What are the determinants of the number of bank relations of Japanese firms?

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Abstract

We explore the determinants of the number of bank relations of listed Japanese firms in a unique data set covering 1982-1999. Japanese firms had about 7 long-term and 8 short-term bank loan relations on average. We present a statistical description of the bank relations in terms of size, financing structure, ownership, and firm activity. We analyze the determinants of the choice for the number of bank relations. Larger firms have a lower concentration of individual loan sets. Having a main bank relation also reduces the number of bank relations, while debt-rich and cash-poor firms have more bank relations.

Keywords: Bank relations, Single versus Multiple Borrowing, Discrete Choice Models

JEL: G21, G32

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1 Introduction

In this paper we analyze in detail the number of banking relations Japanese listed firms had in the last two decades. We focus especially on long-term loans in the period 1982-1999 (with some results for short-term loans in the years 1998-1999). Contrary to earlier studies on the optimal number of bank relationships (see *e.g.* Detragiache *et al*., 2000) we exploit the time variation in our rather unique data set. Moreover, we are able to distinguish differences between short-term and long-term borrowing decisions, which is new in this field (compare *e.g.* with Farinha and Santos, 2000). Since our study provides new insights into Japanese borrowing decisions we present both descriptive statistics and various econometric borrowing choice models.

Why is it interesting to analyze the long-term and short-term borrowing decisions for the Japanese case? First, it is widely believed that especially long-term loans were essential to enhance the rapid Japanese economic development in the 1970s and 1980s. The role of the financial system in providing financial means for investment that generated the high GDP growth rates has been crucial. As known, in post-war Japan long-term bank loans were the number one source of external funds for almost all firms (see Fukuda, 2001). Except for a few cash-rich firms internal financing was limited in general. As Ito (1992) shows, internal financing in the 1960s and 1970s was about 20% of the total financial needs (as compared to 50% for the U.S.) This is even true for firms within the business groups (*keiretsu*), wherein banks play a well-known key position in providing external finance. The dominant role of long-term loans in external finance is reflected in the fact that until the mid-1980s bond financing was strictly regulated (even after 1985 only very large firms were able to issue bonds). So private long-term loans formed the financial core of the investment-led Japanese growth. It is good to illustrate that the major providers of the long-term loans in the 1980s and 1990s were the three long-term credit institutions, so-called city banks (about 10 on average in the last two decades), and for smaller firms the about 120 local (or regional) banks. Secondly, the long-term loans are also seen as the key to the current economic depression in Japan. The bad loan problem has a serious impact on real economic activity since the beginning of the 1990s. When

the bubble burst in 1990 the average quality of especially the long-term loans appeared not to be as good as expected. Third, as explained above banks play a key role in the Japanese industrial structures (keiretsu). Lending activity, combined with equity ownership, is therefore relatively more important than in any other market economy.

The theoretical background of our paper is a key problem in financial economics: what is the optimal number of creditors? These creditors can be holders of either public or private claims. In this paper we analyze the private component, namely the number of bank contacts per firm. Our goal is to get a deeper understanding of the motives of Japanese firms to contact more than one bank or in some cases even more than 10 banks (and about 6 as a median value). For other countries similar work has been carried out (see *e.g.* Ongena and Smith, 2000a, for an international comparative study on 20 countries). In a separate paper Ongena and Smith (2000b) report an overview of studies for various individual countries on this issue. They illustrate that for instance in Norway the number of bank relations is very low (with a median of one), while for Italy median values of 11 relations are reported. Ongena and Smith (2000a) argue that firms in countries with stable and unconcentrated banking systems maintain more banking relations, while firms in countries with strong judicial systems and stronger creditor protections maintain fewer relations. Volpin (2000) adds that countries with low shareholder protection allow for higher private benefits of control and through that allow for more banking relations.

Horiuchi (1993, 1994) presents the most detailed descriptive analysis for the borrowing decisions by Japanese firms up to now. Horiuchi (1993) reports for 1990 an average number of bank relations for 126 firms with less than 300 employees of 3.4 and for 309 firms with more than 300 employees an average number of relations of 7.7. Horiuchi (1994) reports for 1992 an average (and median) number of 3 relations for 364 firms (including small firms with less than 10 employees). So indeed Japanese firms do have multiple banking contacts on average and the question to be answered is why. In our study we extend Horiuchi's work by updating statistical evidence and presenting models that explain the number of banking relations.

For Japanese firms who belong to a keiretsu structure a strong and long-lasting relation with the bank that belongs to the group seems to be natural. But having this line of credit it might also been easier to attract more loans from other banks. It is known in the literature that long-lasting relations with principle banks could lead to higher interest rates to be paid by Japanese firms (see Kaplan and Minton, 1994). So firms might weight the benefits of having one bank (and keep their information secret) or try to let banks bid for the lowest interest rates. It might also be true that some firms want a portfolio of loan-providers in order to reduce the risk of shortage of financial capital (see Section 2 for a more extensive review of the theoretical literature).

The rather unique feature of our data is the time-series information for long-term loans: 1982-1999. Indeed this period covers the 'bubble' and the post-'bubble' years. One of the items covered by us is the analysis of these two rather distinct periods. The idea behind this analysis is that macroeconomic conditions might affect individual borrowing decisions. On the other hand, loans are essential in explaining macroeconomic fluctuations (the 'credit view'). So it is natural to analyze the relation between macroeconomic conditions and the number of banking contacts firms tend to have on average. How is the macro bad loan problem affecting individual firm decisions to contact banks? We illustrate this in Figure 1 that gives the percentage of single-bank relations of 14055 firm-year observations for the years 1982-1999. Figure 1 suggests that during an economic expansion firms tend to rely on a single relation, while in the period of downturn the average percentage of multiple contracts seems to increase. So, current profitability seems to limit the number of bank relations. Without giving a detailed explanation here, this finding stresses the need for our analysis.

Insert Figure 1 about here

We proceed as follows. First we give a review of the theoretical and empirical literature on the determination of the optimal number of bank relations. This literature is largely based in the theory of corporate finance. In this literature one is interested in the game between the provider of capital and the firm regarding the control rights that belong to the

assets. This game can cover the choice between equity and debt, the rights of equity holders (Shleifer and Vishny, 1997), or the composition of external financing (Bolton and Scharfstein, 1996). We review the relevant literature and derive the variables that might influence the choice of the number of bank contacts. Next we describe the data we use. The data are provided by the Development Bank of Japan and form an unexplored rich set of detailed balance sheet and profit-loss account data as well as indicators of ownership of both (long-term) loans and equity. We give an extensive descriptive overview of the variables of interest in Section 3. In Section 4 we shortly discuss two main features of interest: the differences between 'bubble' and post-'bubble' borrowing behavior and the short-term versus long-term borrowing decision. In Section 5 we explore the data further. Since our main dependent variable, the number of bank relations, is a discrete variable we estimate several types of discrete choice models. Moreover, we present results for the explanation of the loan concentration ratio (measured by the Herfindahl index). In the last section we summarize and conclude.

2 Theory and empirical evidence on the optimal number of banking relations

One of the most interesting fields in finance is the topic of coordination problems between suppliers of capital. These problems hold with respect to owners of equity (which lead to the governance problems like described by Shleifer and Vishny, 1997) and the suppliers of debt. Such coordination failures can be harmful and lead to takeover failures (like the depositors in the Diamond-Dybvig (1983) model) or renegotiation problems (see Bolton and Scharfstein, 1996). For debt it is natural to distinguish between public debt (bonds) and credit. By definition, by selecting private credit the firms opts for a higher concentration of claims (see Bris and Welch, 2001).

In this paper we add to the empirical literature on creditor concentration in a very specific way: we focus on concentration of the most concentrated debt component: bank loans. So we do not contribute to a large extent to the work on the choice between public and private finance. Still, bank loan concentration is in itself an interesting phenomenon. Across the globe it is widely observed that firms deal with more than one bank. Ongena

and Smith (2000b) present an overview of studies of various countries and find a range of the average number of banking relationships between 1.6 for small US firms in 1987 to even 33.2 for Italian firms with a credit line over 500 billion Lira in 1993. Ongena and Smith (2000a) observe that larger firms (as measured by sales) hold more bank relations, but firms that do more foreign business typically have less domestic banking contacts. Moreover, there seem to be cross-country financial system variables that are relevant to explain national differences. Firms that reside in countries with poor creditor rights and inefficient judicial systems typically have more banking relationships. If the banking sector is lowly concentrated but stable and private bond markets are effective, the number of relationships per firm is higher. These statistical observations demand an explanation. Why would a firm operate via more than one bank? In this section we present an overview of the theoretical arguments for multiple over single banking relationships.

2.1 **The theory of multiple bank relationships**

The most intuitive explanation of single banking is based on cost minimization. To deal with more than one bank is likely to be costly. First, transaction costs increase, because both screening and monitoring costs are duplicated. It is more expensive to market debt claims to multiple creditors (see Bris and Welch, 2001). These arguments are at the core of the Diamond (1984) delegated monitoring model. The Diamond model predicts a firm to deal with a single bank that pools the costs of asymmetric information. A single bank moreover avoids free-riding problems by private investors. So in all activities prior and during the loan contract it would be cheaper to deal with a single bank. But also in ex post cases, like in the case of bankruptcy, multiple relations will increase the costs of *e.g.* handling debt renegotiation (see Boot and Thakor, 1994, and Bolton and Scharfstein, 1996).

The second determinant of the number of banking relationships is competition on the banking market. If competition is low and the banking market is dominated by a few institutions it is likely that the number of banking relationships drops. On the other hand if competition is fierce and a large number of competing banks fights for new loans firms,

will try to benefit and increase the number of bank contacts. There is something more to this. If the bank is not affected by heavy competition it might consider using the acquired private corporate information to extract rents. Indeed, there is some evidence that the longer the credit relation exists, the higher the costs of the credit line are (Kaplan, 1994). Monopolistic rent extraction ex post might lead to a hold-up problem ex ante. Firms that know that the bank might consider rent extraction might be reluctant to invest and to apply for a loan. Another case of the holdup problem might also exist. In a competitive banking environment a high-quality firm that tries to switch from its previous to a new loan provider gets pooled with low-quality firms and might be forced to pay too high an interest rate. This prevents a high-quality firm from increasing the number of banking relationships.

How do these issues affect the desired quantity of banking relations of a firm? A firm that faces a monopolistic banking industry might want to increase the number of contacts and try to force banks to compete in making offers (see Von Thadden, 1994). This is true for symmetrically informed banks. If we have the opposite case, an inside bank that competes with outside banks, this might change. If outside banks start to compete, the inside bank can use its knowledge on the quality of firms to select the good firms and leaving the lemons as leftovers to the outside banks. This might lead to too high interest rates and a reduction of the number of credit lines. So it is relevant to distinguish between the nature of the existing firm-bank relationships. Petersen and Rajan (1995) give a final argument to the competition issue. They argue that borrowing from banks with great market power facilitates intertemporal sharing of the rent surplus and through that stimulates a single banking relation. Competition in credit markets hinders this process. It might even be so that competition forces rents to the point where it is no longer in the interest of any bank to lend to the firm. Petersen and Rajan (1995) argue that the intertemporal rent sharing is especially crucial to smaller and younger firms.

A third class of arguments against the case of single banking relates to using multiple contacts as insurance against liquidity or liquidation risk. The worst case for the firm is that a profitable project has to be liquidated prematurely. Suppose that the loan includes a

refinancing stage. If the relation bank cannot rollover their initial loan the firm in liquidity need has to apply for loans from non-relation banks (arm's-length financiers). These banks probably think that the applying firms have 'lemon' projects (see also Detragiache *et al*., 2000).

A fourth class of arguments is formed by the ability among lenders to coordinate activities. In a largely decentralized economy banks cannot commit to finance unprofitable long-term projects because dispersed banks with limited capital will find it costly to coordinate actions (Dewatripont and Maskin, 1995). A similar argument is put forward by Bolton and Scharfstein (1996) and Bris and Welch (2001). In the Bolton-Scharfstein-model the manager has an incentive to strategically default the project (*e.g.* by diverting cash to herself). Coordinating with multiple lenders disciplines the manager. On the other hand it might be the case that fewer creditors have more incentives to check managers. Such creditors have an incentive to invest more in monitoring activity (see Bris and Welch, 2001). Writing debt contracts with multiple lenders is costly though (see the first class of arguments). In any case, a decrease of default risk will increase the number of lenders. The same holds to the degree of synergy between the assets of the firm (the degree to which the assets are worth more together than apart) or the liquidation value.

Fifth, the type of business activity might affect the number of creditors. Take the example of a highly innovative, high quality firm that invests to a large extent in R&D. If this firm believes that it will be successful, it will not be willing to give all the information to multiple financiers (see Yosha, 1995). Low-quality firms on the other hand might want to contact multiple banks. Von Rheinbaben and Ruckes (1998) analyze a model that includes the competition on the output market for firms. The main point is again that leakage of information is detrimental to a firm's success on the output market. The firm can avoid this in two ways. First, it decides on the amount of information given to creditors, and second, it can change the number of contacts. If a firm gives more information to a bank and its quality is high, it can get a lower interest rate. More creditors again intensify competition. Highly rated firms optimally try to deal with many

banks and will disclose as little information as they can. Bhattacharya and Chiesa (1995) stress the point that it might be optimal for a bank to inform competitors of the innovating firm with respect to the new technology in order to avoid financial distress. Bolton and Scharfstein (1996) also predict that firms in non-cyclical industries will chose a lower number of lenders.

2.2 **Empirical evidence**

The empirical literature on explaining the number of banking contacts is typically more concentrated than its theoretical equivalent. In Table 1 we present an overview of the results of five studies: Detragiache et al. (2000) for Italian firms, Farinha and Santos (2000) for Portugese data, Ongena and Smith (2000a) for multiple countries, Degrijse and Ongena (2001) for Norwegian firms, and Houston and James (2001) for U.S. firms. We classify the determinants of single-banking relationships along the five theoretical classes presented above (so a + in Table 1 is a positive stimulus for single banking). The classification of variables is in some cases arbitrary, but illustrative for our purposes.

There is at least mixed evidence for the first class: cost minimization. The age of the firm is only found to be important in the Portuguese case. The evidence on firm size is mixed. With respect to the industrial organization of the banking market there seem to be clues that a more concentrated banking market predicts single relations. Not all the studies present results with a straightforward interpretation though. By far the most important category is the class of liquidity/liquidation risk. Here we do find some evidence of its relevance. The coordination problems seem to be less relevant. With respect to the business activity there is not much hard statistical evidence to be favored. An important characteristic is profitability. Degrijse and Ongena (2001), using data for Norwegian publicly listed firms for the period 1979-1995,.find a robust and economically relevant negative two-way correspondence between the number of relationships and sales profitability. They also find that firms replacing a single relationship are on average smaller and younger than those firms choosing not to replace a single relationship.

Insert Table 1 about here

3 Description of the data

The primary source of the data used is the *Financial Statement Data* (FSD) and *Sources of Loans Data* (SLD) of individual firms. Both sets are provided by the *Development Bank of Japan*. The FSD includes more than 500 items in balance sheet accounts, profit and loss accounts and cash flow statements. Moreover, the set contains other qualitative information on stock ownership, like the names of the top-10 shareholders and their holding share of equity. SLD indicates from which financial institution the firms attract their long-term (1982-1999) and short-term loans (1998-1999)[1]. The FSD data covers more than 2000 firms listed on the main Japanese stock markets (Tokyo, Osaka, Nagoya, etc.) from 1957 onwards. The SLD data is, however, available only after 1982. We combine consistently both sources and transform all available information into firm-year observations.

We need to define our interpretation of a bank relation. We the total number of banks that provided long-term loans in year *t* as the number of long-term loans. For most of those loans it will be likely that the relationship continues up to the next year, but we do not check whether the same bank actually provides a long-term loan next year. So suppose that a normal long-term loan will last for three years and a firm has two providers: bank A grants the loan at *t-1*, bank B at time *t.* In our set we observe one bank contact at time *t-1,* 2 at times *t* and *t+1* and only 1 at time *t+2*. So we don't measure the length of an individual loan relation (which we of course could do with our data).

The total number of firm-year observations in the original dataset from 1982 to 1999 is 34939. In combining the two sets, however, some of the observations are excluded mainly due to inconsistencies between the two data sets. For instance, the outstanding long-term loans in the SLD data sometimes do not match the balance sheet registration of

[1] Financial institutions include life- and non-life insurance companies as well as public and private banks. Insurance companies too are main long-term funds suppliers in Japan.

long-term loans in the FSD source. Also, the source of the long-term loans is in some cases classified by miscellaneous financial institutions. In this case we cannot identify the number of bank relations. This is also true for the case of classification as foreign banks; that is to say, the data set does not indicate the specific name of the foreign bank. Since our main concern is the determinants of the number of bank relations, sample firms with above characteristics are excluded from the analysis. As a result of this data screening, we have 20740 firm-year observations in terms of unbalanced panel data from 1982 to 1999.[2]

We use the following symbols and variables to describe the data:

CBR = corporate bonds to total debt;
DAR = debt-to-assets ratio;
EMP = number of employees (in persons; in estimation models in thousand persons);
EXP = exports to sales ratio;
FTA = fixed tangible assets (billion yen);
GIR = gross investment rate (increase in fixed tangible assets excluding land /average of fixed tangible asset at the beginning and the end of the period);
HIL = Herfindahl index for long-term loans;
HIS = Herfindahl index for short-term loans;
ICR = interest coverage ratio (profits before tax plus financial expense to financial expense);
IRR = implicit interest rate (interest and discount paid including bonds /profit before tax);
LAR = liquid assets to total assets ratio;
LLR = long-term loans to total debt;
LND = land to assets ratio;
MBD = main-bank dummy variable = 1 if a bank supplies more than 40% of the loans and is among the top 10 equity holders (see hereafter);

[2] It should be noted, however, that the calendar year does not correspond to the actual accounting period of the firm. For example, the firm with the accounting period starting

NBL = number of long-term bank loans;
NBS = number of short-term bank loans;
ROA = return on assets (profits after tax / the average of the total asset at the beginning and the end of period);
R&D = R&D expenditure to total sales;
SAL = total sales (billion yen);
SEQ = shareholder's equity (billion yen);
SLR = short-term loans to total debt;
STP = average stock price (the average of maximum and minimum stock price during the period, in yen);
TAS = total assets (billion yen, in 1995 constant prices in estimation models);
TBQ = average Tobin's Q (debt + market value of shareholder's equity)/(debt + book value of shareholder's equity). The market value of shareholders' equity is obtained by multiplying the average stock price by the number of shares outstanding;
TDE = total debt (billion yen);
TSL = total short-term loans (billion yen);
TLL = total long-term loans (billion yen).

We checked whether our data reflect the industrial sector of the Japanese economy by mapping our sample on the SNA-classification. Indeed we have a representative sample, although listed firms have an overrepresentation in manufacturing (see Table A1 in Appendix A). In this section we present a selective descriptive overview of the data. We confine ourselves to the correlation coefficients between likely determinants of the number of bank loans and the number of bank loans itself. First we refer to Appendix B for a rather complete overview of the number of long-term loan bank relations across the sample. The single bank relation is actually the most frequently observed number of relations for the period of 1987 to 1991, which is referred to as the 'Bubble Economy'.

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in April 1998 and ending in March 1999 is classified as 1999 in spite that the firm actually operates 9 months in 1998 and only 3 months in 1999.

3.1 Number of long-term bank relations

Table 2 presents the number of long-term bank relations over the sample period. We show the time series of the number of banking relations for various cases. We distinguish: no loans (0), a single loan (1), 2 to 4 loans, 5 to 7 loans, 8-10 loans, 11-15 loans, and over 15 loans. In the bottom line of Table 2 we give the percentage of single loans (se also Figure 1). Table 2 shows that there is a general increase of the number of loans over time. It also appears that especially the classes with multiple loans (over 10 loans) seem to increase above average.

Insert Table 2 about here

We also provide a figure of the mean and median number of long-term loan relations (Figure 2). As can be seen from Figure 2 the average number of relations decreases from 7.74 in 1982 and it reaches it bottom level 6.65 in 1989. After 1990, it fluctuates around 7 except for the sharp decline in 1997. This means that the concentration of the long-term loans has been gradually promoted towards the bubble period but recovered to the original level with the collapse of the Bubble. As shown in Figure 2, however, the median of the number of long-term bank relations is quite stable over the sample period. It remains at 6 except for 1982, 1983, and 1993, where the median is 7.

Insert Figure 2 about here

We also computed the Herfindahl index for long-term loans per firm (see Figure 3). The average of this index increases from 0.370 in 1982 to its maximum of 0.409 in 1990. The same tendency can be seen for the median value. The concentration, however, gradually decreases towards its lowest level 0.335 in 1995 and increases again towards 1997.

Insert Figure 3 about here

Table 3 presents the number of bank relations by the so-called debt-financing pattern. The main reason to give this information is that loans can be seen as substitutes of other debt classes. We classified the sources of debt into 5 categories; (1) trade debt, (2) short-term loans, (3) long-term loans, (4) corporate bonds, and (5) other miscellaneous debt. Accordingly, there are 31 (${}_5C_5+{}_5C_4+{}_5C_3+{}_5C_2+{}_5C_1+{}_5C_0$) combinations of the above 5 funding categories. Table 3 indicates the actually observed combinations of the above 5 sources in our sample. The average number of relations for the patterns labeled 29 and 31 are similar as for the aggregated number, around 7 and 8 for average and 6 and 7 for median, reflecting the fact that these patterns are the most frequently observed ones in our sample. The numbers for the pattern 14 are considerably small, 2.17 for mean and 1 for the median value. Although the sample size is very small (23 firm-year observations), it should be noted that this pattern does not use any other debt instrument except for the miscellaneous class. Also, the number for the patterns 23 and 26 are relatively large, both are well excess of 10. It is also to be noted that these patterns do not use the trade debt at all as debt-financing instrument. On the contrary, the patters 20 and 27, both of which do not use the short-term loan, the number of relations are relatively small, 4.51 and 4.75.

Insert Table 3 about here

Table 4 presents the number of bank relations by firm size, measured by the number of employees (EMP), total assets (TAS), total sales (SAL), total debt (TDE), and total amount of long-term loans (TLL). There is an apparent tendency in the number of bank relations: that is to say, the number of relations increases as the firm size increases. This

increase is quite strong for the mean values but also apparent in de median values. Note that we deflated all nominal indicators in to 1995 yen prices.

Insert Table 4 about here

In the review of the theory of the number of bank relations we argued that some financial indicators might be of influence. In order to shed some descriptive statistical light on this issue we select ten indicators from the financial statements of the firms we consider and relate the profiles of these variables with our information on the number of bank relations.

The first three variables (ROA, STP and TBQ) all relate to profitability. It seems that a higher ROA and STP correlates with fewer loans. For Tobin's Q we do not find a very strong pattern, although a higher Tobin's Q seems to correlate with the smaller loan classes. The items 4 to 8 (DAR, IRR, LAR, LLR and ICR) relate to the financial structure of the firm. A higher debt-to-assets ratio correlates with multiple loans. Single loans seem to be a little more expensive. Firms with higher liquidity tend to have fewer loans. Firms with a high interest coverage opt for fewer loans as well. Item 9 (GIR) describes the real growth of the firm (which does not seem to affect the number of loan choice), while item 10 (LND)gives some information on the likely role of collateral. Firms with more land on the balance sheet tend slightly to have more loans.

Insert Table 5 about here

It is also interesting to consider the variables representing the nature of the firm that seem to affect the number of bank relations. Table 6 presents those variables by the number of bank relations. In Table 6 variables listed in Columns (1) to (7) are those measuring the scale and nature of firm's activity. There is a distinct tendency in those variables: that is to say, in spite of the systematic tendency across the firms with a number of bank relations exceeding two, the firms with a single bank relation show values that are apparent outliers of the above tendency. For all those variables firms with a single bank

relation show a larger value than firms with two to ten bank relations. There seems to be a discontinuity between single and multiple bank relations. This tendency is also conceived for the variables representing specific activity: Research and Development and international activity (as measured by EXP). Both activities are listed in Columns (8) and (9). In columns (10) we present the relation between financial ownership of the firm and the number of bank relations. If the number of banking contacts increases financial institutions apparently also want to hold more equity. The relationship with financial institutions through stock ownership is considerably tight for the large number of bank relations.

Insert Table 6 about here

The Japanese industrial organization differs to a large extent from most western equivalents. Mutual ownership of stock is quite common, especially in the group structures (keiretsu). Within the group structure long-lived equity holdings and lender relations are the key financial characteristics. As known, banks play a central role in these business groups, so it is valuable to give some idea of the relation between simultaneous holdings of loans and equity. Especially if we want to test the hypothesis that firms that have a main bank do want fewer banking contacts. In order to consider the relationship between loan activity and equity ownership, we classify our firm-year observations into the following seven categories:

Case 1: if the largest equity owner is also the largest debt owner;
Case 2: if the largest equity owner resorts under the top-3 debt owners;
Case 3: if the largest equity owner resorts under the top-10 debt owners;
Case 4: if the largest debt owner resorts under the top-3 equity owners;
Case 5: if the largest debt owner resorts under the top-10 equity owners;
Case 6: if one of the top-3 equity owners resorts under the top-3 debt owners
Case 7: if one of the top-10 equity owners resorts under the top-10 debt owners

Table 7 presents the percentage of firms for the above seven cases in our sample by year. As is expected, Case 1 is the most rare case, but it is a striking result that more than 5 percent of the firm-year observations fall into this class. Although the equity ownership by banks is highly restricted in Japan[3], about half of the firm-years are classified in Case 6 and about 90 percent of the firm-year observations in our sample belong to Case 7. In this context, Table 7 suggests the distinct group-feature of the Japanese firms. All the figures show the increasing tendency over the sample period, indicating the tight relationships between firms and banks. These variables will play an important role in the econometric analysis in Section 4.

Insert Table 7 about here

3.2 Number of short-term loans (1998-1999)

Let us turn to the description of bank relations for short-term loans. The data for short-term loan composition by individual firms is available only for 1998 and 1999. Table 8 gives the number of firm-year observations by the number of bank relations in short-term loan. The number of consistently available firms is 1204 and 1211 respectively for 1998 and 1999. As a result the total number of firm-year observations is 2415, in which 71.6 percent of total observations are those using short-term loans as a debt-financing instrument. The firms with a single bank relation, however, consist of 3.9 percent of the total in 1998 and 4.5 percent in 1999. These are considerably lower than the corresponding values of 9.9 percent and 8.5 percent for long-term loans. The concentration of bank loans seems to be lower for short-term loans than for the long-term loans.

Insert Table 8 about here

[3] In Japan the maximum share of equity holding of a bank for one firm is restricted to 5 percent. It should be noted that in our data set the financial institution includes life-

Table 9 also shows the corresponding statistics to those in Table 2 for long-term loans. The exact number of bank relations for short-term loan is presented in the Appendix. As can be seen from the tables, all figures suggest that concentration is lower for short-term loans than for long-term loans. The average numbers of bank relations are 8.25 and 7.99 respectively for 1998 and 1999, while those for long-term loans are 7.22 and 7.38 for the corresponding year. The average Herfindahl indices are 0.297 and 0.286, which are less than the corresponding indices for long-term loan by about 0.07.

Insert Table 9 about here

4 Bubble and post-bubble borrowing and short-term or long-term financing?

In Section 2 we review the wide field of theoretical work on the optimal number of creditors. In Section 3 we discussed our data in some detail. Matching the theoretical insights with the availability of the Japanese data we observe two items of interest in our data that are not covered in large detail by theoretical models:

1. The typical Japanese feature of the bubble economy: how did this affect the borrowing decisions?
2. What are the specific insights with respect to the decision regarding the number of short-term and long-term financiers?

We do not intend to develop a complete new theoretical model that covers these two elements here. Instead we sketch likely determinants of the differences.

With respect to the differences between the characteristics of the Japanese financial system in the 1980s and the 1990s we note the following. First, profitability of firms changed. Table A.3 in Appendix A shows the high ROA-values in the 1980s and the lower profitability in the 1990s (the same holds for Tobin's Q and the average stock price). There is also a remarkable reduction in debt-to-assets and liquid-to-total assets ratio. There are no a priori assumptions though that would trouble the relation between

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insurance companies as well as private banking companies. The equities held by

these variables and the number of bank loans. A variable that could lead to differences between the 1980s and the 1990s is the corporate bonds to total debt variable. The Japanese corporate bond market was not fully developed in the 1980s, but it is in the 1990s. So we expect that the borrowing decisions by firms will be affected stronger by the corporate bond market indicator in the 1990s than in the 1980s. Another striking difference between the 1980s and the 1990s is the growth rate of the firm (see Column (9) in Table A.3) measure by investment. The Japanese economy invested more in R&D in the 1980s (although this is hard to measure precisely, since Japanese firms tend to report lower expenditure on R&D than actually purchased). The strong impetus to growth by investing in R&D seriously changed in the 1990s, so we might expect to see some differences between the borrowing decisions in the 1980s and 1990s due to R&D expenditure shifts.

Next we focus on the demand for the number of short-term and long-term loans. Is there any difference between those two: or in other words is the desired number of loans a function of the maturity of the loans? What are the key-differences between short- and long-term borrowing? First, applying for additional long-term funds is probably more expensive. The firm needs to hand in another detailed long-term investment plan. The lender will ask for collateral and try to monitor the firm during the years of the contract. Secondly, the main advantage of a long-term loan though is that, once the firm obtains the loan, it can pursue its investment policy for a number of years without the disturbances and worries about anew loan application. Applying for another short-term loan will be a little easier in general. This is mostly a kind of roll-over credit. So it is likely that if profitability increases the firm will try to increase its number of long-term loans if it wants to expand business. If the firm owns many liquid assets though it is likely that those assets will be used first to finance investment, given the relatively higher costs of long-term loans. So we expect positive impact of profitability and negative impact of the liquid-to-total assets ratio on the number of long-term loans. For short-term loans these relations will be less important given the relatively lower costs of one additional short-term loan.

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individual and institutions through trust banks are classified as individual holdings.

5 Explaining Japanese multiple bank relationships

In Section 3 we presented descriptive statistics of our data. From this descriptive analysis a general picture of the borrowing activity of Japanese listed firms emerges. We summarize these findings as follows:

- On average Japanese listed firms have about 6-7 long-term and 8 short-term credit relations. These numbers vary across industries;
- There is a time series pattern in loan concentration that coincides with the patterns of a number of financial indicators, such as profitability (ROA), solvability (DAR), and liquidity (LAR) indicators.
- Size of the firm, especially the financial size, seems to correlate with the number of loans.
- There is a clue that stock ownership relations coincide with loan relations (especially via the main-bank relation).
- It is likely that substitution between various liability categories determines the number of bank relations.
- There seem to be differences between the choice for a single or multiple relation as business activity is considered (R&D).

In this section we present behavioral models that describe the concentration of loans more precisely. We can proceed in a number of ways from here. First, we can treat all observations as true firm-year observations and take no account of the panel data nature. This implies for instance that we don't include lagged firm information to predict next period's firm decisions. Alternatively, we could treat the data as a true panel. We use the former approach and analyze firm-year decisions. We can motivate this by decomposing the total observed variance into inter-firm and temporal variance. For the long-term loans we can perform such an analysis. In Table 10 we present our global analysis of variance. Since the data used in this study is a typical unbalanced panel, some firms have relatively small number of observations across the sample period. Sometimes firms have only one observation. Including these firms with such a short sample period in to the analysis of

variance will lead to underestimation of the inter-year variation. Accordingly, we exclude the firms with less than 11 available observations, which amounts to 2/3 of the total sample period of 18 (1982 to 1999). As a result, the number of observations utilized for the analysis is 7602 out of the total of 14055 firm-year observations. Table 10 shows that we need to reject the hypothesis that either cross-section or time variance dominates the observations. It is clear though that the cross-section variance is typically larger than the year-variance. For short-term loans, since we have only a 2-year panel, we typically cannot perform an equivalent analysis.

Insert Table 10 about here

So we use firm-year observations in all our models. Given the time-series nature of our data for long-term loans, and the macroeconomic pattern found, we use various sub-samples in our estimation. In all models we show the results for the following cases:

1. Long-term loans in 1982-1999;
2. Long-term loans in 1982-1989 (the 'bubble' period);
3. Long-term loans in 1990-1999 (the post-'bubble' period);
4. Long-term loans in 1998-1999 (in order to compare with the next class);
5. Short-term loans in 1998-1999.

The first class uses all the data available for long-term loans. The next three give relevant sub-samples, so we can treat the time series nature of the data. The fourth class for long-term loans is modeled in order to compare with the shorter sample for short-term loans.

For these data classes we estimate three basic models:

- A logit-model that explains the choice between single (Y=1) versus multiple (Y=0) relations;
- A multinomial logit-model that explains the choice for the various number of loan classes (single, 2-4, 5-7, 8-10, 11-15, and over 15);
- A tobit-model that explains the Herfindahl-index.

What are the key determinants of the borrowing decisions we model? Here we use the same classes of indicators that are presented in the literature to explain multiple lending.

Since we are not able to observe all the variables we described in Section 2 we present the different variables here in a nutshell:

1. Variables that indicate the size of the firm: number of employees (EMP), total assets (TAS), total sales (SAL), and total debt (TDE), and total long-term loan amount (TLL) (the last four deflated by the GDP deflator);
2. A variables that indicates profitability (ROA). Here we note that in all our results Tobin's Q (TBQ) does not play a significant role;
3. A variable that indicates solvability (debt-to-assets ratio, DAR);
4. A variables that indicates liquidity (liquid-to-total assets, LAR);
5. Variables that indicate alternative financing forms. We use the corporate bonds to debt ratio (CBR) for all models, the long-term loan to debt ratio (LLR) for the short-term loan equations, and the short-term loan to debt ratio (SLR) for the long-term loan equations;
6. A variable that indicates the R&D activity of the firm: R&D expense to total sales. Moreover, we include industry dummies (not reported) and year dummies (not reported).
7. A variable that indicates a main-bank relation (MBD). We define MBD as a dummy variable, which equals 1 if one bank supplies more than 40 % of the loans to the firm and belongs to the top-10 shareholders.

First we present a logit-model of the decision to have either a single loan, represented by Y=1, or to have multiple loans (Y=0). The results are presented in Table 11. In Table 11 we give five panels (A to E) that describe the various sub-samples for long-term and short-term loan decisions. The rows in each panel give the results for the five size indicators as listed above. The columns give the various estimated parameters of the determinants (see also above). In the last column we give the Kullback-Leibler R-squared and the Correct Prediction Rate (CPR). The numbers of observations used in each sub-sample are denoted at the top of each panel. At the bottom of each panel we also provide the marginal derivatives of the determinants x on the probability of a single relation P: dP/dx, since we cannot attach an economic interpretation to the coefficients estimated.

We shade the significant estimated parameters (t-values between brackets below the estimated parameters).

Insert Table 11 about here

From Table 11 a general picture emerges. In all models we find that:

- A higher debt-to-assets ratio DAR increases the probability of multiple loans;
- A higher liquid-to-total assets LAR increases the probability of a single loan;
- A higher corporate bond to total debt ratio increases the probability of a single loan;
- Having a main bank relation increases the probability of a single relation.

These results are in line with most theoretical insights. Apparently the solvability and liquidity of firms affect the number of loans the firms maintains. If a firm has relatively better access to public markets (more corporate bonds) apparently wants less banking contacts. Apart from the main bank firms want to reduce the number of bank relations. Besides these rather standard findings we observe for the size of the firm the following. There is no strong overall finding for size. We do find that the total size of loans (TLL) has a positive impact on the number of bank relations. But in Panel B (1982-1989) there are indications that bigger firms intended to opt for single relations in the bubble period. With respect to profitability there is an interesting finding in Panels D and E. An increase in ROA leads to multiple long-term relations, but to a higher probability of a single short-term bank relation. Note that we can only conclude this from our short samples (1998-1999)[4]. Finally if we compare the results for R&D we tend to find some evidence for an increase in multiple loan contacts with respect to long-term loans in the bubble period, but no significant impact thereafter. The Kullback-Leiber R-squared varies from about 0.1 to 0.3, but the correct prediction rate is around 90 percent for all the models. The fit of the model with total long-term loans (TLL) as an indicator of size is by far better than the fit of the other models. In the following tables we therefore use this indicator as proxy for the size of the firm.

[4] We do not find any impact of Tobin's Q in all our models estimated.

In the next step we analyze the decision of multiple loan contacts a little further (see for a similar approach Detragiache *et al*., 2000). We model 6 classes:

1. a single relationship;
2. 2-4 relationships;
3. 5-7 relationships;
4. 8-10 relationships;
5. 11-15 relationships;
6. 16 and more relationships.

Table 12 contains the results of the estimated multinomial logit model. We again use the same structure as presented in Table 11. Note that we use TLL (total long-term loans) as size indicator. For each panel we present the estimated parameters and the dP/dx values. In estimating the model, the parameters for the Y=1 case (a single relation) are normalized to zero. So all parameters should be interpreted as being the differences from the base case: Y=1. Again, the parameters as such do not have any economic interpretation, so we again give the dP/dx values. In the last section of each panel we give in the last column the fraction of observations that fall into the relevant class.

Insert Table 12 about here

First we present our general findings of Table 12:

- We observe different results for the classes with relatively few loan contacts (see less than 8 loans) compared to the multiple loan contact cases;
- For size (TLL) we find that firms with no more than 4 loan contacts seem to opt for fewer loan contacts, while firms with multiple loans try to increase this number. For short-term loans the critical value of the number of loans is somewhat higher (10);
- Again for profitability we find that more profitable firms in the post-bubble period wanted more long-term loans (especially for the high loan classes) and fewer short-term loans;
- For debt-to-assets we find that a higher DAR decreases the number of loans for the low classes (up to 8), but increases the number of loans above the critical value;

- For liquid assets we find that cash-rich firms tend to reduce the number of long-term loan contacts, especially for the higher loan classes. For short-term loans we find no impact;
- Alternative financing forms (corporate bonds, and short for long-term loans and vice versa) significantly influence the number of creditors. Especially for the average number of loans there seems to be a negative impact of existing access to the corporate bond market on the multiple bank-decision;
- For R&D we find modest results. In general it seems that R&D-intensive firms prefer multiple loans (apart from the firms with 11-15 long-term loans in 1998-1999);
- For the main-bank relation we find an interesting result. Firms with a main bank relation show to prefer to have a few more relations, but no more than 8 at the maximum.

So the main differences between long-term borrowing in the 1980s and the 1990s relate to the impact of profitability (more loans in the 1990s) and R&D (more multiple loans in the 1980s. With respect to the difference between short-term and long-term loans we find a confirmation of the logit model (Table 11) with respect to the impact of profitability ROA) and liquidity (LAR), especially for the higher number of loans classes.

The previous results relate to the discrete lending choice. Next we use a continuous variable as a dependent variable: the Herfindahl-index. This variable is limited in range (by definition in the interval [0,1]). Prior to estimating the model we transformed the original index by taking the logarithm and multiplying it by -1. By this transformation the dependent variable lost its upper bound. After this transformation we apply an ordinary Tobit model with a lower truncation at zero. Table 13 gives the estimation results. It should be noted a larger value of the dependent variable implies a lower concentration (multiple loan contacts). A plus sign in the table therefore indicates that an increase of the determining variable will lead to more banking relations. Table 13 includes the same panels and determinants as before. We again use the five indicators of size.

Insert Table 13 about here

The results in Table 13 lead to the following conclusions:

- An increase in size leads to a lower concentration of loans.
- Higher profitability leads to multiple banking contacts for long-term loans. For short-term loans we don't find any impact;
- A higher debt-to-assets and a lower liquidity lead to more banking relations (apart from LAR for short-term loans);
- A main-bank relation leads to a higher concentration (fewer loan contacts).

These results support the general findings of Table 11. With respect to the role of corporate bonds we find a substitution effect with the number of loans in the 1990s (and not in the 1980s). We find some support for complementarity between the total amount of short-term loans and the number of long-term loans in the 1980s and substitution between the total amount of long-term loans and the number of short-term bank relations in 1998-1999.

5 Summary and conclusions

In this paper we analyze the number of bank relations that Japanese listed firms hold. For long-term loans Japanese firms have about 6 relations (median value), while for short-term loans this number is even higher. Compared to other countries this is about the average value observed. We present an overview of the rather extensive literature in the field of the optimal number of creditors. From this literature we retrieve a set of likely candidate variables that might have an impact on the number of bank relations. We analyze both short-term and long-term loans. Our main attention is focused on long-term loans, since these loans are crucial in the functioning of the Japanese economy. Moreover, our data have more information on the long-term loans (1982-1999) than we have for the short-term loans (1998-1999). Next we present a detailed descriptive analysis of our data. We cross-analyze various classes of variables, like size, profitability, solvability, liquidity, nature, and ownership of the firm with their borrowing relations. After that we turn to more behavioral explanations of the number of banking relations. We estimate discrete choice models of the decision for single versus multiple relations, the decision to have a number of bank relations in certain classes (in a multinomial logit

model) and a model with a continuous measurement of the loan concentration (as measured by the Herfindahl index).

Our general conclusions are as follows. The 'number of bank relations' decision is influenced by size of the firm, profitability, solvability and liquidity of the firm, and the existence of a main bank relation. Apart from these general determinants we find some evidence for a significant role of alternative financing forms (e.g. corporate bonds), and an indicator of the activities of the firm with respect to R&D. We also find some support for differences between the borrowing activity in the 1980s and 1990s. In the 1980s the Japanese corporate bond market was not well developed and did not provide an alternative financing form. Moreover, R&D-intensive firms tended to want more bank relations in the bubble period, but not thereafter. Concerning the differences between short- and long-term borrowing we find that especially profitability and liquidity tend to influence the number of long-term financing contacts.

Concluding, we find in general support for the mainstream of the existing literature on the optimal number of creditors for the Japanese listed firms. We add some newer insights with respect to the dynamic development of the number of loan contacts and the differences between short- and long-term loan activity. Many alternative variables and ideas could be included though from here. A natural candidate to include will be the relative size of the corresponding bank. Via this variable we can model the competitiveness of the loan supply better. Another variable to be implemented is the age of the firm. Age of the firm is a variable that could measure ex ante informational problems. We also plan to pay more attention to the role of collateral.

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Table 1 - Overview of empirical results on single-bank relationships

Class of explanation/variable	DGG	FS	OS	DO	HJ
1 Cost minimalization					
Firm size	+	-		-	-
Firm age	0	+		-	0
Share of defaulted loans recovered	+				
Nonperforming loans	0				
2 Competition on the banking market					
Average size of lending banks	+	+			
Group membership	0				
3 Liquidity risk					
Liquidity shocks	+				
Profitability	+			-	-
Coverage ratio					+
4 Coordination problems					
Firm leverage	+	-			-
Share of first owner	0				
5 Type of business activity					
Patents	0				
R&D	0				
Product innovation	0				
Process innovation	0				
Industry comovement	0				
Variability of asset returns					0
Home sales			-		
Worldwide sales			+		

DGG = Detriagiache, Garella, Guiso (2000)
FS = Farinha, Santos (2000)
OS = Ongena, Smith (2000a)
DO = Degrijse, Ongena (2001)
HJ = Houston, James (2001)

\+ = significant determinant in explaining a choice for a single banking relation;

0 = insignificant determinant;

\- = significant determinant in explaining a choice for multiple banking.

Table 2. Number of bank relations with respect to long-term loans by year

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	total
0	158	200	235	258	283	315	355	391	406	404	409	404	416	446	479	502	516	508	6685
1	49	59	59	66	70	82	86	90	96	93	69	62	69	65	69	94	103	89	1370
$2 \leq NBL \leq 4$	142	140	154	158	155	149	149	172	187	191	192	207	189	213	220	260	254	244	3376
$5 \leq NBL \leq 7$	162	176	159	160	188	179	184	184	189	202	204	187	207	222	230	236	272	286	3627
$8 \leq NBL \leq 10$	117	126	148	144	138	140	126	146	153	159	156	165	140	157	170	168	187	195	2735
$11 \leq NBL \leq 15$	104	90	87	106	89	96	88	85	94	103	111	126	142	143	134	126	138	157	2019
$16 \leq NBL$	47	49	48	43	48	44	42	35	42	51	50	57	54	56	54	49	84	75	928
total	779	840	890	935	971	1005	1030	1103	1167	1203	1191	1208	1217	1302	1356	1435	1554	1554	20740
with long-term loans	621	640	655	677	688	690	675	712	761	799	782	804	801	856	877	933	1038	1046	14055
(percentage)	(79,7)	(76,2)	(73,6)	(72,4)	(70,9)	(68,7)	(65,5)	(64,6)	(65,2)	(66,4)	(65,7)	(66,6)	(65,8)	(65,7)	(64,7)	(65,0)	(66,8)	(67,3)	(67,8)
percentage single relation	7,9	9,2	9,0	9,7	10,2	11,9	12,7	12,6	12,6	11,6	8,8	7,7	8,6	7,6	7,9	10,1	9,9	8,5	9,7

Table 3. Number of bank relations with respect to long-term loans by debt financing pattern

	T	S	L	B	M	(1) mean	(2) median
14			●		❍	2.17	1
20	❍		●		❍	4.51	3
23		❍	●		❍	11.51	11
26		❍	●	❍	❍	12.92	13
27	❍		●	❍	❍	4.75	4
29	❍	❍	●		❍	6.90	6
31	❍	❍	●	❍	❍	7.91	7
			total			7.16	6

T: trade debt
S: short-term loan
L:long-term loan
B:corporate bond
M:miscellaneous debt

Table 4. Number of bank relations with respect to long-term loans by firm size

		# of obs.	(1) mean	(2) Median
EMP (persons)	-300	2574	5.48	5
	300-600	3480	6.32	6
	600-900	2592	6.96	6
	900-1500	2540	8.06	7
	1500-3000	1873	8.72	9
	3000-	996	9.70	8
TAS (billion yen)	-10	1832	4.97	5
	10-20	2802	6.02	6
	20-30	2175	6.36	6
	30-50	2735	7.42	7
	50-100	2644	8.31	8
	100-	1867	9.91	9
SAL (billion yen)	-10	1864	5.46	5
	10-20	2760	6.08	6
	20-30	2017	6.62	6
	30-50	2587	7.34	7
	50-100	2769	8.27	7
	100-	2058	8.95	8
TDE (billion yen)	-5	1334	4.14	4
	5-10	2607	5.49	5
	10-20	3300	6.42	6
	20-30	2009	7.39	7
	30-50	2242	8.58	8
	50-	2563	9.95	9
TLL (billion yen)	-0.25	1729	2.24	2
	0.25-0.75	2369	4.26	4
	0.75-1.50	2287	5.86	6
	1.50-3.00	2623	7.24	7
	3.00-7.50	2923	9.08	9
	7.50-	2124	13.12	12
total		14055	7.16	6

Table 5. Selected financial indicators by number of bank relations (long-term loans)

(mean)	(1) ROA	(2) STP	(3) TBQ	(4) DAR	(5) IRR	(6) LAR	(7) LLR	(8) ICR	(9) GIR	(10) LND
1	2.26	2.173	1.63	55.99	8.51	64.88	3.52	18.04	40.37	6.81
$2 \leq NBL \leq 4$	1.84	1.114	1.75	58.79	5.32	62.24	8.57	9.93	40.82	7.23
$5 \leq NBL \leq 7$	1.29	928	1.55	63.62	5.10	59.79	15.51	5.42	38.33	7.45
$8 \leq NBL \leq 10$	1.38	958	1.52	68.15	5.22	57.68	19.08	4.97	40.17	8.27
$11 \leq NBL \leq 15$	1.06	901	1.47	70.26	5.22	56.18	21.63	3.83	38.02	7.59
$16 \leq NBL$	0.73	910	1.47	73.84	5.23	49.90	26.22	3.38	37.82	8.77
total	1.46	1.095	1.58	64.23	5.54	59.29	14.96	7.28	39.41	7.60
(median)										
1	2.43	787	1.43	55.61	4.72	67.30	1.17	6.30	31.98	5.34
$2 \leq NBL \leq 4$	1.98	717	1.38	58.78	4.74	64.05	5.12	4.63	31.44	5.36
$5 \leq NBL \leq 7$	1.52	620	1.38	64.13	4.83	61.91	11.47	3.37	30.31	5.40
$8 \leq NBL \leq 10$	1.43	619	1.38	69.68	5.10	59.98	16.05	3.12	31.51	6.17
$11 \leq NBL \leq 15$	1.13	612	1.32	70.39	5.01	57.72	18.29	2.67	31.54	5.53
$16 \leq NBL$	0.93	637	1.31	75.67	5.13	50.27	23.93	2.52	30.86	6.09
total	1.55	655	1.37	65.09	4.90	61.29	10.58	3.47	31.16	5.59

Table 6. Some other important indicators by number of bank relations

(mean)	(1) EMP	(2) TAS	(3) TDE	(4) SEQ	(5) SAL	(6) FTA	(7) CFL	(8) R&D	(9) EXP	(10) SHF
1	1.181	52.443	29.021	23.422	64.005	7.590	3.899	0.59	7.18	26.10
$2 \leq NBL \leq 4$	934	44.586	26.050	18.536	50.742	7.436	3.089	0.70	7.35	24.38
$5 \leq NBL \leq 7$	1.021	44.550	27.686	16.864	48.724	8.189	2.909	0.61	6.99	26.13
$8 \leq NBL \leq 10$	1.923	82.775	57.020	25.755	85.234	18.850	4.965	0.65	6.98	31.79
$11 \leq NBL \leq 15$	2.334	189.410	139.905	49.505	177.540	39.930	7.578	0.64	4.29	35.95
$16 \leq NBL$	6.836	1.053.455	870.523	182.932	532.349	739.870	84.418	0.29	0.00	31.45
total	1.259	57.613	36.887	20.726	62.135	11.296	3.652	0.64	7.04	27.26
(median)										
1	585	27.423	14.604	10.998	30.249	3.302	1.808	0.00	0.00	24.18
$2 \leq NBL \leq 4$	551	22.994	12.011	9.052	24.450	3.256	1.467	0.00	0.00	22.70
$5 \leq NBL \leq 7$	621	24.203	14.347	8.200	24.361	3.788	1.355	0.00	0.00	24.30
$8 \leq NBL \leq 10$	725	27.320	18.024	8.003	29.176	5.063	1.646	0.00	0.00	25.68
$11 \leq NBL \leq 15$	994	45.882	30.812	13.037	46.556	7.920	2.301	0.00	0.00	32.02
$16 \leq NBL$	1.395	74.375	51.744	21.924	69.250	16.502	3.605	0.00	0.00	36.42
total	694	29.439	17.998	9.627	30.408	4.644	1.695	0.00	0.00	25.98

Table 7. The relationship between stockholders and debt suppliers

	(1) top1 share holder = top1 long-term debt holder	(2) top1 share holder resorts under top3 long-term debt holder	(3) top1 share holder resorts under top10 long-term debt holder	(4) top1 long-term debt holder resorts under top3 share holder	(5) top1 long-term debt holder resorts under top10 share holder	(6) One of the top3 share holder resorts under top3 long-term debt holder	(7) one of the top10 share holder resorts under top10 long-term debt holder	(8) total
1982	4.83	8.86	14.33	23.99	56.36	40.74	83.90	100.00
1983	4.22	8.28	12.81	25.16	57.03	42.34	84.22	100.00
1984	5.19	10.08	14.05	25.95	59.24	43.97	85.34	100.00
1985	4.73	10.19	13.59	26.29	59.97	43.87	84.93	100.00
1986	4.65	8.72	12.21	26.45	61.63	44.77	85.61	100.00
1987	4.78	9.28	12.61	28.41	63.77	45.36	87.25	100.00
1988	4.59	8.74	12.30	25.93	63.41	42.96	86.52	100.00
1989	5.06	9.13	13.20	30.76	66.57	46.63	87.36	100.00
1990	4.99	10.38	14.45	31.27	64.78	46.78	87.78	100.00
1991	4.88	10.01	14.02	31.79	63.70	46.56	87.23	100.00
1992	3.58	10.23	14.58	31.84	64.45	49.10	88.87	100.00
1993	5.22	12.19	16.67	34.95	68.28	51.99	90.17	100.00
1994	4.49	10.99	15.61	35.21	69.91	50.81	90.76	100.00
1995	5.84	11.68	16.71	32.71	68.69	48.95	90.42	100.00
1996	5.02	11.63	15.28	33.30	72.63	48.69	89.85	100.00
1997	5.47	10.83	14.68	34.30	72.45	49.30	88.96	100.00
1998	5.78	10.50	14.35	35.45	72.93	47.69	89.88	100.00
1999	5.83	11.09	14.91	36.81	72.75	49.14	89.39	100.00
total	5.01	10.27	14.35	31.16	66.23	46.99	87.96	100.00

Table 8. Number of bank relations with respect to short-term loans by year

	1998	1999	total
0	481	476	957
1	47	54	101
$2 \leq NBS \leq 4$	222	220	442
$5 \leq NBS \leq 7$	345	368	713
$8 \leq NBS \leq 10$	296	293	589
$11 \leq NBS \leq 15$	203	197	400
$16 \leq NBS$	91	79	170
Total	1685	1687	3372
with short-term loans	1204	1211	2415
(percentage)	71.5	71.8	71.6
Percentage of single short-term relations	3.9	4.5	4.2

Table 9. Indices of bank loan concentration of short-term loans

		(1) NBS	(2) HIS
	mean	8.25	0,2790
1998	median	7	0,2220
	mean	7.99	0,2862
1999	median	7	0,2260
	mean	8.12	0,2826
total	median	7	0,2239

Table 10 Analysis of variance

factor	suquare sum (type 3)	d.f	mean square sum	F-value
inter-firm	104194.4	509	204.7	34.9
inter-year	1187.2	17	69.8	11.9
error	41469.2	7075	5.9	
total	146509.2	7601		

Table 11 Estimation results for the binary logit model
for the single (Y=1) and multiple relations (Y=0)

Panel A: Long-term loans 1982-1999 N=13853 (Y=1: 1370; Y=0: 12483)

		Estimates									
		constant	Scale	ROA	DAR	LAR	CBR	SLR	R&D	MBD	R2/CPR
(1)	EMP	-3.0365	0.0033	-0.0080	-0.0414	0.0358	0.0166	-0.0012	-0.0966	0.5247	0.1032
		-(5.27)	(0.26)	-(0.89)	-(19.62)	(14.72)	(8.12)	-(0.53)	-(4.26)	(8.56)	0.9013
(2)	TAS	-3.0192	-0.0006	-0.0076	-0.0411	0.0358	0.0173	-0.0015	-0.0924	0.5124	0.1035
		-(5.24)	-(1.48)	-(0.86)	-(19.50)	(14.72)	(8.35)	-(0.65)	-(4.07)	(8.34)	0.9012
(3)	SAL	-3.0313	0.0003	-0.0083	-0.0417	0.0358	0.0165	-0.0010	-0.0980	0.5303	0.1034
		-(5.26)	(1.44)	-(0.93)	-(19.66)	(14.74)	(8.08)	-(0.41)	-(4.32)	(8.65)	0.9014
(4)	TDE	-3.0570	-0.0013	-0.0076	-0.0404	0.0358	0.0175	-0.0016	-0.0914	0.5079	0.1031
		-(5.30)	-(2.06)	-(0.85)	-(18.81)	(14.73)	(8.47)	-(0.70)	-(4.03)	(8.26)	0.9012
(5)	TLL	-1.0550	-1.2119	-0.0154	-0.0151	0.0118	0.0154	-0.0068	-0.0238	0.3395	0.2563
		-(1.74)	-(23.53)	-(1.87)	-(6.60)	(4.55)	(7.15)	-(2.91)	-(1.01)	(5.24)	0.9034
		DP/dx									
(6)	EMP	-0.2501	0.0003	-0.0007	-0.0034	0.0030	0.0014	-0.0001	-0.0080	0.0432	
(7)	TAS	-0.2486	0.0000	-0.0006	-0.0034	0.0029	0.0014	-0.0001	-0.0076	0.0422	
(8)	SAL	-0.2497	0.0000	-0.0007	-0.0034	0.0029	0.0014	-0.0001	-0.0081	0.0437	
(9)	TDE	-0.2517	-0.0001	-0.0006	-0.0033	0.0029	0.0014	-0.0001	-0.0075	0.0418	
(10)	TLL	-0.0778	-0.0893	-0.0011	-0.0011	0.0009	0.0011	-0.0005	-0.0018	0.0250	

Panel B: Long-term loans 1982-1989 N=5262 (Y=1: 561; Y=0: 4701)

		Estimates									
		constant	Scale	ROA	DAR	LAR	CBR	SLR	R&D	MBD	R2/CPR
(1)	EMP	-1.3270	0.0429	0.0009	-0.0508	0.0381	0.0094	-0.0051	-0.1855	0.2674	0.1322
		-(3.44)	(2.36)	(0.06)	-(14.05)	(8.90)	(2.34)	-(1.34)	-(4.77)	(2.64)	0.8938
(2)	TAS	-1.2720	0.0008	0.0009	-0.0505	0.0372	0.0092	-0.0055	-0.1824	0.2654	0.1315
		-(3.31)	(1.33)	(0.06)	-(14.01)	(8.77)	(2.27)	-(1.46)	-(4.68)	(2.61)	0.8941
(3)	SAL	-1.2822	0.0007	0.0010	-0.0510	0.0372	0.0097	-0.0049	-0.1816	0.2684	0.1325
		-(3.33)	(2.40)	(0.07)	-(14.09)	(8.75)	(2.42)	-(1.31)	-(4.69)	(2.65)	0.8934
(4)	TDE	-1.2415	0.0011	0.0010	-0.0508	0.0372	0.0095	-0.0055	-0.1802	0.2639	0.1314
		-(3.23)	(1.23)	(0.07)	-(13.95)	(8.76)	(2.36)	-(1.47)	-(4.65)	(2.60)	0.8938
(5)	TLL	-0.0084	-1.6352	-0.0099	-0.0213	0.0090	0.0142	-0.0094	-0.0696	0.1219	0.2878
		-(0.02)	-(15.14)	-(0.66)	-(5.27)	(1.95)	(3.29)	-(2.45)	-(1.71)	(1.12)	0.8987
		dP/dx									
(6)	EMP	-0.1132	0.0037	0.0001	-0.0043	0.0032	0.0008	-0.0004	-0.0158	0.0228	
(7)	TAS	-0.1086	0.0001	0.0001	-0.0043	0.0032	0.0008	-0.0005	-0.0156	0.0227	
(8)	SAL	-0.1093	0.0001	0.0001	-0.0044	0.0032	0.0008	-0.0004	-0.0155	0.0229	
(9)	TDE	-0.1060	0.0001	0.0001	-0.0043	0.0032	0.0008	-0.0005	-0.0154	0.0225	
(10)	TLL	-0.0006	-0.1228	-0.0007	-0.0016	0.0007	0.0011	-0.0007	-0.0052	0.0092	

Table 11 (cont.) Estimation results for the binary logit model
for the single (Y=1) and multiple relations (Y=0)

Panel C: Long-term loans 1990-1999 N=8564 (Y=1: 809; Y=0: 7755)

		Estimates									
		constant	scale	ROA	DAR	LAR	CBR	SLR	R&D	MBD	R2/CPR
(1)	EMP	-2.6208	-0.0210	-0.0151	-0.0360	0.0360	0.0189	0.0007	-0.0504	0.6852	0.0982
		-(4.49)	-(1.00)	-(1.46)	-(13.62)	(11.99)	(7.77)	(0.25)	-(1.80)	(8.74)	0.9065
(2)	TAS	-2.5972	-0.0011	-0.0150	-0.0356	0.0362	0.0197	0.0005	-0.0462	0.6689	0.0991
		-(4.44)	-(2.20)	-(1.45)	-(13.47)	(12.04)	(8.00)	(0.18)	-(1.65)	(8.50)	0.9058
(3)	SAL	-2.6352	0.0000	-0.0154	-0.0362	0.0363	0.0186	0.0009	-0.0526	0.6937	0.0980
		-(4.51)	-(0.05)	-(1.49)	-(13.55)	(12.07)	(7.66)	(0.31)	-(1.88)	(8.86)	0.9065
(4)	TDE	-2.6724	-0.0030	-0.0150	-0.0339	0.0362	0.0202	0.0003	-0.0437	0.6572	0.1004
		-(4.57)	-(3.11)	-(1.45)	-(12.48)	(12.05)	(8.22)	(0.09)	-(1.57)	(8.36)	0.9059
(5)	TLL	-0.9930	-1.0435	-0.0188	-0.0102	0.0131	0.0153	-0.0055	0.0059	0.4833	0.2497
		-(1.58)	-(18.09)	-(2.06)	-(3.60)	(4.10)	(6.04)	-(1.84)	(0.20)	(5.87)	0.9074
		DP/dx									
(6)	EMP	-0.2085	-0.0017	-0.0012	-0.0029	0.0029	0.0015	0.0001	-0.0040	0.0545	
(7)	TAS	-0.2065	-0.0001	-0.0012	-0.0028	0.0029	0.0016	0.0000	-0.0037	0.0532	
(8)	SAL	-0.2097	0.0000	-0.0012	-0.0029	0.0029	0.0015	0.0001	-0.0042	0.0552	
(9)	TDE	-0.2123	-0.0002	-0.0012	-0.0027	0.0029	0.0016	0.0000	-0.0035	0.0522	
(10)	TLL	-0.0711	-0.0747	-0.0013	-0.0007	0.0009	0.0011	-0.0004	0.0004	0.0346	

Panel D: Long-term loans 1998-1999 N=2036 (Y=1: 192; Y=0: 1844)

		Estimates									
		constant	scale	ROA	DAR	LAR	CBR	SLR	R&D	MBD	R2/CPR
(1)	EMP	-2.2159	-0.0883	-0.0500	-0.0334	0.0383	0.0206	0.0011	0.0387	0.5391	0.1018
		-(4.61)	-(1.31)	-(3.60)	-(6.21)	(6.50)	(3.87)	(0.19)	(0.81)	(3.29)	0.9072
(2)	TAS	-2.2398	-0.0013	-0.0503	-0.0333	0.0384	0.0211	0.0012	0.0395	0.5414	0.1017
		-(4.69)	-(1.39)	-(3.63)	-(6.17)	(6.52)	(3.90)	(0.21)	(0.82)	(3.30)	0.9072
(3)	SAL	-2.2859	-0.0006	-0.0499	-0.0333	0.0387	0.0198	0.0013	0.0335	0.5582	0.1004
		-(4.80)	-(0.87)	-(3.59)	-(6.14)	(6.57)	(3.73)	(0.23)	(0.71)	(3.42)	0.9072
(4)	TDE	-2.3050	-0.0035	-0.0502	-0.0313	0.0384	0.0218	0.0009	0.0406	0.5273	0.1036
		-(4.84)	-(1.85)	-(3.62)	-(5.69)	(6.51)	(4.03)	(0.15)	(0.85)	(3.21)	0.9067
(5)	TLL	-0.4193	-1.2083	-0.0373	-0.0039	0.0114	0.0136	-0.0092	0.0921	0.2390	0.3046
		-(0.80)	-(9.55)	-(2.69)	-(0.68)	(1.80)	(2.35)	-(1.61)	(1.66)	(1.36)	0.9096
		dP/dx									
(6)	EMP	-0.1756	-0.0070	-0.0040	-0.0027	0.0030	0.0016	0.0001	0.0031	0.0427	
(7)	TAS	-0.1776	-0.0001	-0.0040	-0.0026	0.0030	0.0017	0.0001	0.0031	0.0429	
(8)	SAL	-0.1814	0.0000	-0.0040	-0.0026	0.0031	0.0016	0.0001	0.0027	0.0443	
(9)	TDE	-0.1825	-0.0003	-0.0040	-0.0025	0.0030	0.0017	0.0001	0.0032	0.0418	
(10)	TLL	-0.0283	-0.0816	-0.0025	-0.0003	0.0008	0.0009	-0.0006	0.0062	0.0161	

Table 11 (cont.) Estimation results for the binary logit model
for the single (Y=1) and multiple relations (Y=0)

Panel E: Short-term loans 1998-1999 N=2293 (Y=1: 101; Y=0: 2192)

		Estimates									
		constant	scale	ROA	DAR	LAR	CBR	LLR	R&D	MBD	R2/CPR
(1)	EMP	-1.3176	-0.0143	0.0529	-0.0328	-0.0050	0.0271	0.0088	-0.1288	1.9175	0.1982
		-(1.29)	-(0.44)	(2.19)	-(4.61)	-(0.66)	(3.86)	(1.14)	-(1.49)	(8.16)	0.9564
(2)	TAS	-1.3588	0.0003	0.0521	-0.0339	-0.0046	0.0261	0.0099	-0.1399	1.9562	0.1989
		-(1.32)	(0.96)	(2.16)	-(4.72)	-(0.60)	(3.68)	(1.28)	-(1.61)	(8.23)	0.9568
(3)	SAL	-1.3706	0.0006	0.0512	-0.0343	-0.0044	0.0262	0.0106	-0.1422	1.9570	0.1995
		-(1.34)	(1.26)	(2.12)	-(4.76)	-(0.58)	(3.72)	(1.36)	-(1.63)	(8.26)	0.9568
(4)	TDE	-1.3323	0.0003	0.0524	-0.0337	-0.0048	0.0264	0.0096	-0.1348	1.9419	0.1983
		-(1.30)	(0.58)	(2.17)	-(4.68)	-(0.63)	(3.74)	(1.24)	-(1.55)	(8.20)	0.9568
(5)	TLL	-0.5453	-0.4658	0.0424	-0.0081	-0.0134	0.0241	-0.0064	-0.0718	1.5653	0.2699
		-(0.53)	-(5.16)	(1.77)	-(1.05)	-(1.75)	(3.37)	-(0.79)	-(0.86)	(6.48)	0.9564
					dP/dx						
(6)	EMP	-0.0493	-0.0005	0.0020	-0.0012	-0.0002	0.0010	0.0003	-0.0048	0.0718	
(7)	TAS	-0.0509	0.0000	0.0020	-0.0013	-0.0002	0.0010	0.0004	-0.0052	0.0733	
(8)	SAL	-0.0513	0.0000	0.0019	-0.0013	-0.0002	0.0010	0.0004	-0.0053	0.0733	
(9)	TDE	-0.0499	0.0000	0.0020	-0.0013	-0.0002	0.0010	0.0004	-0.0050	0.0727	
(10)	TLL	-0.0195	-0.0167	0.0015	-0.0003	-0.0005	0.0009	-0.0002	-0.0026	0.0561	

Table 12 Estimation results multinomial logit model for number of bank relations:

Panel A: long-term loans 1982-1999 N=13888; R^2=0.2016

Estimates

	Constant	TLL	ROA	DAR	LAR	CBR	SLR	R&D	MBD
(1) 2-4	1.2865	1.0124	0.0113	0.0031	-0.0051	-0.0108	0.0065	0.0421	0.3441
	(2.20)	(19.27)	(1.24)	(1.27)	-(1.85)	-(4.69)	(2.58)	(1.72)	(4.98)
(2) 5-7	-0.6814	1.2865	0.0077	0.0175	-0.0147	-0.0188	0.0095	-0.0030	-0.5600
	-(1.04)	(24.49)	(0.84)	(6.80)	-(5.13)	-(7.61)	(3.66)	-(0.12)	-(7.66)
(3) 8-10	-1.8875	1.4007	0.0412	0.0374	-0.0270	-0.0220	0.0028	0.0198	-1.5986
	-(2.69)	(26.60)	(4.05)	(13.24)	-(8.76)	-(7.98)	(0.98)	(0.70)	-(18.61)
(4) 11-15	-5.5273	1.4809	0.0385	0.0407	-0.0208	-0.0169	0.0022	-0.0135	-2.3240
	-(5.39)	(28.09)	(3.43)	(12.96)	-(6.20)	-(5.54)	(0.67)	-(0.44)	-(21.28)
(5) 16-	-5.8936	1.5273	0.0542	0.0563	-0.0382	-0.0108	0.0098	0.0958	-3.1577
	-(6.16)	(28.93)	(3.97)	(13.17)	-(9.31)	-(2.59)	(2.32)	(2.67)	-(15.73)

dP/dx

(1) single	0.0214	-0.0874	-0.0012	-0.0011	0.0009	0.0011	-0.0005	-0.0017	0.0310	0.0986
(2) 2-4	0.4089	-0.0039	-0.0009	-0.0027	0.0015	0.0006	0.0002	0.0059	0.1883	0.2431
(3) 5-7	0.1085	0.0328	-0.0031	-0.0007	0.0001	-0.0009	0.0010	-0.0047	0.0572	0.2576
(4) 8-10	-0.0005	0.0284	0.0031	0.0022	-0.0017	-0.0011	-0.0005	0.0009	-0.0869	0.1956
(5) 11-15	-0.4073	0.0225	0.0012	0.0013	0.0000	0.0000	-0.0004	-0.0043	-0.1189	0.1424
(6) 16-	-0.1311	0.0077	0.0010	0.0011	-0.0008	0.0003	0.0002	0.0039	-0.0707	0.0628

Panel B: Long-term loans 1982-1989 N=5262; R^2=0.2343

Estimates

	Constant	TLL	ROA	DAR	LAR	CBR	SLR	R&D	MBD
(1) 2-4	-0.2896	1.2044	0.0167	0.0083	-0.0030	-0.0126	0.0090	0.0945	0.5248
	-(0.67)	(10.73)	(1.02)	(1.91)	-(0.61)	-(2.67)	(2.20)	(2.22)	(4.53)
(2) 5-7	-1.4087	1.8161	-0.0057	0.0265	-0.0097	-0.0158	0.0101	0.0518	-0.4146
	-(3.07)	(16.18)	-(0.32)	(5.72)	-(1.88)	-(3.10)	(2.37)	(1.15)	-(3.35)
(3) 8-10	-2.7287	2.0480	0.0212	0.0472	-0.0264	-0.0119	0.0110	0.0289	-1.5341
	-(5.37)	(18.15)	(1.14)	(9.15)	-(4.69)	-(2.07)	(2.32)	(0.58)	-(10.57)
(4) 11-15	-5.1120	2.1661	0.0061	0.0509	-0.0166	-0.0158	-0.0033	-0.0035	-2.2850
	-(8.11)	(19.17)	(0.29)	(8.69)	-(2.68)	-(2.34)	-(0.61)	-(0.06)	-(12.58)
(5) 16-	-5.9451	2.2336	0.0230	0.0603	-0.0440	0.0044	0.0272	0.1275	-2.2957
	-(7.44)	(19.73)	(0.84)	(7.69)	-(5.94)	(0.49)	(3.82)	(1.99)	-(8.73)

dP/dx

(1) single	0.0949	-0.1173	-0.0008	-0.0016	0.0007	0.0010	-0.0007	-0.0051	0.0152	0.1066
(2) 2-4	0.1962	-0.0289	0.0020	-0.0025	0.0012	-0.0003	0.0003	0.0091	0.1748	0.2286
(3) 5-7	0.1145	0.0527	-0.0036	-0.0004	0.0007	-0.0009	0.0005	0.0008	0.0633	0.2605
(4) 8-10	-0.0308	0.0482	0.0024	0.0023	-0.0019	0.0000	0.0005	-0.0029	-0.0937	0.2033
(5) 11-15	-0.2630	0.0339	-0.0006	0.0014	0.0004	-0.0006	-0.0016	-0.0061	-0.1253	0.1376
(6) 16-	-0.1119	0.0113	0.0006	0.0008	-0.0011	0.0008	0.0009	0.0042	-0.0343	0.0633

Table 12 (cont.) Estimated results multinomial logit model for number of bank relations:

Panel C: Long-term loans 1990-1999 N=8535; R^2=0.2085

	Estimates								
	constant	TLL	ROA	DAR	LAR	CBR	SLR	R&D	MBD
(1) 2-4	-0.0613	0.8585	0.0068	0.0001	-0.0060	-0.0103	0.0041	0.0179	0.1962
	-(0.09)	(14.50)	(0.68)	(0.03)	-(1.78)	-(3.81)	(1.29)	(0.60)	(2.24)
(2) 5-7	-0.0255	1.1379	0.0185	0.0124	-0.0170	-0.0189	0.0096	-0.0489	-0.7482
	-(0.04)	(19.20)	(1.76)	(3.92)	-(4.83)	-(6.51)	(2.90)	-(1.50)	-(8.00)
(3) 8-10	-0.0868	1.2354	0.0603	0.0327	-0.0282	-0.0252	0.0004	0.0023	-1.8300
	-(0.12)	(20.79)	(4.92)	(9.35)	-(7.42)	-(7.76)	(0.11)	(0.07)	-(16.44)
(4) 11-15	-2.9337	1.3117	0.0623	0.0331	-0.0220	-0.0165	0.0060	-0.0394	-2.6027
	-(2.80)	(22.05)	(4.56)	(8.60)	-(5.32)	-(4.69)	(1.46)	-(1.05)	-(18.23)
(5) 16-	-2.8763	1.3597	0.0684	0.0484	-0.0343	-0.0169	-0.0001	0.0374	-4.2779
	-(2.73)	(22.82)	(4.18)	(9.08)	-(6.62)	-(3.47)	-(0.02)	(0.82)	-(12.57)

	dP/dx									
(1) single	0.0188	-0.0734	-0.0015	-0.0008	0.0010	0.0011	-0.0004	0.0005	0.0403	0.0944
(2) 2-4	0.0499	-0.0080	-0.0033	-0.0025	0.0016	0.0008	-0.0001	0.0065	0.1922	0.2496
(3) 5-7	0.1182	0.0303	-0.0027	-0.0009	-0.0002	-0.0007	0.0012	-0.0091	0.0618	0.2579
(4) 8-10	0.1335	0.0241	0.0042	0.0022	-0.0017	-0.0014	-0.0008	0.0033	-0.0789	0.1913
(5) 11-15	-0.2553	0.0203	0.0025	0.0011	-0.0001	0.0002	0.0003	-0.0036	-0.1133	0.1463
(6) 16-	-0.0650	0.0066	0.0008	0.0009	-0.0005	0.0001	-0.0002	0.0025	-0.1022	0.0605

Panel D: Long-term loans 1998-1999 N=2021; R^2=0.2444

	Estimates								
	constant	TLL	ROA	DAR	LAR	CBR	SLR	R&D	MBD
(1) 2-4	-0.0221	1.0661	0.0194	-0.0077	-0.0068	-0.0062	0.0072	-0.1178	0.5265
	-(0.04)	(8.29)	(1.24)	-(1.23)	-(1.01)	-(1.01)	(1.16)	-(1.94)	(2.82)
(2) 5-7	-1.0721	1.2819	0.0430	0.0068	-0.0107	-0.0163	0.0155	-0.0753	-0.6915
	-(1.84)	(9.97)	(2.68)	(1.07)	-(1.55)	-(2.48)	(2.46)	-(1.19)	-(3.49)
(3) 8-10	-1.6318	1.3580	0.0808	0.0225	-0.0263	-0.0310	0.0038	0.0039	-1.4914
	-(2.55)	(10.54)	(4.33)	(3.27)	-(3.52)	-(4.15)	(0.54)	(0.06)	-(6.43)
(4) 11-15	-3.8632	1.4421	0.0981	0.0294	-0.0230	-0.0305	0.0077	-0.1891	-3.4556
	-(4.91)	(11.18)	(4.78)	(3.83)	-(2.77)	-(3.58)	(0.95)	-(2.29)	-(9.01)
(5) 16-	-4.0240	1.4952	0.0878	0.0410	-0.0283	-0.0163	-0.0116	-0.0796	-4.3722
	-(4.41)	(11.58)	(3.65)	(4.02)	-(2.70)	-(1.57)	-(1.03)	-(0.87)	-(6.83)

	dP/dx									
(1) single	0.0534	-0.0810	-0.0027	-0.0002	0.0008	0.0009	-0.0006	0.0062	0.0244	0.0945
(2) 2-4	0.1737	0.0072	-0.0039	-0.0027	0.0009	0.0015	-0.0002	-0.0099	0.2202	0.2415
(3) 5-7	0.0467	0.0309	-0.0016	-0.0007	0.0009	0.0002	0.0020	0.0006	0.0614	0.2712
(4) 8-10	0.0042	0.0208	0.0040	0.0015	-0.0017	-0.0020	-0.0006	0.0152	-0.0233	0.1841
(5) 11-15	-0.2113	0.0157	0.0037	0.0012	-0.0004	-0.0011	0.0003	-0.0132	-0.1878	0.1405
(6) 16-	-0.0667	0.0064	0.0005	0.0009	-0.0003	0.0004	-0.0008	0.0011	-0.0949	0.0683

Table 12 (cont) Estimated results multinomial logit model for number of bank relations:

Panel E: Short-term loans 1998-1999 N=2415; R^2=0.1781

	Estimates									
	constant	TLL	ROA	DAR	LAR	CBR	LLR	R&D	MBD	
(1) 2-4	2.2735	-0.0223	-0.0562	0.0103	0.0086	-0.0235	0.0096	0.1174	-0.5162	
	(2.92)	-(1.78)	-(2.19)	(1.25)	(1.05)	-(3.07)	(1.13)	(1.32)	-(2.06)	
(2) 5-7	2.0375	-0.0590	-0.0508	0.0475	0.0039	-0.0224	-0.0065	0.1130	-1.9129	
	(2.64)	-(4.43)	-(2.06)	(5.83)	(0.49)	-(3.00)	-(0.77)	(1.27)	-(7.73)	
(3) 8-10	1.8062	-0.0216	-0.0647	0.0630	-0.0015	-0.0277	-0.0288	0.1582	-3.1692	
	(2.28)	-(1.88)	-(2.47)	(7.44)	-(0.19)	-(3.56)	-(3.26)	(1.76)	-(11.82)	
(4) 11-15	0.7161	0.0244	-0.0680	0.0739	-0.0013	-0.0300	-0.0422	0.1838	-3.8865	
	(0.87)	(2.16)	-(2.50)	(8.36)	-(0.15)	-(3.63)	-(4.45)	(1.99)	-(12.39)	
(5) 16-	-2.2649	0.0535	-0.0416	0.1051	-0.0076	-0.0288	-0.0783	0.2652	-5.4165	
	-(2.23)	(4.40)	-(1.24)	(9.63)	-(0.73)	-(2.85)	-(6.08)	(2.78)	-(8.42)	
	dP/dx									
(1) single	-0.0689	0.0011	0.0020	-0.0014	-0.0002	0.0009	0.0003	-0.0047	0.0636	0.0418
(2) 2-4	0.0967	0.0008	-0.0007	-0.0048	0.0009	-0.0002	0.0033	-0.0008	0.2182	0.1830
(3) 5-7	0.1314	-0.0103	0.0013	-0.0001	0.0005	0.0006	0.0029	-0.0067	0.1072	0.2952
(4) 8-10	0.0942	-0.0008	-0.0018	0.0019	-0.0006	-0.0005	-0.0015	0.0025	-0.1204	0.2439
(5) 11-15	-0.0805	0.0060	-0.0017	0.0023	-0.0003	-0.0006	-0.0024	0.0044	-0.1531	0.1656
(6) 16-	-0.1728	0.0031	0.0009	0.0021	-0.0004	-0.0001	-0.0024	0.0052	-0.1155	0.0704

Table 13 Estimation results Tobit model for Herfindahl index

Panel A: Long-term loans 1982-1999

	constant	scale	ROA	DAR	LAR	CBR	SLR	R&D	MBD
(1) EMP	1.1579	0.0138	0.0062	0.0114	-0.0084	-0.0030	0.0001	0.0141	-0.6476
	(3.27)	(6.98)	(4.71)	(32.25)	-(21.73)	-(7.35)	(0.28)	(3.78)	-(56.56)
(2) TAS	1.1694	0.0004	0.0061	0.0113	-0.0084	-0.0032	0.0001	0.0133	-0.6450
	(3.31)	(7.67)	(4.68)	(31.97)	-(21.80)	-(7.87)	(0.21)	(3.57)	-(56.24)
(3) SAL	1.1648	0.0002	0.0062	0.0113	-0.0085	-0.0027	0.0001	0.0152	-0.6501
	(3.29)	(3.80)	(4.74)	(31.99)	-(21.96)	-(6.80)	(0.22)	(4.09)	-(56.66)
(4) TDE	1.1871	0.0006	0.0061	0.0110	-0.0084	-0.0032	0.0001	0.0137	-0.6450
	(3.36)	(8.03)	(4.66)	(30.83)	-(21.89)	-(7.85)	(0.16)	(3.67)	-(56.27)
(5) TLL	1.1635	0.0064	0.0061	0.0103	-0.0076	-0.0028	0.0002	0.0132	-0.6394
	(3.32)	(16.43)	(4.71)	(28.98)	-(19.76)	-(7.11)	(0.52)	(3.57)	-(56.33)

Panel B: Long-term loans 1982-1989

	constant	scale	ROA	DAR	LAR	CBR	SLR	R&D	MBD
(1) EMP	1.3506	0.0104	0.0059	0.0147	-0.0102	0.0002	0.0018	0.0207	-0.5585
	(7.02)	(2.86)	(2.37)	(22.88)	-(14.59)	(0.21)	(2.76)	(3.21)	-(29.85)
(2) TAS	1.3479	0.0002	0.0060	0.0147	-0.0103	0.0001	0.0017	0.0212	-0.5588
	(7.00)	(1.97)	(2.39)	(22.88)	-(14.74)	(0.17)	(2.66)	(3.27)	-(29.80)
(3) SAL	1.3541	-0.0001	0.0062	0.0148	-0.0103	0.0007	0.0016	0.0230	-0.5631
	(7.03)	-(1.18)	(2.47)	(23.02)	-(14.70)	(0.78)	(2.41)	(3.57)	-(30.06)
(4) TDE	1.3603	0.0003	0.0059	0.0145	-0.0103	0.0001	0.0017	0.0213	-0.5585
	(7.07)	(2.33)	(2.38)	(22.50)	-(14.76)	(0.14)	(2.64)	(3.30)	-(29.81)
(5) TLL	1.3166	0.0045	0.0059	0.0140	-0.0097	0.0000	0.0017	0.0206	-0.5562
	(6.88)	(7.26)	(2.36)	(21.69)	-(13.88)	-(0.04)	(2.66)	(3.22)	-(29.89)

Panel C: Long-term loans 1990-1999

	constant	scale	ROA	DAR	LAR	CBR	SLR	R&D	MBD
(1) EMP	1.2275	0.0150	0.0068	0.0098	-0.0077	-0.0037	-0.0006	0.0120	-0.7010
	(3.50)	(6.47)	(4.40)	(23.12)	-(16.78)	-(8.09)	-(1.24)	(2.65)	-(48.74)
(2) TAS	1.2353	0.0004	0.0067	0.0097	-0.0077	-0.0040	-0.0006	0.0108	-0.6970
	(3.53)	(7.67)	(4.37)	(22.77)	-(16.75)	-(8.63)	-(1.27)	(2.37)	-(48.40)
(3) SAL	1.2318	0.0003	0.0067	0.0096	-0.0078	-0.0036	-0.0005	0.0125	-0.7016
	(3.51)	(5.56)	(4.32)	(22.64)	-(16.97)	-(7.81)	-(1.08)	(2.75)	-(48.72)
(4) TDE	1.2583	0.0007	0.0067	0.0093	-0.0077	-0.0040	-0.0007	0.0111	-0.6968
	(3.60)	(8.08)	(4.35)	(21.66)	-(16.87)	-(8.64)	-(1.32)	(2.45)	-(48.42)
(5) TLL	1.2511	0.0076	0.0067	0.0085	-0.0068	-0.0034	-0.0004	0.0105	-0.6875
	(3.61)	(15.20)	(4.43)	(19.81)	-(14.88)	-(7.60)	-(0.81)	(2.35)	-(48.30)

Table 13 (cont.) Estimation results Tobit model for Herfindahl index

Panel D: Long-term loans 1998-1999

	constant	scale	ROA	DAR	LAR	CBR	SLR	R&D	MBD
(1) EMP	1.3019	0.0183	0.0123	0.0094	-0.0073	-0.0042	-0.0019	-0.0045	-0.6781
	(3.71)	(4.23)	(5.11)	(11.51)	-(8.40)	-(4.22)	-(2.05)	-(0.50)	-(23.12)
(2) TAS	1.3013	0.0005	0.0121	0.0091	-0.0071	-0.0046	-0.0018	-0.0062	-0.6745
	(3.72)	(5.37)	(5.02)	(11.17)	-(8.15)	-(4.61)	-(1.91)	-(0.68)	-(23.05)
(3) SAL	1.2988	0.0004	0.0118	0.0090	-0.0073	-0.0042	-0.0016	-0.0046	-0.6761
	(3.72)	(5.65)	(4.92)	(11.10)	-(8.41)	-(4.25)	-(1.73)	-(0.50)	-(23.16)
(4) TDE	1.3294	0.0008	0.0119	0.0087	-0.0072	-0.0046	-0.0019	-0.0053	-0.6748
	(3.80)	(5.38)	(4.96)	(10.52)	-(8.21)	-(4.60)	-(2.00)	-(0.59)	-(23.07)
(5) TLL	1.3116	0.0042	0.0117	0.0083	-0.0066	-0.0037	-0.0017	-0.0043	-0.6715
	(3.76)	(6.38)	(4.86)	(10.02)	-(7.50)	-(3.77)	-(1.81)	-(0.48)	-(23.02)

Panel E: Short-term loans 1998-1999

	constant	scale	ROA	DAR	LAR	CBR	LLR	R&D	MBD
(1) EMP	1.2793	0.0156	-0.0015	0.0064	-0.0005	-0.0017	-0.0035	0.0039	-0.7674
	(5.88)	(5.55)	-(0.80)	(11.87)	-(0.83)	-(2.59)	-(5.25)	(0.84)	-(39.49)
(2) TAS	1.2794	0.0003	-0.0016	0.0061	-0.0003	-0.0020	-0.0035	0.0017	-0.7594
	(5.93)	(8.28)	-(0.86)	(11.27)	-(0.52)	-(3.16)	-(5.29)	(0.36)	-(39.33)
(3) SAL	1.2679	0.0003	-0.0017	0.0062	-0.0005	-0.0016	-0.0034	0.0034	-0.7659
	(5.83)	(5.81)	-(0.91)	(11.48)	-(0.77)	-(2.47)	-(5.17)	(0.73)	-(39.42)
(4) TDE	1.2969	0.0004	-0.0014	0.0058	-0.0004	-0.0019	-0.0036	0.0030	-0.7610
	(6.02)	(8.42)	-(0.80)	(10.74)	-(0.60)	-(2.99)	-(5.41)	(0.66)	-(39.47)
(5) TLL	1.2664	0.0053	-0.0004	0.0048	-0.0001	-0.0015	-0.0031	0.0022	-0.7543
	(5.97)	(12.28)	-(0.24)	(8.72)	-(0.20)	-(2.34)	-(4.79)	(0.48)	-(39.76)

Appendix A - Additional Descriptive Tables

A.1 Number of sample firms by SNA industry classification and year

A.2 Number of sample firms by debt financing pattern

A.3 Selected financial indicators by year

A.4 Selected financial indicators by industry

A.5 Stock ownership structure by year

Appendix A

Table A1. Number of sample firms by SNA industry classification and year

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	total
(1) Agriculture, forestry and fishery												1	1	1	1	1	2	3	10
(2) Mining	1	2	1	2	2	3	1	2	4	4	5	5	5	4	4	4	3	3	55
(3) Manufacturing	576	595	626	657	672	678	703	736	761	785	783	782	792	834	846	893	967	958	13644
1 Food and beverages	52	56	52	53	55	62	61	66	66	70	70	69	68	75	77	79	83	82	1196
2 Textiles	23	25	35	42	41	45	42	44	45	50	52	54	53	55	58	52	56	56	828
3 Pulp, paper and paper products	11	13	12	14	15	16	15	18	19	21	20	17	16	15	16	17	22	22	299
4 Chemicals	66	67	69	78	83	78	85	86	98	92	91	96	94	97	96	106	123	120	1625
5 Petroleum and coal products	2	3	2	2	2	1	1	3	1	1		1	2	4	2	3	9	6	45
6 Non-metallic mineral products	33	30	34	35	35	32	35	37	39	40	39	38	40	43	43	44	45	47	689
7 Basic metal	41	38	38	42	44	39	41	52	48	49	49	47	52	55	51	56	58	60	860
8 Fabricated metal products	39	38	44	44	49	44	42	47	50	46	47	47	46	48	55	63	65	65	879
9 Machinery	97	99	96	105	105	116	114	118	127	131	132	137	143	149	144	147	157	153	2270
10 Elec. Machinery	85	89	95	97	98	96	102	110	107	116	115	109	112	113	110	114	123	128	1919
11 Transport equipment	63	65	72	69	74	73	77	74	73	76	71	72	64	71	76	82	90	84	1326
12 Precision instrument	18	22	21	23	20	22	23	22	23	22	24	26	27	27	30	29	28	28	435
13 Others	46	50	56	53	51	54	65	59	65	71	73	69	75	82	88	101	108	107	1273
(4) Construction	67	71	80	76	80	85	72	88	93	95	88	89	86	93	105	107	76	82	1533
(5) Electricity, gas and water supply	6	4	4	3	4	4	3	4	5	4	5	6	4	5	6	4	7	8	86
(6) Wholesale and retail trade	55	82	97	109	125	138	151	167	180	192	191	199	200	226	240	260	308	303	3223
(8) Real estate	8	8	7	7	8	7	6	10	13	11	12	11	10	11	14	17	19	20	199
(9) Trans. and communication	46	43	41	46	45	47	48	47	56	52	48	50	49	52	56	54	63	63	906
(10) Services	20	35	34	35	35	43	46	49	55	60	59	65	70	76	84	95	109	114	1084
total	779	840	890	935	971	1005	1030	1103	1167	1203	1191	1208	1217	1302	1356	1435	1554	1554	20740

Table A2 Number of sample firms by debt financing pattern

	T	S	L	B	M	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	total
(5)					❍				1	2	2	1		2	1						1	1		11
(9)	❍				❍	88	95	104	98	94	92	88	91	87	83	88	92	97	113	130	143	178	197	1958
(12)		❍			❍							1					1	1	1	1	1	1	1	8
(14)			●		❍	**1**	**1**	**1**	**1**	**2**	**2**	**2**	**2**	**1**	**1**	**2**	**2**	**1**	**2**	**1**	**1**			**23**
(15)				❍	❍							1												1
(18)	❍	❍			❍	43	61	68	67	64	87	76	73	59	58	61	63	67	75	83	111	118	123	1357
(20)	❍		●		❍	**34**	**32**	**27**	**21**	**16**	**14**	**15**	**13**	**25**	**31**	**23**	**21**	**21**	**19**	**28**	**35**	**45**	**55**	**475**
(21)	❍			❍	❍	14	27	36	54	68	75	112	128	145	150	150	151	158	165	160	150	137	105	1985
(23)		❍	●		❍	**3**	**5**	**3**	**4**	**2**	**4**	**4**	**3**	**4**	**4**	**3**	**1**	**3**	**4**	**7**	**6**	**6**	**6**	**72**
(24)		❍		❍	❍				1	1	2	2	4	3	3	2	1							19
(26)		❍	●	❍	❍	**3**	**3**	**2**	**3**	**4**	**4**	**2**	**4**	**6**	**4**	**3**	**3**	**1**	**3**	**2**	**6**	**4**	**4**	**61**
(27)	❍		●	❍	❍	**22**	**22**	**23**	**21**	**22**	**22**	**30**	**38**	**46**	**44**	**52**	**51**	**61**	**66**	**57**	**58**	**55**	**58**	**748**
(28)	❍	❍		❍	❍	13	17	27	37	54	57	74	95	110	109	108	96	93	92	105	96	81	82	1346
(29)	❍	❍	●		❍	**407**	**439**	**445**	**449**	**442**	**399**	**378**	**356**	**318**	**318**	**274**	**283**	**282**	**327**	**364**	**414**	**486**	**506**	**6887**
(31)	❍	❍	●	❍	❍	**151**	**138**	**154**	**178**	**200**	**245**	**244**	**296**	**361**	**397**	**425**	**443**	**432**	**435**	**418**	**413**	**442**	**417**	**5789**
total						779	840	890	935	971	1005	1030	1103	1167	1203	1191	1208	1217	1302	1356	1435	1554	1554	20740
# of firms with long term loan						621	640	655	677	688	690	675	712	761	799	782	804	801	856	877	933	1038	1046	14055
firms using trade debt(%)						99.1	98.9	99.3	98.9	98.9	98.6	98.7	98.8	98.6	98.9	99.2	99.3	99.5	99.2	99.2	99.0	99.2	99.3	99.1
firms with short-term loan(%)						79.6	78.9	78.5	79.0	79.0	79.4	75.8	75.3	73.8	74.2	73.6	73.8	72.2	72.0	72.3	73.0	73.2	73.3	74.9
firms with long-term loan(%)						79.7	76.2	73.6	72.4	70.9	68.7	65.5	64.6	65.2	66.4	65.7	66.6	65.8	65.7	64.7	65.0	66.8	67.3	67.8
firms with corporate bond(%)						26.1	24.6	27.2	31.4	35.9	40.3	45.1	51.2	57.5	58.8	62.1	61.7	61.2	58.4	54.7	50.4	46.3	42.9	48.0
firms with misc. debt(%)						100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table A3. Selected financial indicators by year

(mean)	(1) ROA	(2) STP	(3) TBQ	(4) DAR	(5) IRR	(6) LAR	(7) LLR	(8) ICR	(9) GIR	(10) LND
1982	2.55	462	1.26	69.91	9.25	66.47	15.67	5.41	48.76	5.07
1983	1.89	482	1.29	69.48	8.11	64.93	15.76	4.28	42.95	5.60
1984	2.11	677	1.44	69.78	7.47	65.75	14.48	4.43	41.69	5.50
1985	2.30	773	1.54	69.66	7.43	65.41	13.40	4.62	46.16	5.69
1986	1.85	863	1.64	69.06	6.97	64.11	13.21	4.39	42.54	5.82
1987	1.83	1.014	1.82	68.84	5.83	63.68	13.18	4.90	40.92	6.08
1988	2.29	1.264	1.96	68.02	5.43	63.23	12.97	6.97	42.00	6.19
1989	2.89	1.446	2.08	67.28	6.33	63.52	11.88	6.77	48.25	6.26
1990	2.72	1.821	2.33	63.96	7.12	62.76	11.98	6.35	52.73	6.42
1991	2.30	1.599	1.99	63.87	8.95	60.97	12.92	5.79	55.07	6.59
1992	1.76	1.189	1.65	62.67	7.52	58.19	14.33	6.31	51.60	7.36
1993	0.72	824	1.34	62.13	5.79	56.19	15.95	5.95	39.11	8.03
1994	0.50	1.019	1.47	60.77	4.57	55.29	16.37	5.40	29.32	8.42
1995	0.68	1.003	1.44	60.62	4.03	55.65	15.69	7.21	27.00	8.74
1996	0.81	918	1.37	60.81	3.02	55.66	15.45	9.06	27.69	9.06
1997	0.96	1.268	1.38	60.13	2.51	55.20	15.10	12.58	31.77	9.50
1998	0.69	1.336	1.62	59.67	2.38	52.10	17.61	12.06	32.05	10.52
1999	-0.43	1.284	1.12	59.78	2.18	51.39	19.63	11.82	26.42	10.99
total	1.46	1.095	1.58	64.23	5.54	59.29	14.96	7.28	39.41	7.60
(median)										
1982	2.15	302	1.17	71.47	7.84	68.60	11.51	3.04	42.03	3.76
1983	1.98	287	1.16	70.90	7.50	67.31	10.79	2.89	34.98	4.05
1984	1.93	371	1.26	71.31	7.03	68.76	9.59	2.84	34.66	4.06
1985	2.00	435	1.35	70.61	6.72	68.49	8.76	2.98	38.33	4.13
1986	1.71	538	1.48	69.97	6.38	67.03	8.70	2.78	36.43	4.26
1987	1.74	652	1.59	69.59	5.25	66.27	8.79	3.19	33.15	4.28
1988	2.19	838	1.71	69.49	4.57	65.26	8.66	4.10	34.29	4.69
1989	2.45	1.013	1.88	68.29	4.67	65.81	7.71	4.52	42.69	4.71
1990	2.32	1.310	2.07	65.46	5.68	65.33	8.18	4.08	47.87	4.69
1991	2.15	1.110	1.78	64.76	7.83	61.69	9.07	3.37	47.99	4.84
1992	1.68	890	1.52	63.50	7.29	58.87	10.13	3.14	43.32	5.54
1993	1.00	595	1.26	63.39	5.48	56.75	12.23	2.80	29.05	6.19
1994	0.90	695	1.37	61.51	4.33	56.09	12.41	2.77	20.52	6.49
1995	1.05	708	1.34	61.34	3.72	57.16	11.56	3.25	20.25	6.67
1996	1.19	660	1.27	60.71	2.71	56.85	10.79	4.06	21.34	7.04
1997	1.28	663	1.27	59.88	2.11	56.93	10.18	5.36	24.52	7.56
1998	1.02	439	1.07	59.67	2.00	53.29	13.35	4.97	25.59	8.40
1999	0.71	357	1.00	58.76	1.96	52.99	16.19	4.18	20.53	8.74
total	1.55	655	1.37	65.09	4.90	61.29	10.58	3.47	31.16	5.59

Table A4. Selected financial indicators by industry

(mean)	(1) ROA	(2) STP	(3) TBQ	(4) DAR	(5) IRR	(6) LAR	(7) LLR	(8) ICR	(9) GIR	(10) LND
(1) Agriculture, forestry and fishery	4.92	2.195	1.93	54.43	2.28	51.22	23.66	16.13	45.37	12.66
(2) Mining	2.52	776	1.84	47.08	4.96	56.69	20.35	12.25	32.60	6.55
(3) Manufacturing	1.38	898	1.61	63.38	5.80	61.48	14.05	6.69	40.87	6.26
1 Food and beverages	2.15	1.003	1.61	59.08	6.58	53.56	14.65	11.06	38.03	9.18
2 Textiles	0.25	565	1.58	70.75	5.61	59.88	17.22	3.83	37.38	6.21
3 Pulp, paper and paper products	0.95	689	1.36	67.22	5.55	52.82	22.64	4.72	35.97	7.65
4 Chemicals	1.89	881	1.66	60.72	7.03	58.71	14.55	8.43	42.53	6.78
5 Petroleum and coal products	0.98	601	1.41	79.23	5.65	60.87	21.71	2.59	35.84	7.94
6 Non-metallic mineral products	1.54	859	1.54	64.80	5.41	61.53	16.73	5.70	45.37	6.63
7 Basic metal	0.97	631	1.51	66.23	5.63	59.18	15.82	3.96	41.01	5.63
8 Fabricated metal products	1.81	739	1.40	67.10	4.86	62.75	11.74	6.65	38.90	8.28
9 Machinery	1.26	813	1.88	61.26	5.35	68.18	12.91	7.59	37.09	5.22
10 Electrical machinery	0.93	1.339	1.67	61.56	6.16	66.92	12.04	6.22	45.68	4.06
11 Transport equipment	1.54	734	1.39	66.63	5.90	56.78	13.08	5.65	43.07	5.18
12 Precision instrument	0.79	812	1.64	63.17	5.65	68.29	13.37	1.56	38.54	4.29
13 Others	1.79	1.245	1.55	60.19	5.22	59.67	12.29	8.43	42.30	8.13
(4) Construction	1.56	971	1.33	76.72	3.57	79.45	6.61	8.59	37.47	5.74
(5) Electricity, gas and water	3.08	551	1.24	69.02	5.45	16.95	40.58	6.53	41.39	9.94
(6) Wholesale and retail trade	1.50	1.259	1.44	63.46	5.57	56.19	13.65	7.42	38.58	10.15
(8) Real estate	1.71	1.164	1.54	68.18	4.40	46.27	27.38	7.31	32.71	19.50
(9) Trans. and communication	1.56	1.255	1.64	68.24	5.38	36.49	30.52	7.13	32.15	13.67
(10) Services	2.09	3.941	2.10	54.61	4.75	39.19	20.92	14.36	32.25	13.72
total	1.46	1.095	1.58	64.23	5.54	59.29	14.96	7.28	39.41	7.60
non manufacturing	1.65	1.512	1.54	66.03	4.96	54.66	16.88	8.53	36.30	10.45
(median)										
(1) Agriculture, forestry and fishery	6.86	2.720	2.14	43.74	2.37	38.97	27.23	19.77	37.76	17.37
(2) Mining	2.60	708	1.78	42.17	4.41	56.25	19.03	7.10	28.88	4.26
(3) Manufacturing	1.56	606	1.39	63.97	5.12	62.21	10.63	3.35	33.30	5.03
1 Food and beverages	2.01	673	1.45	59.48	5.57	53.58	10.03	4.50	29.40	6.75
2 Textiles	0.80	418	1.36	72.21	5.18	59.05	15.50	1.99	26.61	4.47
3 Pulp, paper and paper products	1.40	575	1.28	71.87	5.26	54.24	21.04	2.74	27.46	6.80
4 Chemicals	1.82	681	1.45	59.95	5.28	58.71	10.12	4.07	37.00	5.91
5 Petroleum and coal products	0.62	419	1.32	82.25	4.31	66.75	20.50	2.18	27.80	4.56
6 Non-metallic mineral products	1.41	573	1.39	66.36	5.23	62.09	14.60	2.91	34.46	5.10
7 Basic metal	1.17	519	1.37	67.89	5.29	60.11	13.59	2.68	32.43	4.85
8 Fabricated metal products	1.68	538	1.25	68.53	4.24	63.62	8.45	3.78	30.48	7.46
9 Machinery	1.52	576	1.43	62.09	4.71	69.36	8.76	3.20	28.72	4.15
10 Electrical machinery	1.64	770	1.53	61.61	5.34	69.13	8.42	3.43	38.08	2.84
11 Transport equipment	1.52	569	1.26	66.81	5.32	56.13	10.74	3.38	38.75	4.86
12 Precision instrument	1.50	655	1.49	59.81	5.28	69.10	11.80	3.55	31.31	3.48
13 Others	1.89	715	1.37	58.76	4.91	60.93	9.26	4.35	34.56	6.77
(4) Construction	1.25	734	1.23	80.23	3.09	81.41	4.55	4.06	27.85	4.51
(5) Electricity, gas and water	2.24	417	1.18	75.45	5.23	15.60	39.49	3.74	38.98	9.93
(6) Wholesale and retail trade	1.51	906	1.26	63.85	4.75	57.93	8.71	3.69	26.92	7.76
(8) Real estate	1.73	750	1.27	71.54	4.07	40.81	23.79	3.72	15.30	19.56
(9) Trans. and communication	1.55	596	1.42	70.79	5.45	34.04	27.43	2.89	26.28	12.36
(10) Services	2.03	1.155	1.64	56.75	4.33	38.58	19.58	4.49	20.63	11.70
total	1.55	655	1.37	65.09	4.90	61.29	10.58	3.47	31.16	5.59
non manufacturing	1.54	802	1.31	67.85	4.36	55.70	10.47	3.73	26.78	7.65

Table A5. Stock ownership structure by year (%)

	(1) Govern-ment	(2) financial insti-tution	(3) Security company	(4) Non-financial firms	(5) foreign company	(6) Indi-vidual	(7) total	(8) top1 equity holders' share	(9) top3 equity holders' share	(10) top10 equity holders' share
1982	0.15	24.52	1.07	31.57	3.33	39.35	100	19.78	32.21	49.77
1983	0.13	24.53	1.16	32.78	3.37	38.04	100	20.07	32.43	49.94
1984	0.12	25.07	1.51	32.55	3.78	36.97	100	19.78	32.11	49.74
1985	0.11	25.23	1.86	33.03	3.71	36.07	100	19.63	32.00	49.81
1986	0.09	26.01	2.17	33.60	3.39	34.74	100	19.65	32.34	50.58
1987	0.08	26.60	2.29	34.37	2.77	33.90	100	20.00	32.51	50.81
1988	0.10	26.45	2.67	35.28	2.64	32.86	100	20.52	33.16	51.37
1989	0.07	27.84	2.56	34.96	2.62	31.95	100	19.83	32.13	50.68
1990	0.07	29.32	2.17	35.49	2.84	30.11	100	19.94	32.02	50.77
1991	0.06	30.02	1.76	35.53	2.69	29.94	100	19.83	31.95	50.95
1992	0.10	29.96	1.64	35.48	2.94	29.89	100	19.63	31.38	50.16
1993	0.09	29.59	1.21	35.31	2.85	30.95	100	19.73	31.53	50.12
1994	0.07	29.19	1.28	34.60	3.58	31.28	100	19.91	31.69	50.13
1995	0.07	29.03	1.25	33.89	4.01	31.75	100	19.85	31.76	50.08
1996	0.05	27.83	1.81	34.02	4.08	32.21	100	19.96	31.91	50.16
1997	0.05	27.11	1.30	33.51	4.15	33.88	100	20.06	32.12	50.23
1998	0.08	26.01	0.89	33.14	4.05	35.85	100	20.16	32.28	50.23
1999	0.08	25.14	0.79	32.87	3.70	37.43	100	20.15	32.21	49.99
total	0.08	27.26	1.59	34.00	3.40	33.67	100	19.93	32.08	50.30

Appendix B Yearly details on the number of bank relations

Table B1 Number of bank relations with respect to long-term loans by year

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	total
0	158	200	235	258	283	315	355	391	406	404	409	404	416	446	479	502	516	508	6685
1	49	59	59	66	70	82	86	90	96	93	69	62	69	65	69	94	103	89	1370
2	48	39	50	50	41	48	55	54	73	72	65	68	65	68	82	95	76	85	1134
3	41	51	54	49	54	47	37	60	57	65	60	67	55	67	60	79	89	75	1067
4	53	50	50	59	60	54	57	58	57	54	67	72	69	78	78	86	89	84	1175
5	50	61	63	60	76	65	71	78	70	76	72	66	70	75	75	84	97	95	1304
6	59	59	53	56	59	65	58	55	51	60	66	60	77	82	83	83	96	98	1220
7	53	56	43	44	53	49	55	51	68	66	66	61	60	65	72	69	79	93	1103
8	59	50	53	58	49	52	57	53	55	60	49	57	55	61	70	67	66	67	1038
9	26	40	57	56	58	53	43	59	63	59	66	61	52	53	57	58	68	72	1001
10	32	36	38	30	31	35	26	34	35	40	41	47	33	43	43	43	53	56	696
11	22	29	30	35	23	22	20	21	22	30	35	36	47	43	44	45	40	44	588
12	27	24	23	24	23	28	26	24	27	24	28	31	30	36	30	26	44	50	525
13	20	17	9	15	17	23	22	21	18	19	16	19	23	23	27	27	23	20	359
14	18	8	15	18	13	15	11	10	14	18	23	22	26	23	19	16	21	23	313
15	17	12	10	14	13	8	9	9	13	12	9	18	16	18	14	12	10	20	234
16	14	13	12	14	13	12	11	8	8	10	18	17	19	20	16	11	23	16	255
17	9	7	11	3	7	9	11	8	13	10	8	10	8	5	8	11	15	11	164
18	6	8	2	3	5	7	6	3	6	5	6	8	4	7	5	10	9	10	110
19	3	5	9	10	6	3	2	4	2	5	5	7	5	9	10	5	9	11	110
20	1	2	1	1	2	2	2	2	2	6	4	1	5	2	1	4	7	8	53
21	4	4	3	1	4	2	1		2	2	1	5	5	3	4	3	4	4	52
22	2	2	3	3	3	4	3	2	1	5	2	4	1	1	1		4	3	44
23		2	2	3		1	2	2	4	2	2		3	5	5	3	5	3	44
24		2	1		3	1	2			2	2			1	1		3	4	22
25	1	1	1					2	1		1				1		2		10
26			3	2		1	1	1	1			1			2	1		1	14
27				1	2	1		1				1	1	1					8
28					1			1					1						3
29	1			1						1		1				1			5
30								1										1	2
31		2							1	1							1		5
32	1													1				1	3
34					1							1							2
35	2									1									3
36		1		1							1	1	1						5
37					1	1							1	1					4
39							1										1	1	3
40	1																		1
44																		1	1
45																	1		1
46									1										1
52	1									1									2
55	1																		1
total	779	840	890	935	971	1005	1030	1103	1167	1203	1191	1208	1217	1302	1356	1435	1554	1554	20740

Table B2. Number of bank relations
with respect to short-term loans by year

	1998	1999	total
0	**481**	**476**	**957**
1	**47**	**54**	**101**
2	47	49	96
3	77	71	148
4	98	100	198
5	105	120	225
6	114	126	240
7	126	122	248
8	127	112	239
9	91	106	197
10	78	75	153
11	59	65	124
12	59	47	106
13	38	43	81
14	31	21	52
15	16	21	37
16	15	7	22
17	13	19	32
18	10	8	18
19	7	7	14
20	9	9	18
21	8	2	10
22	6	5	11
23	2	4	6
24	2	3	5
25	1	2	3
26	3	1	4
27	1	3	4
28	1	4	5
29	2	1	3
30	1		1
31	2	1	3
32	1	1	2
33	4		4
34	1		1
39		1	1
40	1		1
41		1	1
42	1		1
total	1685	1687	3372

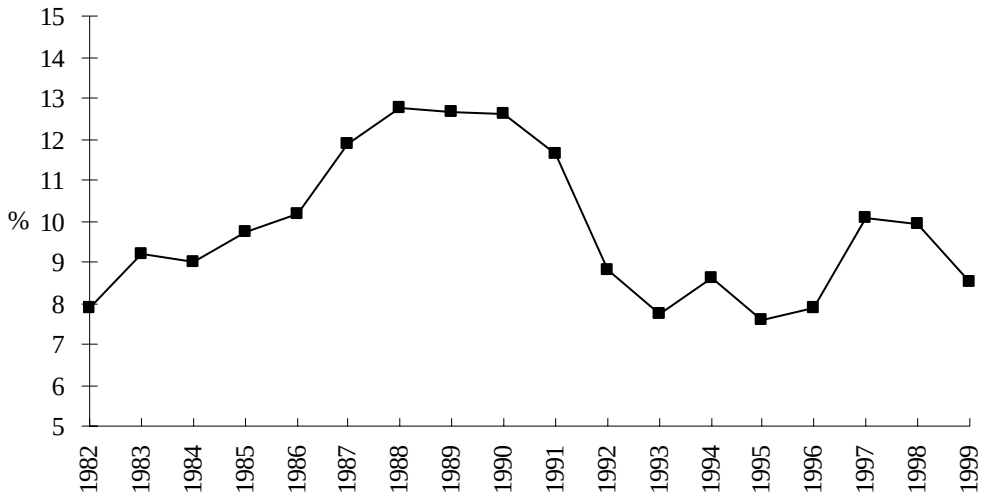

Figure 1. Percentage of firms with a single long-term loan relation

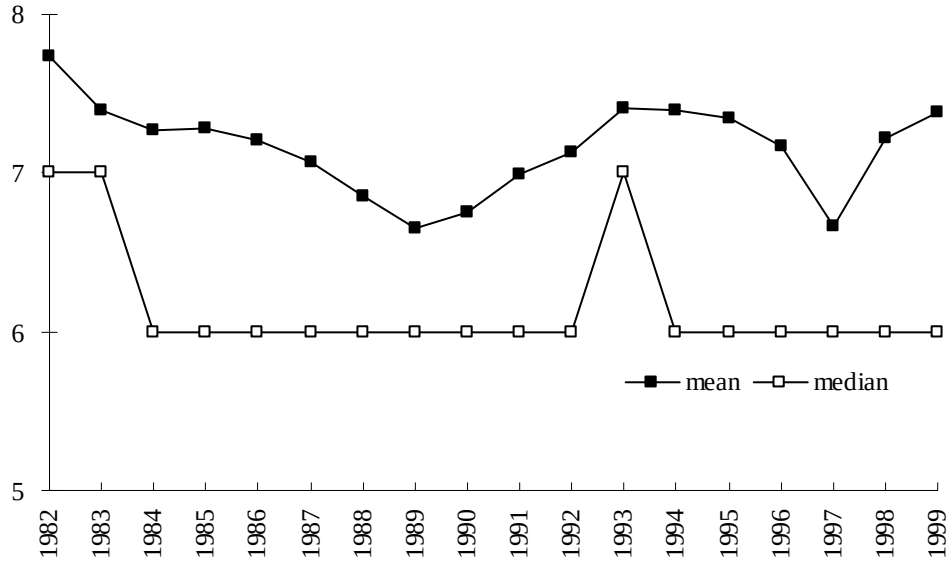

Figure 2. Number of bank relations with respect to long-term loan

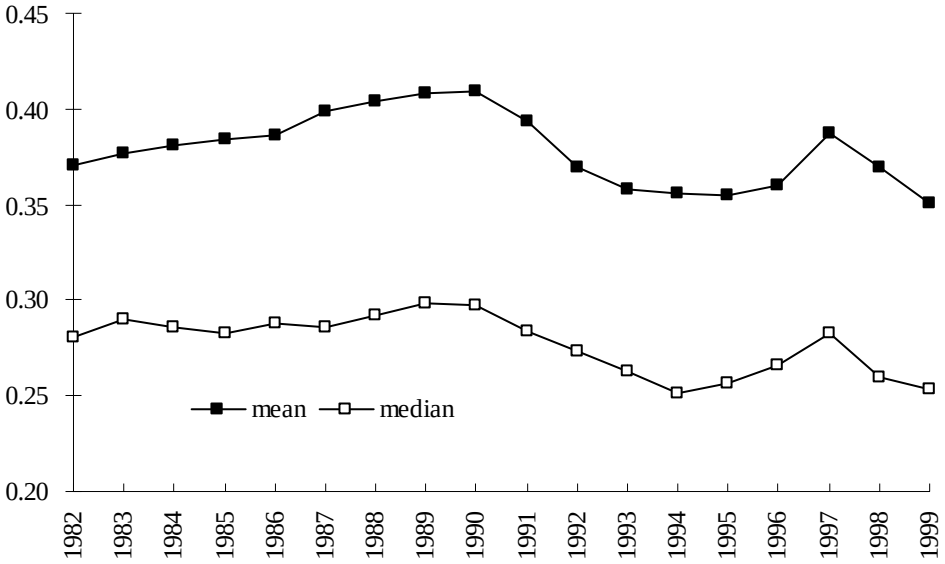

Figure3. Herfindahl index for long-term loans