remains unchanged in areas where banks, for one reason or the other, are not confronted with competition or can cope with competition due to advantages in other areas. Furthermore, our findings are consistent with the financial intermediation literature cited above (e.g. Rajan 1992), which shows that, to mitigate the problem of ex post rent extraction by informed lenders, the borrowing firm will attempt to weaken the bargaining power of these lenders by giving higher priority

to arm's-length finance. Obviously, liberalization in Japan increases the firm's capacity to do so. The results suggest that with competition, banks increasingly have to share the cost savings they may accrue from relationships with firms. Though it is obviously increasing, note that we are not able to detect to what degree banks pass these cost savings on to the client firm.

Liberalization may have many other advantages. However, credit market competition is likely to impose constraints on the ability of the firm and creditor to intertemporally share surplus. As the market power of banks decreases, they cannot extract a larger share of the future surplus generated by the firm, as was possible in a regulated and concentrated market. Thus, competition prohibits banks more and more from generating an implicit equity stake in the firm that could enable it to set a lower interest rate for entrepreneurial projects. This finding agrees with that of Mayer (1988) and Rajan (1992), that increased competition in financial markets reduces the value of relationships because it prevents a bank from reaping the rewards of helping the firm at an early stage. It is therefore possible that banks are less and less able to prevent projects with low short-term returns and/or high risk but long-term viability from being prematurely discontinued. Note that this development is especially dangerous to an economy whose financial markets do not sufficiently compensate for it by initiating alternative structures like venture capital markets.

The findings are furthermore supported by much reported evidence that the banking sector's ability to act as a lender of last resort is deteriorating. Clearly, with only a few exceptions, the developments described above make lending relationships less valuable to a firm since it is less likely to get help when most needed. Finally, it is important to note that the already-weakened Japanese banking sector does not only have to deal with increasing competition from the capital markets. To aggravate their situation, banks have to cope with the unique phenomenon that since the burst of the bubble, interest rates are strongly declining while demand is continuously weakening at the same time. This development dramatically shifts the bargaining power in favor of firms, allowing them to play out banks against alternative sources of finance and most recently also against each other.

### 6.3 Summary and Concluding Remarks

Our analysis highlights central aspects of the role of Japanese bank-firm relationships in times of liberalization and deregulation. Comparing our results with earlier findings, it becomes evident that financial liberalization and deregulation have triggered dramatic changes concerning the position of banks in the financial market and their relationships with large manufacturing firms.

Since liberalization and deregulation have opened up domestic as well as foreign capital markets, easy access to capital is not limited to bank-affiliated firms. While in earlier years firms with close banking ties may have been more profitable or used their advantages to enhance their growth or the compensation of employees, now whether such a relationship benefits a firm or acts as an obstacle depends largely upon the nature of that relationship. Hence, there are two general points made in this chapter. First, in order to assess the economic role of bank affiliations, it is of eminent importance to differentiate between the various ways of establishing and maintaining bank-firm relationships. Second, the rapid development of the Japanese financial market over the last two decades has reduced the monopoly power of banks in a wide range of areas, which has caused dramatic changes concerning the benefits and costs of bank-firm relationships.

Using a variety of proxies which enable us to differentiate between different aspects of bank-firm relationships, the analysis clearly shows that the effect of a bank affiliation can differ substantially. Concerning the opportunity to enhance profitability through advantages of bank affiliations, only when a bank affiliation allows a firm to use large numbers of *keiretsu* loans may the firm be more profitable than its competitors. If at all, bank-firm relationships seem to have a negative effect on the promotion of growth. Moreover, only the advantages that accompany a main bank affiliation seem to improve the compensation of employees. While bank-firm relationships were widely assumed to decrease firm risk, our empirical results do not find any evidence that this can be explained by a main bank affiliation or a strong dependence on *keiretsu* loans. However, a strong influence from banks via bank dispatched directors or large shareholdings seems to have a positive impact on firm risk.

Perhaps the most interesting finding of our study is the impact of credit market

liberalization on the cost and stability of interest rates for bank-affiliated firms. Caves and Uekusa (1976) already argued more than twenty years ago that the rationed Japanese capital market, which protects established banks from competition, is the main reason why Japanese banks were able to easily extract rents generated by bank-firm relationships. They demonstrate that in times of limited competition, banks could obtain these rents via high interest rates and via pressure on client firms to use bank loans as the major source for capital inputs. Comparing our results with previous findings, it seems plausible to argue that with increasing liberalization and decreasing demand for finance, it becomes more and more difficult for banks to extract these rents from their client firms. Only in cases where banks can combine the provision of capital with additional services like managerial advice that cannot be offered by alternative financial sources, may banks continue to charge higher-than-competitive interest rates. Overall, however, competition seems to force banks to increasingly share the rents that may originate from advantages of bank-firm relationships by charging competitive interest rates. This development also affects the impact of bank affiliations on the stability of interest rates: as the debt market becomes increasingly competitive, it seems to be more and more difficult to spread the cost of reducing the volatility of interest rates by asking lower-than-competitive interest rates during one period and higher-than-competitive interest rate during another period. Only banks that can spread these costs over multiple products may still be able to insure client firms against interest rate fluctuations.

Clearly, the interpretation of our empirical results is a far cry from the popular views of the bank-dominated Japanese financial system as an engine of growth for highly efficient firms. Taking a closer look at the system of Japanese bank-firm relationships in transition reveals a more complicated scenario, which includes both advantages and at the same time impediments. Obviously, when alternatives to bank finance increase, the negative components of the system of bank-firm relationships become more evident. The results largely accord with Mayer (1988) and Rajan (1992), who show that increasing competition in financial markets reduces the value of bank-firm relationships. Nevertheless, the results rule out the notion that relationships are of no value, or that relationships and competition are incompatible. Bank financing often involves a long-term relationship that still may help to attenuate problems of asymmetric information that cannot be solved by arm's-length finance. Also note that

despite an increase in arm's-length finance, necessary channels like markets for corporate control, which are typical for engineering intervention in a financial system where arm's-length finance is well developed, have just started to evolve in Japan. Especially until these forms of intervention are fully developed, the Japanese economy will continue to rely heavily on control-oriented finance and therefore bank finance, to ensure that firms behave diligently. In other words, the various forms of bank-firm relationships do not necessarily lose their *raison d'être*. Despite competition, bank-firm relationships can still be valuable for both sides. However, the Japanese financial system and with it, bank-firm relationships have entered a new phase of economic development. Banks slowly begin to realize their fading advantages as well as new opportunities. Hence we can conclude that bank affiliations will continue to be an important factor for the international competitiveness of modern Japanese firms, though not necessarily in the same way as was common during the pre-liberalization period. It is therefore necessary to adjust the image of the banking system as it has existed in much of the post-war era in Japan.

## APPENDIX

### I Definition of Variables

Variable	Explanation
capital/employees	total capital to number of employees
capital stock	capital stock and paid in new capital stock (in billion Yen)
debt/equity	*total debt to total equity
debt/sales	total debt to sales
debt/total assets	leverage

Note: \* indicates that this variable has been truncated at the upper and lower percentile in order to avoid outliers.

### I Definition of Variables (continued)

Variable	Explanation
DISPATCH	index expressing degree of personal relationship between banks and client firms
employment growth	employment growth of each year (yearly difference of log(employees))
equity/total assets	equity ratio
firm risk	firm risk measured by variance of return on sales over five years at a time
GDP	growth (in per cent) of gross domestic product in real terms

Note: \* indicates that this variable has been truncated at the upper and lower percentile in order to avoid outliers.



**I Definition of Variables (continued)**

<b>Variable</b>	<b>Explanation</b>
interest	interest rate on borrowings
interest on borrowing/sales	ratio of interest on total borrowings to total sales
interest ratio	interest and discount expenses to liabilities
investment/employees	ratio of investment in plant and equipment to number of employees
investment/sales revenue	ratio of investment in plant and equipment to sales revenue
KEILO	measure indicating existence and degree of <i>kinyū keiretsu</i> affiliation under the aspect of loan-dependency

Note: \* indicates that this variable has been truncated at the upper and lower percentile in order to avoid outliers.

**I Definition of Variables (continued)**

<b>Variable</b>	<b>Explanation</b>
KEIRETSU	dummy variable indicating whether or not a firm has a <i>kinyū keiretsu</i> affiliation
ln(assets)	natural logarithm of firm size measured by total assets
ln(employees)	natural logarithm of firm size measured by number of employees

Note: \* indicates that this variable has been truncated at the upper and lower percentile in order to avoid outliers.

**I Definition of Variables (continued)**

<b>Variable</b>	<b>Explanation</b>
log sales	logarithm of sales
long-term liabilities/ total assets	ratio of long-term liabilities (maturities longer than one year) to total assets
MB	dummy variable indicating whether or not a firm has a main-bank affiliation
MV	market value of the firm to total liabilities
net income	total net income (in billion Yen)
net income/sales	total net income to total sales
nonbond interest/ nonbond liabilities	ratio of nonbond interest expenses to nonbond liabilities
ordinary income/ sales	ordinary income to sales
profit/interest	*ratio of pre-tax profit (loss) to total interest payments
profit/total assets	pretax profits to total assets

Note: \* indicates that this variable has been truncated at the upper and lower percentile in order to avoid outliers.

## I Definition of Variables (continued)

Variable	Explanation
propensity to invest	ratio of investment in fixed assets to fixed assets of previous year
RME	<p>ratio of male employees to total employees adjusted with respect to age structure of firm's work force:</p> $RME = \frac{ME \times AGM}{ME \times AGM + FE \times AGF}$ <p>with ME: number of male employees; AGM: average age of male employees; FE: number of female employees; AGF: average age of female employees</p>
ROE	*after-tax return on equity
ROI	return on investment
ROS	return on sales
sales growth	annual growth rate of sales
SHARE	ratio of client-firm-shares held by banks among the 20 largest shareholders
short-term liabilities/total assets	ratio of short-term liabilities (maturities up to one year) to total assets
size	variable ranging from 1 (smallest) to 4 (largest) defined by quartiles of total assets

Note: \* indicates that this variable has been truncated at the upper and lower percentile in order to avoid outliers.

## I Definition of Variables (continued)

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<b>Variable</b>	<b>Explanation</b>
total labor cost/employees	firm's total labor cost (including salary, other compensations, contributions to fringe benefits and social security) to the number of employees at the end of each accounting period
var interest rate; prime rate	variance of difference between interest rate and prime rate over five years increments

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Note: \* indicates that this variable has been truncated at the upper and lower percentile in order to avoid outliers.

## II Descriptive Statistics for Regression Variables

Variable	N	Mean	25 % Percentile	75% Percentile
capital/employees	1288	66.234	43.841	82.211
capital stock	1288	43.300	10.800	43.200
debt/equity	1288	2.006	0.854	2.553
debt/sales	1288	0.732	0.549	0.870
debt/total assets	1288	0.582	0.461	0.719
DISPATCH	1288	4.744	0.000	7.326
employment growth	1288	0.001	-0.022	0.026
equity/total assets	1288	0.418	0.281	0.539
firm risk	1288	0.021	0.009	0.024
GDP	1288	2.750	1.000	4.800

Source: KAISHA database; author's computation

## II Descriptive Statistics for Regression Variables (continued)

Variable	N	Mean	25 % Percentile	75% Percentile
interest	1288	0.025	0.016	0.032
interest on borrowings/ sales	1288	0.019	0.010	0.024
interest ratio	1288	0.016	0.006	0.023
investment/employees	1288	5326.641	2240.813	6800.329

Source: KAISHA database; author's computation

## II Descriptive Statistics for Regression Variables (continued)

Variable	N	Mean	25 % Percentile	75% Percentile
investment/sales revenue	1288	0.102	0.054	0.131
KEILO	1288	0.115	0.000	0.239
KEIRETSU	1288	0.402	---	---
ln(assets)	1288	19.317	18.542	20.049
ln(employees)	1288	8.320	7.574	8.845
log sales	1288	19.106	18.510	19.819
long-term liabilities/ total assets	1288	0.190	0.128	0.254
MB	1288	0.814	---	---
MV	1288	3.340	1.988	3.807
net income	1288	10.100	1.600	10.800
net income/sales	1288	0.024	0.012	0.038

Source: KAISHA database; author's computation

## II Descriptive Statistics for Regression Variables (continued)

Variable	N	Mean	25 % Percentile	75% Percentile
nonbond interest/ nonbond liabilities	1271	0.020	0.009	0.029
ordinary income/sales	1288	0.024	0.012	0.038
profit/interest	1288	7.041	1.001	6.967
profit/total assets	1288	0.043	0.018	0.067
propensity to invest	1288	0.418	0.229	0.540
RME	1288	0.884	0.848	0.929
ROE	1288	0.046	0.029	0.081
ROI	1288	0.035	0.025	0.049
ROS	1288	0.056	0.025	0.079
sales growth	1288	0.038	-0.020	0.092
SHARE	1288	0.218	0.162	0.268
short-term liabilities/ total assets	1288	0.391	0.276	0.498
size	1288	2.498	---	---
total labour cost/ employees	1288	6.396	5.585	7.387
var interest rate; prime rate	1288	1.019	0.572	1.408

Source: KAISHA database; author's computation

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