FALL OF "ORGAN BANK" RELATIONSHIP OVER BANK FAILURE AND CONSOLIDATION WAVE: EXPERIENCE IN PRE-WAR JAPAN*

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Abstract

This paper examines how the close ties between banks and non-bank firms – so called "organ bank" relationship in Japanese banking literature – declined through bank failures and banking consolidations in pre-war Japan. With a unique dataset compiled for 1,007 Japanese banks from 1926 to 1936, we measure the degree of "organ bank" relationship by the number of persons who worked as directors or auditors for a bank and a non-bank firm at the same time. We observe that this number of "director interlocking" declined along our sample period, when there were lots of bank failure, bank merger and acquisition events. Our findings suggest that banking consolidation and selection thorough failures may help to eliminate the detrimental connections between banks and non-bank firms, based on Japan's experience.

Keywords: bank, relationship lending, Japan, failure, M&A, banking consolidation

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1. Introduction

The financial system in pre-war Japan has long been characterized by the fact that a number of banks had close relationship with non-banking companies. Those banks are called "organ banks," the original meaning of which is banks as a tool for related non-banking companies. Organ banks played an important role in raising fund for the related industrial firms. However, the literature have stressed that loans of organ banks to the related group tended to be applied to unsound projects, and as a result, they frequently defaulted, which in turn damaged the bank performance.[1]

Meanwhile, during the 1920s and 1930s, Japanese banking sector experienced a significant structural change through a wave of bank failures, merger and acquisitions. The total number of private banks declined from 2,334 in 1901, its peak year, to 65 by the year of 1945. The most rapid decline happened in the period from 1920 to 1932, while the government policies promoted banking consolidations under the sequence of financial crises. Then, what happened to the organ bank relationship during the period of banking consolidation in pre-war Japan? According to our data, the connections between banks and non-banking companies faded as a result of banking consolidation, both in terms of the quantity of connections and the negative effect of this connection on bank performance. In other words, we observe a fall of "organ bank" relationship along the banking consolidation wave.

This observation comes from a dataset we compiled for 1,007 Japanese banks from year 1926 to 1936, consisting of their major accounting variables, such as total assets, total deposits, security holdings, return on equity, etc., duration information such as the time of failure, merger or acquisition events, as well as information on their personnel ties with non-banking companies. As for the information on personnel ties, we measure the degree of connections of banks with non-banking companies with the number of "director interlocks", defined as the number of the cases where a director or auditor of a bank was a director or auditor of its related non-banking company at the same time. Our empirical analysis shows that number of director interlocks was reduced by banking consolidation. In particular, with respect to small banks, number of interlocks per

[1] See Kato (1957), Takahashi and Morigaki (1968), Ishi (1999), Imuta (2000), and Okazaki, Sawada and Yokoyama (2005), for example.

bank as well as per director declined over our sample period. Number of interlocks declined faster for the banks which experienced consolidations.

Furthermore, in addition to the decline in the number of interlocks, the quality of interlocks changed. It is confirmed that the negative effect of interlocks on banks' profitability, measured by returns on equity, diminished over our sample period, and that this change was observed only in the banks that experienced consolidations. Our empirical study using the pre-war Japanese banking data addresses the question about the impact of banking consolidation on bank-firm relationship. There is already a vast literature on the impact of banking consolidation, but our study distinguishes from the others with a new focus on how the personal ties between banks and non-bank firms changed over the consolidations. The studies closest to ours might be the analysis of the impact of banking consolidation on the supply of credit to small business borrowers, represented by Berger et al. (1998). The empirical studies on small business lending in the United States generally explore the loan-level data and investigate how the banking consolidation changes the allocation of loan portfolio. For the pre-war Japanese banks, we could not find loan-level data, but we have the advantage to get the data on personal connections of directors of banks and non-banking firms and there was more dramatic change in the bank-firm relationship within our sample period. So, although our study also examines the bank-firm relationship, we focus on how this relationship affect the performance of banks through the governance structure determined by this relationship.

It is recently discovered in the banking literature that it is the organizational and governance structure, instead of bank size, that matters for small business lending (Takats, 2004; Peek and Rosengren, 1998). These findings suggest that the change in the organizational and governance structure of banks brought by bank consolidation may be more important than the change in bank size as a consequence of bank consolidation. The historical data we used in this paper has a unique feature in providing us the information about how banks' boards of directors were organized in terms of their relationship with industrial companies, before and after consolidation.[2] To our knowledge, this is the first empirical study on the impact of banking consolidation on the bank-firm relationship through the channel of governance structure of banks.

Another strand of the literature that our work is related to is the literature on relationship banking, or sometimes more narrowly defined as, "related lending". As summarized in LaPorta, Lopetz-Salianes and Zamaripa (2003), there are advantages and disadvantages of relationship banking (i.e. close ties between banks and firms). The "information view" focuses on its advantages in overcoming asymmetric information problem between banks and business borrowers, especially in the early stage of economic development. Lamoreaux (1994), Aoki and Patrick (1994), Petersen and Rajan (1994), and Hoshi and Kashyap (2001) provide empirical evidences supporting this view. The "looting view", on the other hand, stresses that related lending may result in unsound loans to related firms and encourages interest groups to loot the resource of banks into their related borrowers in case of defaults. LaPorta et al. (2003) showed an example of "looting" through related lending with loan data of Mexican banks during their financial distress of 1990s. Also, Okazaki, Sawada and Yokoyama (2005) confirmed that the director interlocks was harmful to banks' profitability and increased the probability of bank runs and closures, using the interlocking data of the Japanese banks in 1926.

Related to these prior works, in particular to Okazaki et al (2005), here, we explore how this negative side of relationship banking changed over time in pre-war Japan. Interestingly, these negative effects diminished along with banking consolidation.[3] The rest of paper is organized as follows. Section 2 explains data. Sections 3 to 5 describe our empirical analysis on the impact of banking consolidation on the organ bank relationship. Section 3 focuses on the quantitative decline of organ bank relationship accompanying bank failures and consolidations; section 4 focuses on the effect of bank-firm relationship on bank performance and its change over time; while section 5 provides a comparison between a sub-sample of consolidated banks and non-consolidated banks on both the quantity change and the quality change of their connections with non-banking firms. Conclusions and discussions are summarized in Section 6.

2. Overview of the Organ Bank Relationship and Banking Consolidations

2.1. Data

We focus on the interlocking of directors and auditors between banks and non-banking companies to measure the connection between them, following Okazaki et al. (2005). The data source of director interlocking is *Ginko Kaisha Yoroku* (*Directory of the Banks and Firms*) by Tokyo Koshinjo, one of the

[2] The director interlocking data in year 1926 has been compiled and first explored in Okazaki, Sawada and Yokoyama (2005). Interlocking data used in this paper extended the old data set by including the number of interlocks in year 1931 and year 1936.

[3] Other studies that document the negative effect of organ bank relationship in pre-war Japan include Kato (1957), Takashi and Morigaki (1968), Teranishi (2000), Yamazaki (2000), and Okazaki et al. (2004), but they did not address the change of this effect along banking consolidation.

largest private credit bureaus.[4] From this source we can have the names of the directors and auditors of each bank and non-banking firm whose paid-in capital was larger than two hundred thousand yen.

As in Okazaki et al (2005), if a person who was a director of a certain bank, was at the same time a director of a non-banking firm, we identify that there was one interlock. If a person who was a director of a certain bank, was at the same time directors of two non-banking firms, we identify that there were two interlocks. Since we are interested in how the organ bank relationship was affected by the structural change in the late 1920s and the early 1930s, we compile the interlocking data of 1926, 1931 and 1936.

The financial data of each bank is obtained from *Ginkokyoku Nenpo* (*Year Book of the Bank Bureau of the Ministry of Finance*), which covers all of the banks in Japan. As the sample, we take banks which are commonly found in both of the sources, *Ginko Kaisha Yoroku* and *Ginkokyoku Nenpo.*[5] The financial data in *Ginkokyoku Nenpo* is basically limited to the balance sheet data. Also, the profit data are censored at zero.[6]

The data source of bank exits is *Ginko Jiko Geppo* (*Monthly Bank Affairs*) prepared by the Bank of Japan. From this source, we can identify the cause of each exit: consolidation, bankruptcy, closure, dissolution etc.[7]. With respect to each consolidation, we have information of the event date, the consolidation type, and the locations of the headquarters as well as the paid-in capital of the participants. The consolidation types refer to the following three categories, absorption, acquisition, and combination into a new bank.

The combination into a new bank is to a type where a new bank was established after dissolving all of the participants. According to *Kin'yu Kenkyukai (Research Committee of Financial Issues)* (1934), in the case where the powers of the participants were nearly equal, they tended to choose a combination into a new bank. So in the following analysis, we define the type of combination into a new bank as "mergers of equals", and include the types of absorption and acquisition as absorbing consolidations. All the other bank exits are as bank failures.

2.2. Basic Statistics

Panel A of Table 1 shows basic statistics of director interlocking in the years of 1926, 1931 and 1936. We divide banks into two groups, large banks and small banks. Large banks refer to the banks with assets not less than 10 million yen. While the number of large banks decreased about 25% from 1926 to 1936, the number of small banks decreased about 60%, implying that the share of small banks sharply declined in this period. With respect to all the banks in the sample, the average number of interlocks per bank in 1926 was as large as 7.26. This value increased gradually from 1926 to 1936. Looking at the sub-samples, small banks and large banks, we find that the average number of interlocks in small banks declined in this period, whereas it did not in large banks.

The similar tendency is observed also with respect to the number of interlocks normalized by the total number of directors (the number of interlocks per director). On the other hand, the number of interlocks normalized by asset size (number of interlocks/asset) decreased both in large and small banks. In sum, we can say that the director interlocking with non-banking companies was attenuated in small banks in the period from the late 1920s to the early 1930s, while it was not in large banks.

Panel B shows the composition of director interlocking by year. We classify director interlocking into four types, by the positions of the involved directors in the bank and the non-banking company. Here we focus on the positions of the senior director and the junior director.

The senior director refers to the president, chairman, vice-president and executive director. The junior director refers to the ordinary director and auditor. For example, in the year of 1926, the percentage of the interlocks between the senior director of banks and the senior directors of non-banking companies was 5.2 % of the total interlocks. This composition of director interlocking did not vary substantially among 1926, 1931 and 1936. Also, the composition was not considerably different between large and small banks (not reported in the table). Panel C shows the basic statistics of the banking industry by year and by bank size.[8] The asset size of total banks has a sharp upward trend from 1926 to 1936. The increase of banks size is mainly due to consolidations and failures of small banks. While the profitability (ROA and ROE variables, standing for return of assets and return of

[4] The positions of directors include chairman, president, vice-president, executive director, ordinary director and auditor. Some banks did not have a position of senior director (chairman, president, vice-president, or executive director).

[5] The point of time investigated in *Ginko Kaisha Yoroku* is different from that in *Ginkokyoku Nenpo*, we lose many observations in matching these sources especially when consolidation and failure occurred frequently. Hence, to keep sample observations as many as possible, we use the end value of 1926 and the beginning value of 1931 and 1936 (the end value of 1930 and 1935) with respect to *Ginkokyoku Nenpo*.

[6] If profit of a bank was negative, the negative value is not reported in this source.

[7] *Ginko Jiko Geppo* dose not carry the information on all types of exits other than consolidation before Jun. 1930. Therefore we supplement this information, using Goto(1991).

[8] As for variable definitions, see appendix (definition of variables).

equity respectively) [9]decreased from 1926 to 1931, it slightly improved after that until 1936, basically reflecting the change in macroeconomic conditions.[10]

3. Bank Exits and the Presence of Director Interlocking

3.1. Expected Effect of Bank Exits

As stated above, many banks exited from the industry through consolidations and failures in the period from the late 1920s to the early 1930s. In this section, we examine how director interlocking affected the possibility of bank exits and investigate its implication. We expect that if those banks with director interlocking exited with higher probability, the presence of director interlocking would decline in the banking industry. This effect is related to the change in the quantity of director interlocking.

At the same time, bank exits might have an effect to change the quality of director interlocking. We will investigate this quality change in more details in Section 4, in which we will show that director interlocking was negatively correlated with profitability with respect to small banks, and not with respect to large banks. Given this relationship, we can infer that the average quality of director interlocking would be improved, if small banks with director interlocking exited with higher probability. So, in this section, we examine whether director interlocking made the probability of exit higher, especially with respect to small banks.

3.2. Model

We examine how director interlocking between banks and non-banking companies affected the probability of bank exit in the period from 1927 to 1936, using the data of the banks which operated in 1926. In this analysis, we refer to all types of exits except consolidation as failures, and classify bank consolidations into absorbing consolidations and mergers of equals. The former includes absorptions and acquisitions in *Ginko Jiko Geppo*, and the latter is combinations into new banks. So all together, there are three types of bank exits in our analysis according to their causes: merger of equals, absorbing consolidation and failure. To capture the effect of director interlocking (as well as bank size) on the probability of bank exits, we estimate the following equation by a multi-nominal logit model.

$$\text{Prob}(EXIT_i) = F[\beta_0 + \beta_1 * INTERLOCK_i + \beta_2 * SIZE_i + \beta_3 EQ_i + \beta_4 * CAPDEPO_i + \beta_5 * LIQUID_i + \beta_6 * ROE_i + \beta_7 * SECURITY_i] \quad (1)$$

The dependent variable, EXIT can take 4 values. It takes the value one, two and three, if a bank exited by a merger of equals, an absorbing consolidation and a failure, respectively. It takes value zero, if a bank survived until the end of 1936. As explanatory variables, we use the value of 1926.

In selecting explanatory variables, we principally follow the literature on the determinant of bank failure and M&As (Facarelli et al., 2002; Wang, 2004; Wheelock and Wilson, 2004). INTERLOCK is the variable to capture the effect of organ bank relationship[11]. If banks with director interlocking exited with higher probability, the coefficient of INTERLOCK is expected to be positive. We use two alternative INTERLOCK variables. One is the natural log value of the number of interlocks (LNINTERLOCK).[12] The other is the number of interlocks normalized by the number of directors (INTDIRC). SIZE, measured as log value of banks' total assets, is supposed to capture the risk of a bank[13]. Since large banks generally can bear a certain economic or liquidity shock more easily through diversifying asset or liability risk, compared to small banks. Furthermore, it can be also associated with the determinant of M&As. Smaller banks are likely to be consolidated because their restructuring is more manageable to acquirer banks (Facarelli et al., 2002)[14], and also because the Bank Law of 1927 discouraged the existence of small banks. Therefore, we expect the coefficient of SIZE to be negative. EQ is used to capture the effect of the Great Kanto Earthquake of 1923. It takes the value 1, if the headquarters of a bank was located in the areas damaged by this earthquake, i.e., Tokyo, Kanagawa, Chiba and Saitama prefectures. Several prior works pointed out that many banks in the south Kanto area suffered from bad loan problems as a result of this natural disaster (Kato, 1957; Takahashi and Morigaki, 1968, etc.). Hence, we expect that EQ has a positive effect, at least, on the probability of failure.

The rest of the explanatory variables are financial ratios. These variables are chosen to capture the components of the CAMEL rating which has become a standard guideline for the risk of bank failure (Wang, 2004; Wheelock and Wilson, 2004)[15]. CAPDEPO, indicating the ratio of equity capital to total deposits (the inverse of LEVARAGE), is used

[9] In calculating ROA and ROE, we regard the value of censored profit as zero.

[10] 1931 was the bottom year of the Great Depression in Japan. In 1930, Japan returned to the gold standard, which was accompanied by the cutback of government expenses and the deflation.

[11] In Wang (2004), INTERLOCK is used to capture management efficiency of a bank.

[12] In actual estimations, we use the natural log value of one plus the number of interlocks

[13] We use the value of total capitals plus total deposits as total assets, because we cannot get the complete value of total asset of bank from *Ginkokyoku Nenpo*.

[14] Actually, former research confirmed that bank size was significantly correlated with the probability of being acquired ((Facarelli et al. 2002; Wheelock and Wilson,2000; etc.).

[15] CAMEL: capital adequacy, asset quality, management efficiency, earnings, liquidity. This rating system has been used in Federal Reserve banks of the United States.

to capture capital adequacy of a bank. Low value of this variable indicates high risk[16]. Therefore, the sign of this variable is expected to be negative. LIQUID is the variable on liquidity. It indicates the ratio of bank deposit reserve to total assets. If a bank has sufficient liquid assets, it is unlikely to be faced with a run or closure, because it can accommodate withdrawal demands by depositors. Therefore, we expect LIQUID has a negative effect on bank failure. As a variable indicating profitability, ROE, return on equity, is used. ROE is expected to have a negative effect on bank failure. Also, ROE may have a negative effect on the probability of being consolidated, if the purpose of bank consolidation is to transfer superior management skill from acquirer banks to target banks. Finally, SECURITY is used to capture asset quality. As stated in previous section, security holdings are considered to be relatively safe compared to loans. Therefore, SECURITY is expected to be negatively associated with bank failure.

3.3. Results

The results are reported in Table 2. INTERLOCK refers to the log value of number of interlocks (LNINTERLOCK) in Panel A, and number of interlocks per director (INTDIRC) in Panel B. In each of the panels, model [1] shows the estimation result of equation (1) without the four financial ratio variables, while model [2] shows the result in case we add the four financial ratios. With respect to all of the models we tested the independence of irrelevant alternatives to check whether existence of each type of exit was irrelevant to the choice of the remaining two exit options.[17] For each type of exit, we cannot reject the null hypothesis that two remaining alternatives which are available to a bank are irrelevant, as indicated in the last row.

For Model [1] in the panel A of Table 2, all of the coefficients of INTERLOCK are positive, but it is statistically significant only with respect to failure, which implies that the more interlocks a bank had, the more likely the bank failed. This is consistent with the view that banks with strong connection with their related firms performed badly due to unsound loans and consequently were forced to exit from market through failure. The coefficient of SIZE is negative and statistically significant at 1% level for all types of exits. This result indicates that exiting banks were smaller than surviving ones. Furthermore, its magnitude for failure is especially large, which may reflect that bank size is strongly associated with risk. As is expected, EQ has positive effects on absorbing consolidations and failures, which indicates that banks damaged by the earthquake in 1923 were forced to exit from the market through absorptions and failures. In Model [2], where four financial ratios are added, we can also confirm that the positive correlation between the probability of failure and the number of interlocks, but this correlation is slightly weaker. On the other hands, ROE has a strongly negative effect on the probability of failure. It is likely that ROE partially absorbs the effect of director interlocking, as later analysis in the following section shows the director interlocking indeed had a negative effect on ROE. However, it is notable here that director interlocking increased probability of failure not only by way of lowering profitability. Other financial ratios have no significant effect on any type of exits. In panel B, we check the result by replacing LNINTERLOCK with INTDIRC. Positive correlation between the probability of failure and director interlocking is confirmed in this alternative specification.

Finally we run the same regressions, splitting the bank samples into small banks and large banks, defined in section 2. The results are shown in Table 3 for small banks and in Table 4 for large banks. With respect to small banks, we have similar results as the full samples regression. Namely, small banks failed with higher frequency, if they had more director interlocking. However, with respect to large banks, significant correlation is not observed between director interlocking and probability of failure[18]. These results are consistent with the observation in Table 1. As we have seen, average number of interlocks declined in small banks. That decline, at least in part, reflects the selection pressure which excluded the small banks with director interlocking.

4. Effect of Director Interlocking on Profitability and Its Change Over time

From previous section, we observe a decline of director interlocking between banks and non-banking companies in terms of its quantity through bank exits. In this section, we focus on the quality change of director interlocking along the banking consolidation wave. In order to capture the change in the nature of director interlocking between banks and non-banking firms over time, we focus on the effect of director interlocking on bank performance, in particular, the profitability of banks, which is measured by the return on equity (ROE).[19] We

[16] It should be noted that as is stated in Wang(2004), high value of CAPDEPO may reflect inability to collect deposits due to loss of credibility. In this case, CAPDEPO is expected to have a positive effect on bank failure. Therefore, it might be better to interpret the coefficient of CAPDEPO as the net effect between capital adequacy and incredibility.

[17] See Hausman and Mac Fadden (1984) for details.

[18] We eliminate EQ in estimation of large banks (Table 4) because EQ always equals zero in all banks exiting by merger of equals.

[19] ROA is also considered to be an alternative measure. However, we cannot get the complete value of total asset of bank from *Ginkokyoku Nenpo* as mentioned before. Hence, we focus on ROE, here. But, we also estimated ROA, calculated by incomplete total assets (total capitals+ total deposits), and confirmed that the

compare the effect of the director interlocking on ROE between the three data points, 1926, 1931 and 1936, by running OLS regressions on bank profitability for each year separately.

4.1. Model

Our model of bank profitability is similar as used in Okazaki et al.(2004). Profitability is measured by ROE and the factors affecting bank profitability include loan quality, the intensity of competition, the attitude of risk and economies of scale[20]. The basic OLS regression equation to be estimated is as follows:

$$ROE_i = \beta_0 + \beta_1 * INTERLOCK_i + \beta_2 * EQ_i + \beta_3 * MARKET_i + \beta_4 * SIZE_i + \beta_5 * SECURITY_i + \beta_6 * LEVERAGE_i + \varepsilon_i \quad (2)$$

The dependent variable is ROE of banks. With respect to explanatory variables, INTERLOCK is used to capture the organ bank relationship, defined as in previous section. According to the literature on the organ bank relationship, the banks with stronger connection with non-banking companies devoted more funds to corrupt loans to them. Consistent with these literature, Okazaki et al.(2003) confirmed an negative effect of these variables on bank profitability, based on the data of 1926. On the other hand, in this paper, we are interested in how this negative effect changed over time.

The variables of EQ and SIZE are the same as defined in Section 3, standing for earthquake dummy and log of total assets respectively. SIZE is included here to capture economies of scales. MARKET is used as a proxy for the extent of market competition[21]. It indicates the market share of the top three banks in a prefecture in terms of the number of branch offices[22].

SECURITY and LEVARAGE are variables to control for risk of a bank. If a bank is strongly risk-averse and the proportion of safe assets in its portfolio is high, the bank is unlikely to earn high profit, but is also unlikely to be exposed to risk. SECURITY is the ratio of security holding to the total loans[23]. Here we assume that securities were relatively safe assets, since they were mainly government bonds and debentures of major companies[24]. However, the sign of this coefficient is not clear *a priori*, because it depends on the relative average returns of loans and securities. Especially, as corporate performance generally slowed down in this period, it is possible that the profit of a bank holding more safe assets would be higher than that of a bank holding more risky assets[25]. LEVARAGE, which indicates the financial leverage of a bank, is used to control for the effect of capital structure of a bank, following Modigliani and Miller's proposition II[26]. MM's propostion II states that the expected return on equity increases along with financial leverage In addition to these control variables, we include the area dummies, considering that some regional economic shocks were observed in the 1920s-1930s, although not reported in the tables[27].

4.2. Results

The estimation results are reported in Table 5. Panel A indicates the results for year 1926. In columns 1 and 2, the natural log value of the number of interlocks, LNINTERLOCK is used as INTERLOCK. In column 3 and 4, the number of interlocks per director, INTDIRC, is used as INTERLOCK. According to the result, the director interlocking has a strongly negative effect on bank profitability, which implies that the connection between banks and non-banking companies was unfavorable for bank profitability, as the literature on the organ bank relationship have pointed out. With respect to other variables, the coefficient of SIZE is positive and statistically significant, which implies that large banks could benefit from economies of scale. EQ is negative and statistically significant. We can infer that banks damaged by the big earthquake in 1923 suffered from a bad loan problem. We also find that, as the standard oligopoly theory predicts, banks in highly concentrated market was relatively profitable. Finally, the asset portfolio of banks did not have a significant effect on the profitability. These results are generally consistent with those of Okazaki et al.(2005)[28].

result was not qualitatively different with that of ROE.

[20] There are many studies on the determinants of bank profitability that propose various models, according to specific problems the authors were analyzing. However, most of the literature considers three factors as important determinants of bank profitability: economies of scale, the level of external competition, and the attitude to risk (Smirlock, 1985; Bourke, 1989; Berger, 1995, Goddard et al., 2001, 2003). Besides these factors, Okazaki et al.(2005) included the variable if director interlocking between banks and firms, to test organ bank hypothesis.

[21] In the following analysis, we classed a prefecture as a separate market.

[22] Unfortunately, we cannot access information on the individual amounts of loans or deposits by prefecture, with respect to banks operating in multiple prefectures. Even if we replace the share of the top three banks with the share of the top single bank, we could get quite similar results.

[23] In Okazaki et al.(2005), SECURITY was defined as the ratio security holding to assets. However, based on data of 1931 and 1936, this ratio is highly correlated with SIZE (ρ=0.454 and 0.508). On the other hands, the correlation between the ratio security holding to total loans and SIZE is not so high(ρ=0.188 and 0.277). Hence, we use this ratio as the definition of SECURITY.

[24] Imuta [1976] confirmed that stocks accounted for only 10.9% of total security holdings on average, with respect to 60 banks whose data on 1925 was available.

[25] Actually, Okazaki et al.(2005) confirmed that SECURITY had a positive sign and it magnitude was larger especially, in small banks.

[26] See Brealey and Myers (2002), Chapter 17.

[27] We split the whole country by 9 areas. They are composed by Hokkaido/Tohoku, North-Kanto, South-Kanto, Chubu/Hokuriku, Tokai, Osaka/ Hyogo, other Kansai, Chugoku/Shikoku and Kyushu/Okinawa. To be noticed, South-Kanto dummy is identical to the earthquake dummy, EQ.

[28] One exception is that the positive effect of SECURITY is

In Panel B, the results for year 1931 are reported. In column 1, the coefficients of INTERLOCK are still negative and statistically significant. Although absolute values of the coefficients are smaller than those of 1926, the difference is not so large. Also, the coefficient of SIZE is still positive and statistically significant, and the coefficient is slightly larger than that of 1926. Furthermore, the negative effect of the earthquake dummy (EQ) is still negative and statistically significant.

Panel C presents the results for 1936. According to column 1, the coefficient of INTERLOCK is still negative. However, statistical significance of the coefficient declines to be 10%, and the also the magnitude is 40% smaller than that in 1926. On the other hand, SIZE still has a strongly positive effect on profitability, which implies that economy of scale was stable in the period from 1926 to 1936. With respect to EQ, the negative effect is no longer observed in 1936, because Japanese banking system had recovered from the damage of the earthquake by that year.

Now, we check other specifications. In column 2 of Panel A-C, including LEVARAGE, we can confirm results with those of column 1. Namely, the negative effect of INTRERLOCK observed in 1926 and 1931 is attenuated in 1936. On the other hand, the positive effect of SIZE becomes weak in 1926 and 1936, compared with column 1. This is considered to reflect that LEVARAGE is highly correlated with SIZE in 1926 and 1936 (ρ=0.487, 0.527)[29]. Actually, the positive effect of LEVARAGE is especially larger in 1926 and 1931. Hence, the coefficient of LAVARAGE is considered to partially capture the effect of SIZE. In column 3 and 4, we can also confirm that the negative effect of INTERLOCK is remarkably attenuated from 1926 to 1936. The coefficient of INTERLOCK is no longer statistically significant, and its magnitude is substantially smaller in 1936.

Meanwhile, Okazaki et al. (2005) pointed out that the effect of the director interlocking on bank performance depended on bank size in 1926. That is, with respect to small banks, director interlocking had a negative effect on bank performance, whereas it had not with respect to large banks. Hence, we estimate equation (2) by bank size (small banks and large banks).

The results are reported in Table 6. Panel A, B, and C report the results for 1926, 1931 and 1936, respectively. Column 1 and 2 of each panel show the results for small banks, and column 3 and 4 show those for large banks. And, we use LNINTERLOCK in column 1 and 3, and INTDIRC in column 2 and 4 as the variable of INTERLOCK. In column 1 and 2 of Panel A, it is confirmed that the director interlocking was harmful in small banks. As is shown in column 1 and 2 of Panel B and C, the coefficient of director interlocking of small banks is still negative and statistically significant in 1931 and 1936. Also, the absolute value of the coefficient of INTERLOCK did not decline, in case we use INTDIRC as INTERLOCK[30]. On the other hand, with respect to large banks (column 3 and 4), the nature of director interlocking was not bad in general.

These results of sub-sample regressions suggest that the improvement of the quality of director interlocking confirmed by the full sample regressions, mainly reflects a change in the scale distribution of banks. That is, the decrease of the proportion of small banks, which had bad relationship with non-banking companies, led to the improvement of the average quality of director interlocking.

5. Effect of banking consolidation on director interlocks using a sub-sample

5.1. Expected effect of bank consolidations

A bank consolidation is potentially expected to change the governance structure of the participating banks through the change of ownership structure and hence the board of directors.

As a matter of fact, Shiratori (2001) pointed out that one of the aims of the consolidation promotion policy in the 1920s Japan was to remove unsound relationship between banks and industrial companies.

Specifically, the government recognized that if a small bank was acquired by a large bank and became one branch of the acquiring bank, unsound loans to the related companies would be reduced by the discipline of the acquiring bank[31]. Even a merger of equals is likely to improve the relationship with industrial companies, because each participating bank does not like for the new bank to take over the unsound relationships of the other participants. Hence, first we expect that number of director interlocks would decline through consolidations.

Second, we expect that quality of director interlocking would be improved, in the sense that its negative effect became weaker. In the rest of this section, we examine these expectations.

attenuated compared to that in Okazaki et al.(2005). This may be because we change the definition of SECURITY. See footnote 23.

[29] On the other hands, the correlation between LEVARAGE and SIZE is not so high in 1931(ρ=0.285).

[30] We also conducted the same regression, including the variable, LEVARAGE. It is confirmed that the results were generally similar with those of Table3. However, the effect of SIZE became weak in 1926 and 1936, as seen in Table2.

[31] Stein (2002) proposed the theory that a decentralized organization had a advantage in transactions associated with soft information compared to a hierarchical organization. Given that related lending was based on soft corrupt relationship between banks and business group, according to Stein's model, bank consolidation could reduce such related loans.

5.2. Sub-sample of consolidated and non-consolidated banks

In order to examine the effect of the bank consolidation on director interlocking, we use the consolidation samples in the period from Jan.1927 to Dec.1929, when bank consolidations increased sharply. Then, we compare how the quality of director interlocking changed through the consolidation, by comparing the change of the coefficient of INTERLOCK in equation (2) from 1926 to 1931, between consolidated banks and non-consolidated banks.[32]

The data source of the consolidations is *Ginko Jiko Geppo* (*Monthly Bank Affairs*) described in previous section. We cannot use all of the consolidations as the sample for two reasons.

The first reason is availability of the interlocking data. Since *Ginko Kaisha Yoroku*, the data source for interlocks, does not contain information on banks and non-banking firms whose paid-in capital was less than two hundred thousand yen, we should exclude the consolidations where the paid-in capital of at least one participant was less than two hundred thousand yen.

The second reason is that in order to capture the effects of the consolidation in the sample period clearly, we eliminate the effects of the consolidations which occurred one year before or one year after the sample period. Namely, we excluded those consolidations where at least one participant took part in another consolidation in 1926 or 1930. After these procedures, 69 events of consolidations which involved 172 participants are left to us. As the control sample, we selected those banks which did not participate in any consolidation in the period from 1926 to 1930.

Table 7 shows the number of the consolidation sample and the control sample we have got in this way. The consolidation participants are classified into four categories by the type of the consolidation they were involved. Here, the multi-time consolidation refers to the consolidation where at least one bank experienced more than one consolidation in the sample period. For example, if Bank A merged with Bank B in 1927, and also acquired Bank C in 1929, we regard these two consolidations as one multi-times consolidation where Bank A consolidated with Bank B and Bank C. Basic statistics by type of participants are shown in appendix table.[33]

5.3. Results

First, let us compare the number of interlocks between the consolidation sample and the control sample (Table 8). The 172 consolidated banks had 1218 interlocks in the pre-consolidation year (1926), and 387 non-consolidated banks had 2416 interlocks in the same year. On the other hand, in the post-consolidation year (1936), the number of interlocks came to be 814 and 1913, respectively. The changes are -33.2% for the consolidated banks, and -20.8% for the non-consolidated banks[34]. As we expected, consolidations contributed to reducing director interlocks.

Next, we check the effect of consolidations on the quality of director interlocking. The baseline of the following analyses is equation (2) in Section 4, but here we allow the difference in the effects of director interlocking between consolidated banks and non-consolidated banks, in order to capture the effect of the consolidation. Specifically, we use the consolidation dummy (CONS) which takes the value one, if the bank participated in a consolidation, and zero otherwise. Then, we can express the effect of director interlocking in the consolidated banks by the interaction terms of INTERLOCK and CONS. In the same way, the effect of director interlocking in non-consolidated banks is expressed by the interaction terms of the INTERLOCK and (1-CONS).

The results are reported in Table 9. As INTERLOCK we use LNINTERLOCK in column 1-2 and INTDIRC in column 3-4. In column 1 indicates the results of pre-consolidation year (1926). The coefficient of the interaction term of INTERLOCK and CONS is negative and statistically significant at 1% level. Namely, the director interlocking of consolidated banks was unfavorable to profitability in pre-consolidation year. On the other hand, the coefficient of the interaction term of INTERLOCK and (1-CONS) is negative but not statistically significant. In addition, the absolute value of the coefficient is much smaller than that of the interaction term with CONS. These results suggest that in the pre-consolidation year, director interlocking was unfavorable for the consolidated banks, but was not so for the non-consolidated banks.

According to column 2, the coefficient of the interaction of INTERLOCK and CONS is still negative but no longer statistically significant in the post-consolidation year (1931). Furthermore, its magnitude declines by 50%, compared with that in the pre-consolidation year (1926). This indicates that the quality of director interlocking in the consolidated banks was improved. On the other

[32] If we use year 1936 as post-consolidation year, we lose many samples of consolidation.

[33] In appendix table and following analysis, multi-time mergers are classified into mergers of equals if the last consolidation out of multiple ones was the form of a combination into a new bank, and absorbing consolidation if the last consolidation was the form of an acquisition or absorption. By this classification, they are divided into 16 absorbing consolidations and 2 mergers of equals.

[34] In calculating the change of interlocks in consolidated banks, we found some bank directors who held director positions in both banks to be consolidated. To avoid double counting, we used only the value of interlocks in one side of bank with respect to such directors.

hand, the coefficient of director interlocking in non-consolidated banks is still negative and statistically insignificant. In addition, its absolute value is two times larger than that in the pre-consolidation year. Namely, the quality of director interlocking in the non-consolidated banks was not improved at least.

These results indicate that the consolidation had a positive effect on the nature of director interlocking. In column 3 and 4, where we replace LNINTERLOCK by INTDIRC, we can confirm the similar results except for the coefficient of CONS in the pre-consolidation year, the results are basically the same as those in column 1-2. Since the effect of the SIZE became greater from the pre-consolidation year to the post-consolidation year, it might affect on the estimation results. Hence, we ran the regressions, using the number of interlocks normalized by bank assets as INTERLOCK (not reported). Also in this case, the quality of director interlocking in the consolidated banks was improved, whereas it became worse in the non-consolidated banks. Furthermore, we had similar results, in case including the variable, LEVARAGE (not reported).

Next, we split CONS into three dummy variables by type of the participants in the consolidation, namely, ACQUIRER, TARGET and EQUALS. ACQUIRER and TARGET are the dummy variables which indicate that the bank was an acquirer and a target of the absorbing consolidation (absorptions or acquisitions) respectively. EQUALS is a dummy variable which indicates that the bank is a participant in a combination into a new bank. Then, we use these three dummy variables and their interaction terms with INTERLOCK.

The results are reported in Table 10. We use LNINTERLOCK in column 1-2 and INTDIRC 3-4 as INTERLOCK, respectively. In column 1, the coefficient of INTERLOCK for the acquirer banks is negative and statistically significant at 1% level. On the other hand, the coefficient of INTERLOCK for the target banks is negative and statistically significant at 1% level. Although the absolute value of the latter is larger than that of the former, the difference is not large. Therefore, in the pre-consolidation year, the quality of director interlocking was not favorable in both of the acquirer banks and the target banks.

In column 2, which show the results of the post-consolidation year, the variables related to the target banks are excluded by definition, and the dummy variable ACQUIRER refers to the acquirer bank after absorbing the target bank. The coefficient of ACQUIRER*INTERLOCK is still negative, and statistically significant. However, the negative correlation between director interlocking and profitability in the acquirer bank is attenuated, although it absorbed the target bank with unsound relationship with non-banking firms. Also, from columns 3 and 4 we can confirm the similar results. Therefore, we can say that the absorbing consolidation had a positive effect of improving the quality of director interlocking. Then, how did the improvement happen? Considering power balance between acquirer banks and target banks, it is reasonable to interpret that the unsound relationship at least in the target banks was eliminated through the consolidation. To confirm this interpretation, we checked how the director interlocking of the target bank was eliminated through the absorbing consolidation. It was found that 91% of the directors of the target banks who had had director positions in non-banking companies, were eliminated from the post-consolidation banks, which means 92 % of the total number of interlocking relations in target banks was terminated. This fact is consistent with our interpretation.

As for mergers of equals, the negative effect of director interlocking becomes weak according to column 1 and 2. However, in columns 3 and 4, where INTDIRC is used as INTERLOCK, such effect is not observed at all. In this sense, we cannot get strong evidence that mergers of equals had the effect of improving the quality of relation between banks and firms.

6. Concluding remarks

In pre-war Japan, many banks were tied with non-banking companies through director interlocking, and the banks controlled by the non-banking companies, namely "organ banks" were a source of unsound loans, as related lending in contemporary developing countries. In this paper, we examined how the organ bank relationship faded in the period from the late 1920s to early 1930s. First, it is confirmed that number of interlocks per bank as well as per director in small banks declined in this period. One of the reasons is that with respect to small banks, number of interlocks positively affected the probability of bank failure. The other reason is that consolidations had an effect to reduce interlocks. Number of interlocks declined faster with respect to the banks which experienced consolidations. In addition to decline in the number of interlocks, the quality of interlocks changed at the same time. As consolidations selectively excluded interlocks with unsound quality, the average quality of interlocks was improved. It is confirmed that the absolute value and statistical significance of the coefficient of the interlock variable in the ROE regressions declined over time, and that this change was observed only in the banks that experienced consolidations.

A close bank-firm relationship is not unique to pre-war Japan. Lamoreaux (1994) made clear that "insider lending" was perverse in New England in the nineteenth century. LaPorta, Lopetz-Salianes and Zamaripa (2003) studied "related lending" in contemporary Mexico and pointed out that such related lending behavior is widely observed in

contemporary developing countries.[35] This paper is the first attempt to see how this relationship changed over time and what mechanisms worked for the change, using a unique dataset of bank-level director interlocking in pre-war Japan. Our findings suggest that banking consolidation and selection thorough failures may help to eliminate the detrimental connections between banks and non-bank firms.

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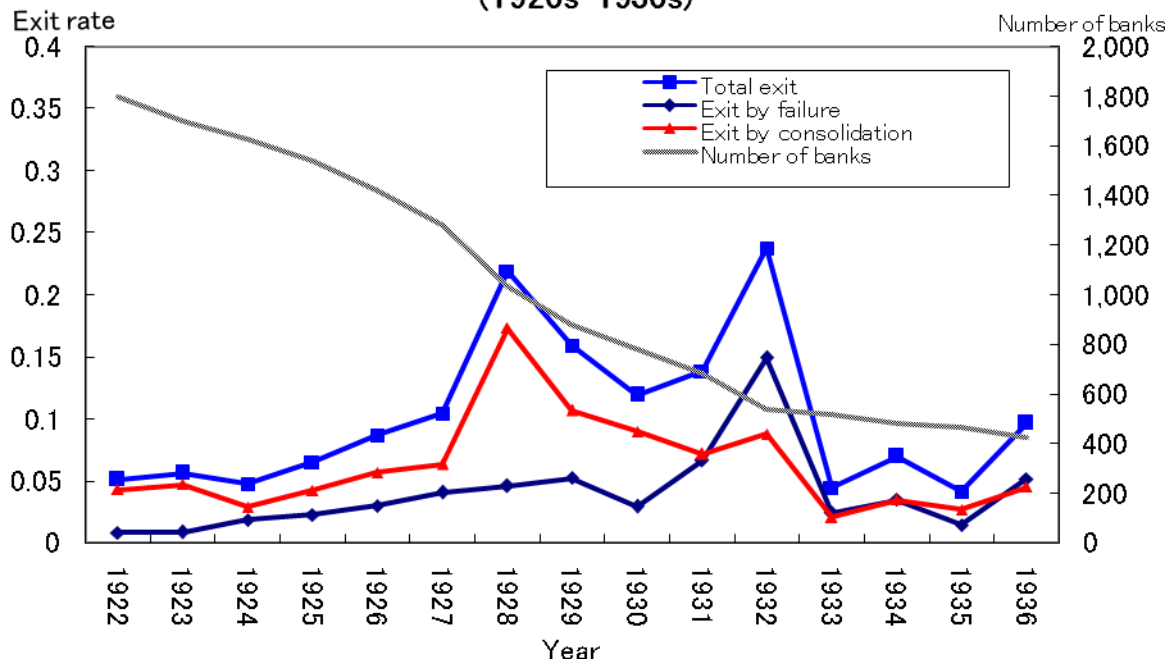
Figure1 Exit rate from market in Japanese banking industry (1920s-1930s)



Source: Goto(1968)

Table 1 Sample description
Panel A Characteristics of director interlocking

Year		1926			1931			1936		
Variables/Bank size		Total	Large	Small	Total	Large	Small	Total	Large	Small
Number of interlocks	Mean	7.26	20.06	5.02	7.83	21.45	4.58	8.04	19.94	4.13
	Median	4.00	15.00	3.00	4.00	18.00	3.00	4.00	15.00	2.00
Number of directors	Mean	8.57	10.71	8.20	8.90	10.97	8.40	8.59	9.65	8.24
	Median	8.00	10.00	8.00	8.00	11.00	8.00	8.00	9.00	8.00
Number of interlocks	Mean	0.84	1.87	0.67	0.86	1.99	0.59	0.90	2.03	0.53
per director	Median	0.50	1.65	0.38	0.50	1.58	0.36	0.44	1.68	0.29
Number of interlocks/	Mean	2.77	0.72	3.13	2.38	0.71	2.78	1.75	0.62	2.12
Asset size(million yen)	Median	1.29	0.51	1.64	1.04	0.51	1.36	0.77	0.37	1.04
Number of banks		1007	150	857	659	127	532	453	112	339
Number of banks with interlocks		836	147	689	539	126	413	374	109	265
(percentage)		83.0%	98.0%	80.4%	81.8%	99.2%	77.6%	82.6%	97.3%	78.2%

Panel B: Composition of director interlocking

Year	1926		1931		1936	
	Director in non-banking company					
	Senior	Junior	Senior	Junior	Senior	Junior
(Bank Director)						
Senior director	5.1%	22.4%	4.7%	22.1%	5.7%	22.2%
Junior director	10.8%	61.7%	11.7%	61.6%	15.6%	56.4%

Panel C: Basic statistics

		1926			1931			1936		
Variables/ Bank size		Total	Large	Small	Total	Large	Small	Total	Large	Small
Assets(miliion yen)	Mean	10.96	60.3	2.33	15.92	72.2	2.49	25.69	95.62	2.72
	Std.dev.	(47.53)	(111)	(2.01)	(72.61)	(153)	(2.12)	(119.8)	(227.86)	(2.14)
Total Loans/Total Deposits	Mean	2.11	1.59	2.2	1.51	1.25	1.58	1.36	1.42	1.14
	Std.dev.	(11.13)	(6.78)	(11.72)	(2.81)	(3.06)	(2.74)	(4.12)	(4.15)	(0.34)
Equity Capitals/Total Deposits	Mean	1.04	0.29	1.17	0.81	0.34	0.93	1.01	1.23	1.14
	Std.dev.	(7.06)	(0.26)	(7.65)	(1.87)	(0.59)	(2.04)	(5.11)	(5.85)	(4.03)
ROE	Mean	13.28	13.84	13.18	7.94	8.96	7.7	8.97	10.27	8.54
	Std.dev.	(7.92)	(7.82)	(7.94)	(6.45)	(3.85)	(6.91)	(5.98)	(5.28)	(6.14)
ROA	Mean	4.11	2.75	4.35	2.35	1.72	2.5	2.43	1.61	2.70
	Std.dev.	(3.2)	(2.64)	(3.23)	(2.17)	(1.06)	(2.34)	(1.99)	(0.93)	(2.17)
Security Holdings /Total Loans	Mean	0.155	0.243	0.14	0.292	0.464	0.251	0.507	0.798	0.412
	Std.dev.	(0.298)	(0.253)	(0.303)	(0.647)	(0.34)	(0.695)	(0.699)	(1.078)	(0.482)
bank deposit reserve/Assets	Mean	0.089	0.088	0.089	0.102	0.100	0.102	0.13	0.098	0.139
	Std.dev.	(0.077)	(0.050)	(0.804)	(0.093)	(0.700)	(0.098)	(0.094)	(0.057)	(0.101)

Table 2 Effect of director interlocking on bank profitability

PanelA: Year 1926

Dependent Variable	ROE							
Definition of INTERLOCK	LN(INTERLOCK)				INTDIRC			
Explanatory Variables/Model	[1]		[2]		[3]		[4]	
INTERLOCK	−1.1852	a	−0.9959	a	−0.8087	a	−0.7541	a
	(0.3361)		(0.3335)		(0.2949)		(0.2705)	
SIZE	1.1844	a	0.4505	c	0.9497	a	0.2599	
	(0.2454)		(0.2652)		(0.2287)		(0.2417)	
EQ	−3.0715	a	−3.5748	a	−2.7208	a	−3.2713	a
	(0.9063)		(0.8839)		(0.9087)		(0.8873)	
MARKET	0.0508	c	0.0389		0.0481		0.0361	
	(0.0296)		(0.0272)		(0.0295)		(0.027)	
SECURITY	1.5287		1.5084		1.646		1.6118	c
	(1.011)		(0.9705)		(1.0021)		(0.9554)	
LEVERAGE			0.6937	a			0.7178	a
			(0.1556)				(0.1551)	
INTERCEPT	−3.6472		5.5166		−1.4092		7.3098	b
	(3.5392)		(3.5932)		(3.4571)		(3.4405)	
Log Likelihood	−3397.1371		−3376.7003		−3400.317		−3378.3589	
NOB	1007		1007		1007		1007	
Censored Observation	64		64		64		64	

PanelB: Year 1931

Dependent Variable	ROE							
Definition of INTERLOCK	LN(INTERLOCK)				INTDIRC			
Explanatory Variables/Model	[1]		[2]		[3]		[4]	
INTERLOCK	−0.9548	a	−0.9099	a	−0.7265	a	−0.6967	b
	(0.3445)		(0.3395)		(0.2719)		(0.2696)	
SIZE	1.3961	a	1.1063	a	1.2603	a	0.9776	a
	(0.2949)		(0.2814)		(0.2665)		(0.2547)	
EQ	−2.396	b	−2.6749	a	−1.9927	b	−2.2889	b
	(0.9766)		(0.9905)		(0.9436)		(0.9527)	
MARKET	0.0024		0.0027		−0.002		−0.0015	
	(0.02)		(0.0196)		(0.0203)		(0.0199)	
SECURITY	0.1697		0.1482		0.1612		0.1406	
	(0.4981)		(0.4807)		(0.5132)		(0.4944)	
LEVERAGE			0.257	a			0.2584	a
			(0.0408)				(0.0402)	
INTERCEPT	−11.8607	a	−8.2417	b	−10.6643	a	−7.1115	b
	(3.7532)		(3.6027)		(3.5229)		(3.3804)	
Log Likelihood	−2008.1669		−1995.1055		−2009.3909		−1996.2365	
NOB	659		659		659		659	
Censored Observation	92		92		92		92	

Panel C:Year 1936

Dependent Variable	ROE							
Definition of INTERLOCK	LN(INTERLOCK)				INTDIRC			
Explanatory Variables/Model	[1]		[2]		[3]		[4]	
INTERLOCK	−0.6987	c	−0.5882	c	−0.2437		−0.3519	
	(0.3943)		(0.3527)		(0.5753)		(0.3331)	
SIZE	1.2199	a	0.4312		1.01	a	0.3013	
	(0.2509)		(0.2764)		(0.2801)		(0.2708)	
EQ	1.3931		0.3319		1.5933	c	0.5465	
	(1.0342)		(0.8941)		(0.9191)		(0.8677)	
MARKET	−0.0375	c	−0.0329		−0.0382	c	−0.034	
	(0.0217)		(0.0215)		(0.0217)		(0.0214)	
SECURITY	1.7315	b	1.5072	b	1.7143	b	1.5229	b
	(0.8157)		(0.6826)		(0.8305)		(0.6794)	
LEVERAGE			0.5666	a			0.5787	a
			(0.1366)				(0.1416)	
INTERCEPT	−9.2026	b	1.116		−7.0121	c	2.3692	
	(3.5486)		(3.6995)		(3.9574)		(3.7127)	
Log Likelihood	−1365.3299		−1343.3323		−1366.9294		−1344.1447	
NOB	453		453		453		453	
Censored Observation	46		46		46		46	

Notes: Significance at 1%,5% and 10% level are denoted by "a" "b" and "c". The figures in parentheses are heteroscedasticity robust standard errors. 7 area dummies are included. Significance levels are reported for two-tailed tests. Definitions of the variables can be found in the appendix.

Table3 Effect of director interlocking on bank profitability by bank size

PanelA: Year 1926								
Bank Size	Small banks				Large banks			
Definition of INTERLOCK	LN(INTERLOCK)		INTDIRC		LN(INTERLOCK)		INTDIRC	
Variables	[1]		[2]		[3]		[4]	
INTERLOCK	−1.3368	a	−0.8622	b	0.1483		−0.2348	
	(0.3584)		(0.3376)		(0.9197)		(0.6348)	
SIZE	1.9452	a	1.6322	a	−0.1975		0.0054	
	(0.4069)		(0.396)		(0.8356)		(0.7841)	
EQ	−3.7282	a	−3.3522	a	1.1645		1.1694	
	(1.0134)		(1.0268)		(2.2492)		(2.1831)	
MARKET	0.0603	b	0.0574	c	0.0476		0.0476	
	(0.0306)		(0.0311)		(0.0897)		(0.0904)	
SECURITY	1.863	c	1.9989	c	−0.8223		−0.8454	
	(1.0933)		(1.074)		(1.0713)		(1.0669)	
INTERCEPT	−14.2235	b	−11.0431	c	14.0973		11.4547	
	(5.7592)		(5.6795)		(12.7275)		(12.9044)	
Log Likelihood	−2875		−2880		−511		−511	
NOB	857		857		150		150	
Panel B: Year 1931								
Variables	[1]		[2]		[3]		[4]	
INTERLOCK	−0.9314	b	−0.8638	b	−0.8136		−0.4961	c
	(0.3817)		(0.3989)		(0.5159)		(0.2558)	
SIZE	2.0842	a	1.9388	a	1.1104	b	1.1138	b
	(0.5556)		(0.5335)		(0.4589)		(0.4364)	
EQ	−2.7546	b	−2.3646	b	−1.7895		−1.489	
	(1.2083)		(1.1736)		(1.6002)		(1.5128)	
MARKET	−0.0015		−0.0049		0.0276		0.0247	
	(0.0264)		(0.0266)		(0.0217)		(0.022)	
SECURITY	0.1011		0.1136		0.2807		0.4126	
	(0.5122)		(0.5353)		(0.8932)		(0.8972)	
INTERCEPT	−21.5161	a	−20.0841	a	−8.7364		−10.1724	
	(7.4901)		(7.293)		(6.523)		(6.8085)	
Log Likelihood	−1627.2		1628.2		−337.3		−336.8	
NOB	532		532		127		127	
Panel C:Year 1936								
Variables	[1]		[2]		[3]		[4]	
INTERLOCK	−0.7979	c	−0.9128	c	0.3049		0.6372	
	(0.435)		(0.5173)		(0.814)		(0.7775)	
SIZE	1.9589	a	1.8782	a	0.6343		0.4768	
	(0.535)		(0.5198)		(0.6664)		(0.6683)	
EQ	0.2159		0.413		3.1791		2.4087	
	(1.0148)		(1.0039)		(2.1866)		(1.5503)	
MARKET	−0.0393		−0.0405		0.0092		0.0133	
	(0.0274)		(0.0272)		(0.029)		(0.0301)	
SECURITY	3.1819	a	3.2158	a	0.84	c	0.6861	
	(0.9741)		(0.9829)		(0.4375)		(0.495)	
INTERCEPT	−20.0308	a	−19.4359	b	−3.8687		−1.5341	
	(7.6638)		(7.5546)		(10.0294)		(10.622)	
Log Likelihood	−1018		−1018		−333		−331	
NOB	341		341		112		112	

Table4 Determinants of type of exits in Prewar Japanese banking industry (all banks)

Panel A: LN(INTERLOCK)

	[1]			[2]		
Type of Exit	Equals	Absorbing	Failures	Equals	Absorbing	Failures
LN(INTERLOCK)	0.151	0.0178	0.3241 a	0.1674	0.0084	0.2414 b
	(0.1164)	(0.0998)	(0.1085)	(0.117)	(0.0992)	(0.1113)
SIZE	−0.3277 a	−0.4195 a	−0.6234 a	−0.3494 a	−0.4233 a	−0.4952 a
	(0.0945)	(0.0771)	(0.0935)	(0.1098)	(0.08)	(0.0936)
EQ	−0.4554	0.6522 a	1.0485 a	−0.3696	0.6477 b	0.8918 a
	(0.3759)	(0.2505)	(0.2486)	(0.383)	(0.2546)	(0.2638)
CAPDEP				−0.2515 b	−0.0036	0.0271
				(0.1227)	(0.0419)	(0.0296)
LIQUID				−1.1452	0.701	−2.3637
				(1.1236)	(1.0035)	(1.566)
ROE				0	−0.0136	−0.0823 a
				(0.0104)	(0.0107)	(0.0193)
SECURITY				−1.0552	−0.0634	−0.296
				(0.6953)	(0.2365)	(0.4114)
INTERCEPT	3.9416 a	5.9679 a	8.1952 a	4.6303 a	6.1783 a	7.7012 a
	(1.2977)	(1.059)	(1.2677)	(1.537)	(1.1071)	(1.2658)
NOB		1007			1007	
Log Likelihood		−1310			−1277	
IIA-test	−0.56	3.11	−0.28	0.39	0.67	−2.65

Panel B: Number of Interlocks per director

	[1]			[2]		
Type of Exit	Equals	Absorbing	Failures	Equals	Absorbing	Failures
INTDIRC	−0.026	0.0582	0.3568 a	−0.0009	0.0525	0.3113 a
	(0.1149)	(0.0995)	(0.0948)	(0.1143)	(0.0962)	(0.0961)
SIZE	−0.2501 a	−0.4348 a	−0.6188 a	−0.2669 b	−0.4427 a	−0.5109 a
	(0.0916)	(0.0722)	(0.0866)	(0.107)	(0.0744)	(0.0864)
EQ	−0.4635	0.6346 b	0.9187 a	−0.382	0.6349 b	0.7878 a
	(0.3775)	(0.2524)	(0.2502)	(0.3845)	(0.2563)	(0.2625)
CAPDEP				−0.2323 c	−0.0062	0.023
				(0.1208)	(0.0341)	(0.0222)
LIQUID				−1.1223	0.695	−2.3767
				(1.1614)	(0.9986)	(1.5336)
ROE				−0.0015	−0.0133	−0.0821 a
				(0.0106)	(0.0107)	(0.019)
SECURITY				−1.0857	−0.0639	−0.3481
				(0.721)	(0.2422)	(0.4224)
INTERCEPT	3.0523 b	6.1772 a	8.349 a	3.6868 b	6.4378 a	8.0671 a
	(1.3107)	(1.0339)	(1.2234)	(1.5515)	(1.0762)	(1.2269)
NOB		1007			1007	
Log Likelihood		−1307			−1274	
IIA-test	−0.16	1.31	−1.08	1.75	−3.05	−3.54

Notes: Significance at 1%,5% and 10% level are denoted by "a" "b" and "c". The figures in parentheses are heteroscedasticity robust standard errors. Significance levels are reported for two-tailed tests. IIA-test reports the value of test on the Independence from Irrelevant Alternatives property (Hausman and Mac Fadden(1984). Definitions of the variables can be found in the appendix.

Table5 Determinants of type of exits in Prewar Japanese banking industry (Small banks)

Panel A: LN(INTERLOCK)

	[1]						[2]					
Type of Exit	Equals		Absorbing		Failures		Equals		Absorbing		Failures	
LN(INTERLOCK)	0.1178		0.019		0.3464	a	0.1424		0.0061		0.2638	b
	(0.1266)		(0.1062)		(0.1163)		(0.1276)		(0.1054)		(0.1206)	
SIZE	−0.4622	a	−0.4114	a	−0.6806	a	−0.5637	a	−0.411	a	−0.4619	a
	(0.1351)		(0.1183)		(0.1347)		(0.157)		(0.1219)		(0.1416)	
EQ	−0.1156		0.4012		1.1761	a	0.0315		0.3867		1.0703	a
	(0.3984)		(0.2928)		(0.2805)		(0.4025)		(0.3014)		(0.3019)	
CAPDEP							−0.3695	b	−0.0022		0.0197	
							(0.1472)		(0.0254)		(0.0174)	
LIQUID							−2.0895	c	0.0711		−3.1919	c
							(1.2264)		(1.0078)		(1.6866)	
ROE							−0.0026		−0.0129		−0.0893	a
							(0.01)		(0.0116)		(0.0205)	
SECURITY							−0.8013		0.0541		−0.6605	
							(0.6818)		(0.2052)		(0.6302)	
INTERCEPT	5.8561	a	5.8999	a	8.9528	a	7.8326	a	6.0843	a	7.374	a
	(1.8681)		(1.6516)		(1.8607)		(2.1849)		(1.6999)		(1.9334)	
NOB			857						857			
Log Likelihood			−1131						−1094			
IIA-test	3.56		1.04		−0.45		14.63		−0.50		−1.12	

Panel B: Number of Interlocks per director

	[1]						[2]					
Type of Exit	Equals		Absorbing		Failures		Equals		Absorbing		Failures	
INTDIRC	0.0506		0.1109		0.4454	a	0.0922		0.1048		0.4166	a
	(0.1471)		(0.1216)		(0.1132)		(0.148)		(0.12)		(0.1181)	
SIZE	−0.429	a	−0.4375	a	−0.6861	a	−0.5248	a	−0.4429	a	−0.4855	a
	(0.1302)		(0.115)		(0.1301)		(0.1526)		(0.1187)		(0.1361)	
EQ	−0.1402		0.375		1.0219	a	−0.0018		0.3654		0.9327	a
	(0.4016)		(0.2944)		(0.2849)		(0.4057)		(0.302)		(0.3049)	
CAPDEP							−0.3603	b	−0.0047		0.017	
							(0.147)		(0.0198)		(0.0125)	
LIQUID							−2.0944	c	0.015		−3.307	b
							(1.2476)		(0.9946)		(1.6502)	
ROE							−0.0037		−0.0124		−0.089	a
							(0.01)		(0.0115)		(0.0204)	
SECURITY							−0.831		0.0462		−0.7484	
							(0.7031)		(0.2173)		(0.561)	
INTERCEPT	5.5107	a	6.2374	a	9.2277	a	7.4306	a	6.4925	a	7.8325	a
	(1.8443)		(1.6353)		(1.8374)		(2.1685)		(1.6882)		(1.9048)	
NOB			857						857			
Log Likelihood			−1127						−1090			
IIA-test	2.76		0.15		−0.45		5.86		1.08		−0.69	

Notes: Significance at 1%,5% and 10% level are denoted by "a" "b" and "c". The figures in parentheses are heteroscedasticity robust standard errors. Significance levels are reported for two-tailed tests. IIA-test reports the value of test on the Independence from Irrelevant Alternatives property (Hausman and Mac Fadden(1984). Definitions of the variables can be found in the appendix.

Table6 Determinants of type of exits in Prewar Japanese banking industry (large banks)
Panel A: LN(INTERLOCK)

	[1]			[2]		
Type of Exit	Equals	Absorbing	Failures	Equals	Absorbing	Failures
LN(INTERLOCK)	0.3662	0.0019	0.0636	0.4411	0.0896	0.1063
	(0.3162)	(0.3251)	(0.3139)	(0.339)	(0.301)	(0.3358)
SIZE	−0.5084	−0.2683	−0.2828	−0.3794	−0.107	−0.2986
	(0.3095)	(0.2793)	(0.2766)	(0.287)	(0.283)	(0.3138)
CAPDEP				0.0832	−2.9449 c	1.3666 c
				(0.8082)	(1.7218)	(0.813)
LIQUID				10.7774 b	12.024 b	7.5564
				(5.1089)	(5.3376)	(5.4765)
ROE				0.0089	−0.0634	−0.0228
				(0.0278)	(0.0461)	(0.0401)
SECURITY				−3.4657 c	−7.2836 a	0.9775
				(1.9866)	(2.0958)	(0.6272)
INTERCEPT	6.5676	3.4695	3.3773	3.8017	2.3466	2.4839
	(4.8912)	(4.3801)	(4.4605)	(4.7723)	(4.6986)	(5.328)
NOB		150			150	
Log Likelihood		−179.3			−162.4	
IIA-test	−0.01	−0.24	0.04	1.07	0.62	−8.98

Panel B: Number of Interlocks per director

	[1]			[2]		
Type of Exit	Equals	Absorbing	Failures	Equals	Absorbing	Failures
INTDIRC	−0.2354	0.0827	0.0328	−0.1876	0.1642	0.0819
	(0.195)	(0.1955)	(0.2013)	(0.2055)	(0.2111)	(0.2109)
SIZE	−0.2402	−0.3206	−0.2793	−0.1182	−0.1636	−0.3072
	(0.3031)	(0.2843)	(0.2764)	(0.2861)	(0.29)	(0.3094)
CAPDEP				0.2361	−2.9249 c	1.358
				(0.783)	(1.6865)	(0.7985)
LIQUID				8.9404 c	12.4046 b	7.5747
				(5.2243)	(5.3654)	(5.567)
ROE				0.0079	−0.0587	−0.0221
				(0.0277)	(0.0427)	(0.039)
SECURITY				−3.7615 c	−7.3652 a	0.9925
				(1.9741)	(2.1801)	(0.6273)
INTERCEPT	3.386	4.2162	3.4299 c	1.056	3.1618	2.7544
	(5.0342)	(4.6828)	(4.6066)	(4.9409)	(4.9094)	(5.4192)
NOB		150			150	
Log Likelihood		−179.2			−162.5	
IIA-test	−0.01	0.18	−0.10	−2.56	−0.09	3.37

Notes: Significance at 1%,5% and 10% level are denoted by "a" "b" and "c". The figures in parentheses are heteroscedasticity robust standard errors. Significance levels are reported for two-tailed tests. IIA-test reports the value of test on the Independence from Irrelevant Alternatives property (Hausman and Mac Fadden(1984). Definitions of the variables can be found in the appendix.

Table7 Observations of consolidation samples

	Number of consolidation				
	Total	1927	1928	1929	Participating banks
(1) Consolidation					
Merger (absorption)	23	8	9	6	47
Acquisition	11	2	7	2	22
Combination into a new bank	17	5	7	5	42
Multi-times merger	18				61
Total consolidations	69				172
(2) Peer group (Non-consolidated)	387				387

Table8 Change in number of interlocks from pre- to post-consolidation

		Total number of interlocks		
	NOB	1926(pre-M&A)	1931(Post-M&A)	Growth rate
(1) Total consolidation	69	1218	814	-33.2%
Absorbing consolidation	50	997	683	-31.5%
Merger of equals	19	221	131	-40.7%
(2) Peer group	387	2416	1913	-20.8%

Table9 Effect of consolidation on the nature of bank governance

Dependent Variable	ROE							
Definition of INTERLOCK	LN(INTERLOCK)				INTDIC			
Year	1926 (Pre-merger)		1931 (Post-merger)		1926 (Pre-merger)		1931 (Post-merger)	
Variables/Model	[1]		[2]		[3]		[4]	
CONS	2.8098	b	0.9443		1.145		-0.3292	
	(1.2841)		(1.4334)		(0.8773)		(1.0204)	
CONS*INTERLOCK	-2.3426	a	-1.1678	c	-2.1131	a	-0.5092	
	(0.5588)		(0.638)		(0.4953)		(0.4721)	
(1-CONS)*INTERLOCK	-0.2769		-0.6343		-0.2155		-0.7202	c
	(0.4582)		(0.4308)		(0.4924)		(0.4318)	
SIZE	0.694	b	1.3743	a	0.566	c	1.2883	a
	(0.3201)		(0.3774)		(0.3002)		(0.3561)	
EQ	-2.7088	b	-3.0789	b	-2.4693	c	-2.8032	b
	(1.3211)		(1.2519)		(1.3248)		(1.2189)	
MARKET	-0.0029		0.0045		-0.0055		0.0019	
	(0.0289)		(0.0234)		(0.0289)		(0.0233)	
SECURITY	2.6362	b	0.0868		2.6384	b	0.1	
	(1.2686)		(0.5221)		(1.3269)		(0.5397)	
INTERCEPT	3.7376		-11.5482	b	5.3795		-10.6207	b
	(4.4525)		(5.0325)		(4.3433)		(4.8408)	
Log Likelihood	-1844.9653		-364.5075		-1846.87		-1364.987	
NOB	559		456		559		456	
Censored Observation	20		71		20		71	

Notes: Significance at 1%,5% and 10% level are denoted by "a" "b" and "c". The figures in parentheses are heteroscedasticity robust standard errors. 7 area dummies are included. Significance levels are reported for two-tailed tests. Definitions of the variables can be found in the appendix.

Table10 Effect of consolidation on the nature of bank governance by type of participants

Dependent Variable	ROE							
Definition of INTERLOCK	LN(INTERLOCK)				INTDIC			
Year	1926 (Pre-merger)		1931 (Post-merger)		1926 (Pre-merger)		1931 (Post-merger)	
Variables/Model	[1]		[2]		[3]		[4]	
ACQUIRER	3.2444	b	2.2611	c	1.6428		0.4559	
	(1.4747)		(1.2567)		(1.051)		(1.0807)	
ACQUIRER*INTERLOCK	−2.3641	a	−1.4346	b	−2.195	a	−0.5683	
	(0.6323)		(0.5865)		(0.6246)		(0.4571)	
TARGET	2.2248				0.4873			
	(1.9753)				(1.3242)			
TARGET*INTERLOCK	−2.6444	a			−2.5143	a		
	(0.906)				(0.8797)			
EQUALS	3.5927	c	−1.4972		1.5837		−0.8301	
	(1.9176)		(3.5155)		(1.3409)		(2.3657)	
EQUALS*INTERLOCK	−2.0271	c	−0.667		−1.1638		−2.1719	
	(1.0709)		(1.6955)		(1.2075)		(2.732)	
(1−CONS)*INTERLOCK	−0.2514		−0.6067		−0.1912		−0.6859	
	(0.4611)		(0.4341)		(0.4939)		(0.4319)	
SIZE	0.6587	b	1.3237	a	0.5248	c	1.2265	
	(0.3348)		(0.385)		(0.3122)		(0.3569)	
EQ	−2.4943	c	−3.1326	b	−2.2895	c	−2.8478	
	(1.3301)		(1.2523)		(1.3368)		(1.2186)	
MARKET	0.0021		0.0046		−0.0007		0.0019	
	(0.0288)		(0.0234)		(0.029)		(0.0232)	
SECURITY	2.569	b	0.0787		2.5726	c	0.0903	
	(1.2739)		(0.5197)		(1.3206)		(0.5373)	
INTERCEPT	4.0447		−10.8455	b	5.8212		−9.7439	
	(4.652)		(5.1523)		(4.5038)		(4.8665)	
Log Likelihood	−1843.3154		−1363.7143		−1845.3031		−1364.1823	
NOB	559		456		559		456	
Censored Observation	20		71		20		71	

Notes: Significance at 1%,5% and 10% level are denoted by "a" "b" and "c". The figures in parentheses are heteroscedasticity robust standard errors. 7 area dummies are included. Significance levels are reported for two-tailed tests. Definitions of the variables can be found in the appendix.

Appendix Table: Sample description about pre-merger banks

Panel A: Acquirer banks

Variable	NOB	Mean	Std. Dev.	Min	Max
Number of Interlocks	50	11.44	12.33	0.00	63.00
Number of interlocks per director	50	1.21	1.24	0.00	5.25
ROE	50	13.65	4.46	1.47	23.96
ROA	50	3.50	2.05	0.10	9.64
Assets(1000 yen)	50	36486.53	87244.54	761.16	475586.30
EQ	50	0.12	0.33	0	1
MARKET	50	32.16	15.41	11.31	63.64
SECURITY	50	0.26	0.39	0.01	2.73

Panel B: Target banks

Variable	NOB	Mean	Std. Dev.	Min	Max
Number of Interlocks	74	6.04	7.60	0.00	34.00
Number of interlocks per director	74	0.70	0.90	0.00	4.20
ROE	74	12.38	7.10	0.00	47.62
ROA	74	4.32	5.12	0.00	40.37
Assets(1000 yen)	74	4968.41	11003.66	56.71	80121.54
EQ	74	0.11	0.31	0	1
MARKET	74	33.90	16.03	11.31	63.64
SECURITY	74	0.14	0.13	0.00	0.78

Panel C: Participants in mergers of equals (combination into a new bank)

Variable	NOB	Mean	Std. Dev.	Min	Max
Number of Interlocks	48	5.75	5.48	0.00	27.00
Number of interlocks per director	48	0.74	0.72	0.00	3.38
ROE	48	14.62	5.91	0.00	30.06
ROA	48	4.54	2.01	0.00	9.02
Assets(1000 yen)	48	2170.54	1700.50	480.14	8722.22
EQ	48	0.00	0.00	0	0
MARKET	48	31.45	15.23	13.17	94.59
SECURITY	48	0.12	0.16	0.00	0.80

Panel D: Non-consolidated banks (Control samples)

Variable	NOB	Mean	Std. Dev.	Min	Max
Number of Interlocks	387	6.24	8.47	0.00	66.00
Number of interlocks per director	387	0.79	0.97	0.00	5.60
ROE	387	13.63	7.50	0.00	63.26
ROA	387	4.42	3.21	0.00	28.43
Assets(1000 yen)	387	7029.58	39319.25	249.68	572070.10
EQ	387	0.13	0.34	0	1
MARKET	387	28.27	12.63	11.31	100.00
SECURITY	387	0.14	0.20	0.00	2.34

Appendix: Definitions of the variables

Variables	Definition
LN(INTERLOCK)	Natural log value of number of interlocks. Number of interlocks means the total number of the positions of directors and auditors of non-banking companies, held by the directors and auditors of each bank.
INTDIRC	Number of interlocks per director. That is, the number of interlocks divided by the number of directors.
SIZE	Natural log value of total deposit plus the book value of capital. Capital is the sum of paid-in capital, reserved fund and profit
EQ	Dummy variable which equals 1, if the bank's head office was located in Tokyo, Kanagawa, Chiba, or Saitama prefecture, and 0, otherwise.
MARKET	Share of top three banks in term of the number of branch offices in each prefecture.
ROA	Ratio of profit to total deposit plus the book value of capital. Profit is equal to the profit of the second half of the fiscal year, multiplied by two.
ROE	Ratio of profit to the book value of capital. The profit is equal to the profit of the second half of the fiscal year, multiplied by two. Capital is the sum of paid-in capital, reserved fund and profit
LIQUID	Ratio of bank deposit reserve to assets(total deposit plus the book value of capital) . Bank deposit reserve indicates the sum of cash holdings and deposit to BOJ and other banks.
CAPDEPO	Ratio of the book value of capital to total deposits.
SECURITY	Ratio of security holdings to total loans
LEVERAGE	Ratio of total deposits to the book value of capital. Capital is the sum of paid-in capital, reserved fund and profit
CONS	Dummy variable which takes the value one, if the bank participated in a consolidation, and zero otherwise.
ACQUIRER	Dummy variable which takes the value one, if the bank was an acquirer in an absorbing consolidation, and zero otherwise.
TARGET	Dummy variable which takes the value one, if the bank was a target in an absorbing consolidation, and zero otherwise.
EQUAL	Dummy variable which takes the value one, if the bank was a participant in a combination into a new bank, and zero otherwise.