

# **Bank Merger Movement and Evolution of Financial System\* : Experiences in Prewar Japan**

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## **Abstract**

In this paper we examined effects of bank consolidations on the financial system, using the data on the Japanese banking industry before the Second World War, when the first bank merger movement occurred and the deposit insurance did not exist. The focuses of our analysis are the governance structure and the performance of banks. First, we found that consolidations had an effect of excluding the unfavorable director interlocking between banks and their related firms, especially, in the case of absorbing consolidations. Second, we confirmed that consolidations had a positive impact on deposit growth, but not on bank profitability.

***Journal of Economic Literature Classification; G21, G34, N25***

**Key Word; Bank merger, Corporate governance, Director interlocking**

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\* We would like to thank the participants of the seminars at the RIETI, Hitotsubashi University Yokohama National University and West Coast Japan Economic Seminar, including Professor Shuto Abe, Masahiko Aoki, Kazumi Asako, Bernard Elbaum, Mikiko Fujiwara, Masako Ii, Takeo Hoshi, Tokuo, Iwaisako, Satoru Kano, Katsuyuki Kubo, Sukenari Kurasawa, Ronald Makinnon, Makoto Saito, Urike Schaede, Seki Obata, Hiroyuki Odagiri, Takeshi Otsu, Kotaro Tsuru, Takashi Ui and Tsutomu Watanabe, for helpful comments.

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## **1. Introduction**

Since the late 1990's, a wave of bank consolidations has spread across Japan. Besides three mega mergers, which resulted in Mizuho Financial Group, UFJ Bank and Sumitomo-Mitsui Bank, the Financial Service Agency (FSA) announced a policy to promote mergers between regional financial institutions in 2002. The implications of bank consolidation to the financial system in general is not only an issue of great relevance, but has also been one of the focuses of the current literature on banking and finance (Berger, Demsetz and Strahan [1999]) In this paper, we approach this issue, by using the data on the Japanese banking industry before the Second World War. As will be shown in the following section, the recent merger trend is the second wave of bank mergers in Japanese financial history. From the 1920s to the 1940s, there was a large bank merger movement in Japan. We intend to identify significant lessons relevant to the present situation from the analysis of the rich historical data gathered from the first wave.

The literature on the prewar Japanese financial system has often stressed the system's fragility. First, because a system of deposit insurance did not exist and numerous small banks existed, bank runs took place frequently. While Britain and Canada also lacked a deposit insurance system during the prewar period, the number of banks did not climb above 200 in the twentieth century (Saunders and Wilson [1999]). On the other hand, more than 2000 banks existed in Japan during the early twentieth century, and consequently, the sixteen series of bank runs occurred from 1896 to 1927 (Yabushita and Inoue[1993]). In particular, the bank runs in 1927 propagated themselves over the whole of the country, and 45 banks were closed.

Second, many banks were controlled by certain industrial companies through capital and personal relationships, and those banks tended to give unsound loans to those companies (Kato[1957]; Takahashi and Morigaki[1968]). Okazaki and Yokoyama[2002a] compiled a comprehensive data base on the directors that controlled the interlocking between the banks and

industrial companies, and found that the performance of those banks with many interlocked directors tended to be poor<sup>1</sup>. The bank-firm relationship in which the firm controls the bank, is essentially different from that of the Main Bank System in postwar Japan, where the bank monitors the firm (Aoki, Patrick and Sheard[1994]). The phenomenon that industrial companies control banks is not specific to prewar Japan. La Porta, Lopez-de-Silanes and Zammari[2001] stresses so called “related lending” in contemporary Mexico and many other developing countries. They made it clear that those banks which went bankrupt after the Mexican financial crisis in the 1990s, had, compared with surviving banks, concentrated their loans to the related companies.

On the other hand, a large wave of bank consolidations took place in Japan after the 1920s. We examine the effects of this merger wave on the above two characteristics of the financial system. The focuses of the analyses are as follows. First, we focus on the governance structure of the bank. Specifically, we examine the effects of the bank consolidation on the extents and quality of the director interlocking between banks and industrial companies. It is known that the close bank-firm relationship was pervasive in New England in the nineteenth century, as well as in contemporary developing countries (Lamoraux[1994]), which suggests that this kind of relationship is, to some extent, universal in the early stages of economic development. This paper sheds light on the process leading to the disappearance of this relationship during the process of economic development.

Second, the effects of consolidation on bank performance are examined. Here we focus on the two performance indicators reflecting the stability of the financial system, namely the ability to collect deposits and profitability. In prewar Japan, where the deposit insurance system did not exist, depositors were sensitive to the bankruptcy risk of banks. Given this behavior of depositors, the

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<sup>1</sup> Okazaki and Yokoyama[2002a] used various performance measures, including ROA and the probability of bank run.

effects of bank consolidation were thought to be relatively significant, because consolidation enlarges the bank scale and thereby enables the bank to diversify its portfolio and reduce the risk of bankruptcy. In fact, Saunders and Wilson[1999] showed that equity ratios of banks in Britain and Canada substantially declined in the early 1900s, where bank consolidation proceeded. They interpreted this as a reflection of the decline in the equity level requested by depositors. However, their paper did not statistically test the effect of bank consolidation. We will perform a statistical test of this effect under the condition where a deposit insurance system did not exist.

The paper is organized as follows. Section 2 provides an overview of the historical background of the bank merger movement in prewar Japan. Section 3 outlines the analyses of the relationship between the consolidation and governance structure of banks, focusing on director interlocking. Section 4 examines the effects of consolidation on bank performance after which Section 5 provides a summary to conclude the paper.

## **2. Historical background of the bank merger movement**

The industrial organization of the Japanese banking industry was substantially different from that seen in the postwar period. The most remarkable feature is that numerous banks entered the industry, owing to the loose entry regulations, and as a result, many banks also exited the industry through failure and mergers.

The history of the modern banking industry in Japan started with the National Bank Act in 1872. National banks were private banks, which were privileged to issue bank notes. After the Bank of Japan was established as the central bank in 1882, the national banks were reorganized into ordinary banks, and at the same time many other ordinary banks were established. Besides ordinary banks, there were deposit banks, which specialized in small sized deposits. The number of private banks swelled to as many as 2334 (1890 ordinary banks and 444 deposit banks) at its peak in

1901 (Figure 1). After that, the selection of banks due to market forces started, and at the same time, the government introduced the policy intervention to reduce the number of banks and expand their scales. From the early 1900's, the government restricted the entry of new banks, by setting a minimum limit of capital required to gain a license. Then, from the early 1920's, the government stopped licensing new banks as well as allowing the establishment of new branches, and at the same time it promoted bank mergers (Table 1).

In 1927, a powerful measure to urge bank consolidations was given to the government. The Bank Law in 1927 set the lower limit of bank capital to one million yen, and obliged existing banks to clear this limit in five years<sup>1</sup>. When this law was legislated, there were 1420 ordinary banks, out of which 807 did not clear the limit. Furthermore, the government did not approve each of those banks to increase capital by itself. As a result, those banks were obliged to choose one of the two alternatives, liquidation or consolidation. The number of bank exits due to consolidation increased to 222 in 1928, when the Bank Law was enacted. Then, during the Second World War, the government de facto forced banks to merge. When the war ended, the total number of banks was reduced to 65, and the basic structure of the postwar banking industry had emerged.

The basic reason the government promoted bank mergers after the 1920's was that it recognized that a financial system with numerous small-sized banks was unstable. Also, the financial authorities recognized that there was another basic factor for the instability of the financial system, namely the close bank-firm tie. For example, after the financial crisis in 1927, the Bank of Japan reported that the control of banks by industrial companies was the basic reason for the crisis (Bank of Japan[1969]).

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<sup>1</sup> As to the banks whose headquarters were located in Tokyo and Osaka, the limit was 2 million yen, and as to the banks whose head quarters were located in the towns whose populations were less than ten thousand, it was five hundred thousand yen.

Okazaki and Yokoyama[2002a] quantifies the bank-firm relationship in 1926, focusing on the director interlocking. They counted the number of cases in which directors and auditors of each bank were at the same time directors and auditors of industrial companies, and found that that number, a bank-firm tie measure, was negatively related to the profitability of each bank. This implies that in prewar Japan a close bank-firm tie was an unfavorable factor for the bank, as was evident in contemporary Mexico (La Porta et al[2001]).

It is remarkable that the government expected that bank consolidation would resolve the unsound relationship between the banks and industrial companies. Specifically, they thought that if a small bank was acquired by a large bank to become one of its branches, unsound loans due to the tie between the small bank and related industrial companies would be reduced. Also, the government expected that as a result of the consolidation, full-time managers would increase, on the ground that employment of a full-time manager had scale economy (Shiratori[2002]).

### **3 The Effect of Consolidation on The Governance Structure**

#### **3.1 Data and Samples**

In this section, we examine the impact of bank consolidation on the governance structure of banks. Specifically, we focus on the interlocking of directors and auditors between banks and non-banking firms. It is because the data on the ownership structure are limited, and also the borrowing data of each firm by bank are generally not available. On the other hand, according to Okazaki and Yokoyama [2002a] and other related literatures, it is expected that we can capture the strength of the bank-firm ties using the information on the interlocking of directors and auditors.

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. This is because bank consolidations increased tremendously due to the Bank Law, promulgated in 1927. The data source

of the bank consolidations is *Ginko Jiko Geppo (Monthly Bank Affairs)* published by the Bank of Japan. From this source we can obtain the basic information on each bank consolidation, including the event date, the names of participating banks, the prefecture where their head offices were located, the amount paid-in capital in pre-merger banks and post-merger banks, and the consolidation type. In this source, bank consolidations are classified into three types, namely, absorption, acquisition and combination into a new bank. Here, the combination into a new bank refers to a type of consolidation where a new bank was established after dissolving all of the participants.

The information on the type of consolidation is useful because we can infer the power balance among the pre-consolidation banks from it. According to Kin'yu Kenkyukai [1934], in the case where the powers of the pre-consolidation banks were equal, they tended to choose to combine into a new bank. On the other hand, when one bank dominated the other participants, absorption or acquisition tended to be chosen. Hereafter, we classify bank consolidations into absorbing consolidations and mergers of equals. The former includes absorptions and acquisitions in *Ginko Jiko Geppo*, while the latter refers to combinations into new banks.

The financial data of each bank is obtained from various issues of *Ginkokyoku Nenpo (Year Book of the Bank Bureau of the Ministry of Finance)*, which covers all of the banks in Japan. To compile the data on interlocking of directors and auditors between banks and non-banking firms, we use *Ginko Kaisha Yoroku (Directory of the Banks and Firms)* by Tokyo Koshinjo, one of the largest private credit bureaus.<sup>1</sup> This source allows us to capture the names and positions of the directors and auditors of each bank and non-banking firm with paid-in capital larger than twenty thousand yen.<sup>2</sup> With respect to the identification of the interlocking between banks and non-banking firms,

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<sup>1</sup> 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)

<sup>2</sup> While *Ginko Kaisha Yoroku* of 1926 covers 1079 ordinary banks, *Ginkokyoku Nenpo* covers 1420

we follow Okazaki and Yokoyama [2002a]. Namely, if a person who was a director of a certain bank was at the same time a director of a certain non-banking firm, we identify that there was one interlock. Meanwhile, if a person who was a director of a certain bank, was at the same time a director of two non-banking firms, we identify that there were two interlocks. Since we are interested in the change of interlocking relationships between before and after a bank consolidation which occurred in the period from 1927 to 1929, we also included the data on the director interlocking in 1926 and 1931.<sup>1</sup>

Table2 summarizes the data on interlocking, concerning all banks available in *Ginko Kaisha Yoroku*. According to the table, nearly 80% of ordinary banks were connected to non-banking firms through interlocking of directors and auditors, which reconfirms the result of Okazaki and Yokoyama[2002a]. Categorizing the banks in terms of paid-in capital, we find that the percentage of the banks with director interlocking was the highest in the large-sized group. The same relationship is also observed in the average number of interlocks per bank and per director. Paying attention to the change from 1926 to 1931, we find that the average number of interlocks per bank and per director increased slightly.

Now, we select the samples to examine the effect of bank consolidation. As mentioned above, the sample period from 1927 to 1929 was the period when an especially large number of bank consolidations occurred. However, we cannot use all of them as the samples for the following two

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ordinary banks. The samples common to both sources are 1007 ordinary banks.

<sup>1</sup> Editing *Ginko Kaisha Yoroku*, Tokyo Koshinjo collected information by prefecture around April of each year. This year book includes the index by person. From this index, we can get the list of the director positions of each person. On the other hand, *Zenkoku Shokaiisha Yakuinroku* (Directory of the Company Directors), which is used by Okazaki and Yokoyama[2002a], lacks this kind of index. In this sense, *Ginko Kaisha Yoroku* is more useful. While, *Zenkoku Shokaiisha Yakuinroku* covers more non-banking firms than the former, regarding the number of interlocks which we are particularly interested in, *Ginko Kaisha Yoroku* covers about 90% of *Zenkoku Shokaiisha Yakuinroku*.

reasons. The first reason is data availability. Since *Ginko Kaisha Yoroku* does not contain information on banks and non-banking firms with paid-in capital of less than twenty thousand yen, we should limit the consolidation samples to those in which paid-in capitals of all the participants were at least twenty thousand yen or larger. The second reason is to eliminate the effect of the consolidation which occurred one year before and after our sample period. For this purpose, we excluded those consolidations in which any participants took part in another consolidation in 1926. At the same time, we excluded those consolidations in which any participants took part in another consolidation in 1930. As the control samples, we selected those banks which did not participate in any consolidations in the period between 1926 and 1930.

Panel A of Table3 shows the number of the consolidation samples and control samples selected in this way. The merger participants are classified into four categories by the type of consolidation. Here, multi-times consolidation refers to that in which at least one bank experienced multiple consolidations within the sample period. For example, if Bank A merged with Bank B in 1927, and also acquired Bank C in 1929, we regard these consolidations as one multi-times consolidation where Bank A consolidated with Bank B and Bank C.<sup>1</sup>

Panel B provides the information on the number of interlocks and total assets of the sample banks before consolidation, where the consolidation participants are classified into three groups, acquirer banks, target banks and participants of mergers of equals. With respect to the multiple-time mergers, the consolidations which included at least one merger to form a new bank,

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<sup>1</sup> Out of the 18 multiple-time consolidations, 15 experienced consolidations twice, and 3 experienced three times. In the analysis of Berger and Humphrey [1992], they regard those consolidations as one consolidation, if an acquirer bank merged with another bank in the same year or the next year.

are regarded as a merger of equals.<sup>1</sup> It is confirmed that while acquirer banks, the largest in total assets, had more interlocks than the other banks, the target banks comes to the top, in the case where we normalize interlocks by total assets (interlocks /total assets).

### 3.2 Quantitative Change of Director Interlocking

To begin with, we examine how bank consolidations affected the extent of the director interlocking between banks and firms. Concerning banks which participated in the consolidation  $i$ , the change of the interlocking from 1926 to 1931 is defined as follows:

$$\Delta INTERLOCK_i^C = INTERLOCK_{31}_i^C - (INTERLOCK_{26}_i^1 + INTERLOCK_{26}_i^2) \quad (1)$$

Where  $INTERLOCK_{31}_i^C$  is the number of interlocks of the bank in 1931 after the consolidation, and  $INTERLOCK_{26}_i^k$  ( $k=1,2$ ) is the number of interlocks of the participant banks in 1926. As for the non-consolidated banks, we simply use the difference of interlocks between 1926 and 1931.

Panel A of Table 4 compares the change of total number of interlocks between the consolidated and the non-consolidated banks. The number of interlocks declined in all of the groups. The reason for this general decrease of interlocking is thought to be the promulgation of the Bank Law in 1928, which regulated director interlocking.<sup>2</sup> Comparing the consolidated banks with the non-consolidated banks, we found that the interlocks decreased more significantly in the former than in the latter (-33.0% versus -20.7%). This fact seems to indicate that consolidations had the effect of reducing interlocking. However, a more detailed examination including statistical tests, is

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<sup>1</sup>. Consequently, the 16 samples out of 18 multiple-time consolidations are classified into the absorbing integration, and the other two samples are classified into a merger of equals.

<sup>2</sup> Inspection by the Bank of Japan started in 1928, where BOJ aimed at soundness its client banks. Also, inspection by the Ministry of Finance (MOF) started in 1927, where MOF aimed to promote not only sound banking but also urging bank consolidations (Ito[1928]).

necessary. Panel B of Table 4 shows the distributions of the number of interlocks in 1926 between the consolidated banks and the non-consolidated banks. The distribution of the non-consolidated banks is biased toward the lower side, compared with that of the consolidated banks. Therefore, if we simply compare the change of the numbers of interlocks between the two groups, the difference of the initial distributions might be reflected in the result.<sup>1</sup>

Hence, we selected an appropriate peer sample matched for each consolidated bank, out of the 387 non-consolidated banks, instead of using all of the control samples. In selecting peer samples, we took into account of the number of interlocks in 1926, asset size and operating area.<sup>2</sup> Panel C compares the average changes of interlocks, defined by Equation (1), between the consolidated banks and the selected matched non-consolidated banks. In comparison, we split the samples into several sub-samples, by type of the consolidation, by area and by asset size. With respect to the consolidation type, we focus on the distinction between absorbing consolidations and mergers of equals. With respect to the area, we focus on the distinction between the urban area and non-urban area. The urban area is defined as those prefectures including Tokyo, Osaka, Kagawa, Aichi, Kyoto and Hyogo, and the consolidation in urban area refers to that where the head office of the new bank was located in above five prefectures. Finally, concerning the asset size, we divided the consolidation samples into three groups by the asset size of the pro-forma bank.

According to Panel C, in the case of the full samples, decreases of the interlocks were 5.8 and 4.2 respectively in the consolidated banks and the matched non-consolidated banks. However, the

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<sup>1</sup> If we conduct the t-test without any adjustment, the difference of interlock in the number of interlock in means is statistically significant at 1 % level.

<sup>2</sup> As we mentioned above, since control samples have a bias toward the lower number of interlocks in 1926, there no room to select in our discretion as for the matched banks with more than 15 interlocks in 1926. Additionally, when we select the matched banks with less than 10 interlocks, we always select the non-consolidated bank which has the same interlocks as those of the paired consolidated bank.

difference between the two groups is not statistically significant. Also, the cases in which decrease of the interlocks were larger in the consolidated banks, were no more than a half of the samples (33 out of 69).

Concerning the sub-samples, only in the case of the local area and medium scale, the decrease in the consolidated banks was larger than in the non-consolidated banks and the difference was statistically significant. Even in these cases, the significance level was marginal (10%).

So far, it is observed that the number of interlocks generally decreased in the period from 1926 to 1931, but that the decrease was not significantly greater in the consolidated banks. However, this result does not necessarily mean that the consolidation had no effect on the interlocking. To make this point clear, we paid attention to the types of consolidations, namely mergers of equals (combination into a new bank) and absorbing consolidations. First, let us examine mergers of equals. The banks which took part in this type of consolidations had 221 interlocks in total, before the consolidations (total number of directors were 122), and after the consolidations, the number of interlocks decreased to 131. Examining these 221 pre-consolidation interlocks, we found that it was not rare that a bank director who held a director position in a non-banking firm, also had a director position of the bank which was to be consolidated with the former bank. Hereafter we refer to this kind of director as a “duplicated bank director”. Actually, out of the 122 bank directors with interlocking positions, 20 were duplicated bank directors. After the consolidations, 75 percent of these duplicated bank directors remained as the directors of the newly established banks. This fact indicates that not a small part of the combinations into new banks, occurred within the same corporate groups. In this case, it is unlikely that the bank consolidation altered the relationship between banks and firms.

On the other hand, the banks which participated in the absorbing consolidations, had 390 directors with interlocking positions, out of which only 8 were duplicated bank directors. Also, the acquirer

banks are expected to have strong incentives to exclude the relationship between the target banks and their related firms. In order to check how interlocks of the target banks were affected by the mergers and acquisitions, we focused on those absorbing consolidations, where the target banks had at least one interlocks before the consolidations. There were 38 of those consolidations in our samples, and the participant banks had 197 interlocking directors. According to Table 5, out of the 197 interlocking directors, 179 (91%) were terminated from the post-consolidation banks. Moreover, in 22 consolidations out of 38 samples, all of the target banks' directors with interlocking positions were eliminated.

It is notable that the above analysis focuses only on whether the interlocking directors of the target banks were eliminated from the board of directors of the new banks. Accordingly, if the directors of the firms related to the target bank, who had not been directors of the banks, were selected as directors of the acquirer banks after the consolidation, we overestimate the effect of eliminating the connection of the target with its related firms. To check this possibility, we show the number of interlocks related to the target banks, in post-consolidation banks, in panel B of Table 5. We can confirm that only 36 out of the total 598 interlocks in the post-consolidated banks, were related to the target banks.<sup>1</sup>

### **3.3 Effect on the Interlocking Relations of Senior Directors.**

So far, we have analyzed the impact of consolidations on director interlocking with respect to all of the bank directors. On the other hand, in the following analysis we focus on the senior directors of banks (i.e. president, chairman, vice-president, executive director), because, in general, senior directors are thought to have a larger influence on managerial decisions, including the lending

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<sup>1</sup> According to Table5, as the directors of the target banks with interlocking positions were eliminated by the 38 absorbing consolidations, the number of interlocks potentially declined by 391. However, it actually declined by only 302. That is, the acquirer banks, in contrast, strengthened the connection with their related firms during this period for some reason.

policy. In addition, thorough focusing on senior directors, we can examine the increase in full-time managers. As mentioned in section 2, the Ministry of Finance expected an increase in full-time managers as a result of the bank consolidation.

Table 6 compares the changes of the interlocks of senior directors between the consolidated and the non-consolidated banks. Since some banks did not have senior directors, we excluded those banks from our samples. Column (1) of Table 6 is a comparison between the consolidated banks and all the non-consolidated samples, while column (2) is comparison between the consolidated banks and the matched non-consolidated samples.

First, while in the consolidated banks, interlocks decreased by nearly 40%, in the non-consolidated banks, interlocks decreased by around only 15%. In comparison with Panel A of Table 4, based on all directors, the relative decrease of interlocks in the consolidated banks is clearer concerning the senior directors. Also, the difference in the decrease between the two groups is statistically significant. One possible reason for the great decrease in the number of senior director interlocks is that they had larger influence on managerial decisions. The acquirer banks, which, as discussed above, tended to eliminate the directors of the target banks with interlocking relations, are thought to have stronger incentives to eliminate the senior directors of the target banks with interlocking relations. Another reason is that the posts of senior directors were generally limited in number. Therefore, the probability for the senior directors of the pre-consolidation banks to lose their positions by the consolidation, was large, especially in a consolidation in which more than two banks participated.

Next, we focus on full-time managers. Here, we define a full-time manager of a bank as a senior director of a bank without any other positions of director or auditor. According to Table 6, the percentage of full-time managers to all the senior directors in the consolidated banks did not change between pre-and post-consolidation. While the percentage in the non-consolidated banks

increased slightly, we cannot observe a significant difference. Moreover, focusing on the average number of interlocks per senior director, we find that it increased in the consolidated, while it decreased in the non-consolidated banks. This index is considered to be a good measure of managerial specialization, because the fewer other director positions a senior director held, the more time he could spend for the bank management. After all, we can conclude that contrary to the expectation of the Ministry of Finance, bank consolidations did not have the effect of promoting specialization in terms of bank management.

### **3.4 Qualitative Change of Director Interlocking**

In this section, we examine the effect of bank consolidation on the nature of the director interlocking. As discussed above, absorbing consolidations substantially eliminated the director interlocking in the target banks, and also consolidations in general had the effect of eliminating the interlocking of the senior directors. These facts suggest the possibility that the nature of the director interlocking changed through bank consolidations. We examine this possibility relying on the method of Okazaki and Yokoyama[2002a]. Using the data of 1926, Okazaki and Yokoyama[2002a] obtained the result that the number of interlocks negatively affected the return on assets (ROA) of banks. Accordingly, we examined how this negative relationship changed between pre-and post-consolidation.<sup>1</sup>

First, we estimated the effect of interlocks on ROA in the pre-consolidation year (1926) and the post-consolidation year (1931), concerning all the banks available in *Ginkokyoku Nenpo* and *Ginko Kaisha Yoroku*. Since the profit data in *Ginkokyoku Nenpo* are censored at zero, we run Tobit regressions as follows:

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<sup>1</sup> In calculating ROA, since we use the end of total assets as the denominator, the profit of the second half of the year, multiplied by two, is used as the numerator, instead of total profit of the year (the profit of the first half plus the that of the second half). Even if we use the profit of the year, the result did not change qualitatively.

$$ROA_i = \beta_0 + \beta_1 LN(1 + INTERLOCK_i) + \beta_2 URBAN_i + \beta_3 LN(ASSET_i) + \beta_4 BRANCH_i \quad (2)$$

where LN(1+INTERLOCK) is a natural log of the number of interlocks added by the value one, and URBAN is a dummy variable that takes the value one if the head office of the bank is in the urban prefectures (Tokyo, Kanagawa, Aichi, Kyoto, Osaka and Hyogo), and zero otherwise. ASSET and BRANCH denote the total assets and the number of braches, respectively.

Column 1 and 2 of Table 7 show the results of the estimation with respect to all of the banks available in our data source. The coefficient of LN(1+INTERLOCK) is negative and statically significant at 5% level in 1926, namely the pre-consolidation year, which implies that the director interlocking had a negative effect on the profitability of the banks, which is consistent with Okazaki and Yokoyama[2002a]. The coefficients of URBAN and LN(ASSET) are negative and statistically significant. This relationship is inferred to reflect the situation that while medium-and large-sized banks were very competitive in the urban area, many of the small banks had monopolistic powers in the segmented local market (Imuta[1976]; Teranishi[1982]). On the other hand, as for 1931, the post-consolidation year, while the coefficient of LN(1+INTERLOCK) is still negative, its magnitude declined by 40%, and also it is statistically insignificant. We can say that the negative effect of the director interlocking became weak in the period from 1926 to 1931, concerning the banking industry as a whole.

In order to show that this change of the nature of the director interlocking was due to bank consolidations, we estimate the same equations, splitting samples into those banks participating in consolidations and the control samples. To capture the effect of director interlocking in the consolidated banks and in the non-consolidated banks respectively, the interaction terms, CONS\*LN(1+INTERLOCK) and (1-CONS)\*LN( 1+INTERLOCK) are added to the independent variables, where CONS is the dummy variable that takes the value one, if the bank participated in a

consolidation, and zero otherwise.<sup>1</sup>

Column 3 and 4 of Table 7 show the estimation results in the pre-and post-consolidation years, respectively. As to the pre-consolidation year (1926), the coefficients of both  $CONS*LN(1+INTERLOCK)$  and  $(1-CONS)*LN(1+INTERLOCK)$  are negative. However, while the former is statistically significant at 1% level, the latter is insignificant. Namely, before the consolidations, the director interlocking of the consolidation participants was worse in quality than that of the non-participating banks. With respect to the post-consolidation year (1931), as shown in column 4, the coefficient of  $CONS*LN(1+INTERLOCK)$  is still negative, but statically insignificant. Moreover, its magnitude substantially declines. On the other hand, the coefficient of  $(1-CONS)*LN(1+INTERLOCK)$  hardly changed. These results can be interpreted that the nature of director interlocking changed thorough consolidations.

Why is this remarkable change observed? In order to address this question, we focus on the types of the consolidation. As mentioned in section 3, we classify bank consolidations into the absorbing consolidations and merger of equals (merger into a new bank). Also, as to the former, we classify the participants into the acquirer banks and the target banks. Using these split samples, we estimate the same equations (column 5 and 6 of Table 7), where ABSO and EQ are the dummy variables which take the value one, if the bank took part in an absorbing consolidation and a merger of equals, respectively, and zero otherwise. In the pre-consolidation regression, ABSO indicates that the bank was to be an acquirer, and ABSOTRG indicates that the bank was to be a target of an absorbing consolidation.

In the pre-consolidation regression (column 5), comparing the coefficients of the interaction

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<sup>1</sup> While in column [3]-[6] of Table 7 [3]-[6], the dummy variables (CONS, ABSO, ABSOTRG, NEW) and their interaction terms with  $LN(1+interlock)$  are included, we also estimated the equations excluding CONS, ABSO, ABSOTARG, and NEW. However, the coefficients of the interaction terms did not change qualitatively.

term between the acquirer banks and the target banks, we find that the latter is negative and statistically significant at 1% level, and that its magnitude is considerably larger than that of the former. This result indicates that the director interlocking of the target banks was relatively poor in terms of quality. As for the merger of equals, the coefficient of the interaction term is nearly the middle value between the acquirers and the targets of the absorbing consolidations. All of the constant-term dummies (ABSO, ABSOTRG, EQ) have positive coefficients, which implies that the consolidated banks were more profitable than the non-consolidated banks for the reasons other than director interlocking. In particular the coefficient of ABSOTRG is large. This is considered to reflect the situation that the target banks had more or less monopolistic power in the separated local market.

Column 6 reports the post-consolidation estimation. Concerning consolidations of equals, the coefficient of  $EQ * LN(1 + INTERLOCK)$  is smaller in magnitude as well as statistically insignificant. However, it does not indicate that the nature of director interlocking changed through consolidations, because this coefficient was also insignificant in the pre-consolidation year. With regard to absorbing consolidations, the coefficient of  $ABSO * LN(1 + INTERLOCK)$  was not affected by absorbing the target banks. In other words, the nature of the director interlocking in the acquirer banks did not change<sup>1</sup>.

Synthesizing these results with the observations in 3.3, we can conclude that concerning absorbing consolidations, a substantial part of the interlocking connections in the target banks, which was poor in quality before the consolidations, were eliminated by the consolidations, and that as a result, the negative effect of the director interlocking disappeared. Concerning the consolidations of equals, the quality of the director interlocking did not change through the consolidations. This is because as pointed out in 3.3, a substantial part of the participants in this type of consolidations

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<sup>1</sup> The target banks were extinguished through the consolidation, by definition.

were affiliated to the same corporate groups.

#### **4. Consolidation and the bank performance**

##### **4.1. Sample and Methodology**

In this section we examine the relationship between bank consolidations and stability of the financial system. Specifically, we focus on the two indicators, which were supposed to have a strong effect on the stability of the financial system, that is, the ability of banks to attract deposits measured by deposit growth rate, and the profitability measured by return on assets (ROA).<sup>1</sup> Due to the lack of the safety-net for depositors in prewar Japan, bank runs frequently occurred, and consequently many banks were obliged to be closed. Also, Yabushita and Inoue [1993] reported that the probability of a bank to be closed was negatively correlated with its profitability.<sup>2</sup>

When a banking system is not protected by the deposit insurance system, the potential benefit of a bank consolidation is thought to be larger. Because the diversifying of a loan portfolio by a bank consolidation reduces depositor's risk, and thereby lowers the probability of a bank run. Therefore, a consolidated bank can enhance the profitability of its portfolio thorough reducing idle reserve holdings in preparation for withdrawal of deposits.<sup>3</sup>

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<sup>1</sup> We have much literature on the impact of consolidation on the bank performance. (Berger and Humphrey[1992]; Cornett and Teranian[1992]; Linder and Crane[1992]; Pilloff[1996]; Rodes [1992,1998]). While some of them focus on cost and X-efficiency, we cannot do it, since the information on cost is not available in *Ginkokyoku Nenpo*.

<sup>2</sup> While Yabushita and Inoue[1993] uses ROE(return on equity) as a measure of profitability, we focus on ROA. This is because we would like to examine how efficiency of asset management was improved by the consolidation.

<sup>3</sup> Saunders and Wilson[1999] interprets that the secular decline in the capital ratios of the Canadian and British banks from 1900s to 1920s, reflected the decline of the capital level requested by the depositors,

We investigate the effect of consolidation by comparing the performance of the consolidated banks with the non-consolidated banks in the period from one year before the consolidation to two and three years after the consolidation. In order to capture the effect of consolidations in broad terms, we extend the sample period of the preceding sections. That is, we use all the consolidations of ordinary banks in the period from 1927 to 1932 as samples.<sup>1</sup> As a result, we have 164 consolidation samples, in which 392 banks were involved. Table 8 provides the basic statistics on the pre-consolidation banks. According to this table, the acquirer banks were larger in terms of assets than the other banks, including the target banks, the banks participated in the mergers of equals, and the non-consolidated banks. On the other hand, the target banks and the participants of the mergers of equals had a relatively high ROA, which are considered to reflect the fact that those banks had more or less market power in the segmented local markets.<sup>2</sup>

We used the following OLS regression to measure the effect of consolidation:

$$X_i = \beta_0 + \beta_1 CONS_i + \beta_2 LN(ASSET_i) + \beta_3 \Delta BRANCH_i + \beta_4 URBAN_i \quad (3)$$

The dependent variable,  $X_i$ , is the difference of ROA or deposit growth rate from T-1 to T+2 or T+3, where the consolidation was assumed to occur in year T.  $\Delta BRANCH$  denotes the difference of the number of the branches. LN(ASSET) is the natural log of the total assets in year T-1. Here,

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based on, Gorton and Pennacchi [1990] and Calomiris and Wilson [1998]. We cannot directly apply their studies to the prewar Japanese banking industry, since most of the banks did not take part in the open capital market, and consequently they were thought to be unable to adjust their capital level at will.

<sup>1</sup> Since *Ginko Kaish Yoroku*, the source of data on the director interlocking, does not contain the data of the banks with paid-in capital less than twenty thousand yen, the consolidations involving those banks are excluded from the samples in the previous section. However, in this section our sample includes these small banks, because we do not use data of *Ginko Kaish Yoroku* in this section.

<sup>2</sup> Concerning the return on assets, Linder and Crane [1992] show that the target banks have higher ratios of net interest income to assets than the acquirer banks. They explain that this is because the structure of loan portfolio and liabilities is different between large banks and small banks.

concerning the variables of the consolidated bank in year T, the value of the pro-forma bank is used. The definitions of URBAN and CONS are the same as in Section 3.

Now, we are particularly interested in the sign of the dummy variable, CONS. The coefficient is expected to be positive with respect to both dependent variables, if the consolidation had a positive impact on the bank performance. Since the number of consolidation samples is not large enough to estimate the model year by year, we pool all the samples, and use year dummy variables to control for the shocks common to the samples of the same year.

#### 4.2 Empirical Results

Table 9 indicates the OLS estimation of Equation (3). Column 1 and 2 are the results of the deposit growth rate regressions, regarding the periods from T-1 to T+2 and T-1 to T+3, respectively. The coefficients of CONS are positive and statistically significant, which means the capability to collect deposits was enhanced through the consolidation. It is remarkable that the coefficient of LN(ASSET) and  $\Delta$  BRACH are also positive and statistically significant. Besides the effect of the consolidation itself, it increased the ability to collect deposits through raising the asset size and branch number of the bank<sup>1</sup>

The background behind these results is thought to be the Showa Financial Crisis in 1927 and the Great Depression. It is inferred that negative shocks in the lack of protection by the deposit insurance system urged risk-averse depositors to transfer their deposits to larger banks which were perceived to be safer. Based on the data from 1900 to 1940, Teranishi[1982] confirms that bank deposits shifted from small and medium banks to the five large banks (Daiichi, Mitsubishi, Mitsui, Sumitomo and Yasuda) and the postal savings. Negative

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<sup>1</sup> Based on the deposit and loan data of Mitsubishi Bank by branch, Okazaki [2002b] shows that the increase of the branches in 1920s and 1930s mainly contributed to collecting deposits.

coefficients of the year dummies reflect that the shift from bank deposits to postal savings progressed after the Showa financial Crisis in 1927, because the benchmark of the year dummies is the consolidation samples in 1927( i.e., the change from the end of 1925 to the end of 1929 or 1930). Assuming that depositors had strong preferences over the safe assets, we can interpret the positive effect of the consolidation to mean that consolidations were perceived by depositors as a good signal concerning the risk of bank failure.

Next, column 3 and 4 provide the results with respect to the difference of ROA. The coefficients of CONS are negative and statically significant at 5% and 1% level, respectively.<sup>1</sup> According to the results, ROA declined 0.3-0.4% thorough the consolidations<sup>2</sup>. On the other hand, LN(ASSET) had a strongly positive effect on the bank profitability. The average magnitude of economies of scale is approximately 0.05-0.1%.<sup>3</sup> However, compared with the effect of CONS,

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<sup>1</sup> Since consolidations were often accompanied by the reevaluation of the asset, we adjust the asset of the post-consolidation bank in the following way.

$$ASSET_{T+i} = ASSET_{T-1} + (ASSET_{T+i} - ASSET_T), \quad i=2, 3$$

Without the adjustment, the effect of consolidation on ROA is still negative, but less significant.

<sup>2</sup> Since we did not include the banks which exited through failures and dissolutions, in estimating Equation (3), it is possible that the estimation results are affected by the sample selection bias.

Therefore, we also estimated the sample selection model by the maximum likelihood method.

According to the sample selection estimation, the bank consolidation still had a positive impact on the growth rate of deposits. Also the coefficient of CONS is larger in magnitude and statistically more significant, compared with the OLS estimation. On the other hand, as for ROA, the coefficient of CONS is still negative, but statistically insignificant. Anyways, there is no evidence indicating a positive impact of consolidation on profitability.

<sup>3</sup> We calculate the effects of the asset scale by the type of consolidation, based on the mean and the median of total assets of the pre-consolidation banks, respectively. The calculation is as follows:

$$0.157(0.209) * [LN(ASSET_{T-1}^A + ASSET_{T-1}^B) - w^A LN(ASSET_{T-1}^A) + w^B LN(ASSET_{T-1}^B)], \text{ where } W \text{ is}$$

the weight based on total assets.

the negative effect of consolidation cannot be offset by the economies of scale.

On the other hand, as shown in Table 8, scale economy was not observed in terms of profitability before the consolidation year. These facts suggest that the profit structure in the banking industry changed in the late 1920s. The result that the coefficient of URBAN is positive and statistically significant at 1% level, also supports this interpretation.<sup>1</sup>

As discussed at the beginning of this section, bank consolidations, especially in relation to lack of deposit insurance, potentially enhance bank profitability. However, in reality, the consolidation had a negative impact on ROA in prewar Japan. In order to understand the reason for this negative effect, we pay attention to the types of consolidations again. Integration of multiple organizations is generally accompanied by coordination costs. The magnitude of this cost is likely to depend on the type of consolidations. Compared with absorbing consolidations, the coordination cost is expected to be larger in mergers of equals, where there was no dominant participant.<sup>2</sup> Additionally, as we saw in Section 3, the effect of consolidation on the governance structure was different between absorbing consolidations and mergers of equals, which is also expected to bring about the different effects on the profitability. Also, the more participants, the larger the coordination cost would be.

Therefore, we add the independent variables denoting these relevant factors to equation (3) with ROA as the dependant variable. First, we replace CONS by is AQU, MRG and EQ, which

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<sup>1</sup> Okazaki [1993] argues that the difference of interest rates between the urban and the rural areas expanded in 1920s, because the local banks were deprived of good borrowers by urban banks and consequently had to increase risky mortgage loans.

<sup>2</sup> Berger et al. [1999] points out the cause of poor improvement of cost efficiency by M&As in the 1980s was that the gains of M&A were offset by managerial difficulties in larger organizations, conflicts in corporate culture, or problems in integrating systems. Sanwa Bank [1974] describes the internal conflicts which Sanwa Bank suffered from just after the consolidation in 1933. Sanwa Bank, the predecessor of UFJ Bank, was established through consolidation of three large banks.

denote acquisitions, absorbing mergers, and mergers of equals (combinations into new banks), respectively. Second, we add the set of the number-of-participants dummies, NOP $k$  ( $k = 3, 4 \dots, 8$ ), which is value one, if the number of the participants is  $k$ , and zero otherwise.<sup>1</sup> Table 10 reports the results. In column 1 and 2, all the coefficients of the consolidation-type dummies are negative. Particularly, the coefficient of EQ is statistically significant and larger in magnitude. That is, mergers of equals had a larger negative impact on the profitability. On the other hand, the coefficients of absorbing consolidation dummies (AQU and MRG) are statistically insignificant. These results indicate that the impact of the absorbing consolidations on the profitability was small. Therefore, we can basically attribute the negative impact of consolidation in Table 9 to the merger of equals.

In column 3 and 4, we add NOP $k$  to control the impact of the number of the consolidation participants. The coefficients of NOP4 and NOP6 are negative and significant, but in the other cases they are not statistically significant. Hence, we can say that there is no evidence of a stable relationship between the number of merger participants and the profitability of consolidated banks. On the other hand, comparing column 3 and 4 with column 1 and 2, we find that the magnitudes and statistical significance of the effects of EQ are smaller, when we control the number of the participants. It implies that the negative effects of the NEW on ROA in column 1 and 2 includes the effect of the number of participants. Also, it is notable that the coefficient of NEW is still negative after controlling for the number of participants effect, which implies that the merger of equals results in the decline of efficiency. This result is consistent with the results in the governance structure discussed in section 3.

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<sup>1</sup> Since there was no case where the number of merger participants was seven, we do not use the dummy variable, NOP7.

## 5 Concluding Remarks

In this paper, we analyzed the impact of bank consolidations on the stability of the financial system, focusing on two aspects, namely the governance structure and the bank performance. With respect to the governance structure, we found that consolidations had an effect of excluding the unfavorable director interlocking between banks and their related firms, especially, in the case of absorbing consolidations. This result has important policy implications for presently developing countries which are faced with the similar governance problem between banks and non-banking firms. Berger et al. [2002] demonstrate that large banks have a little comparative advantage in making loans based on soft information using the US data. They argue that it can be beneficial for developing countries to encourage entry of large multinational banks, which are less likely to engage in the related-lending. Our results support their discussion quantitatively, as long as the well-disciplined multinational banks enter these countries through acquiring unsound domestic banks.

Concerning the stability of the financial system, we confirmed that consolidations had a positive impact on deposit growth. This effect was significant for the stability of the financial system, because due to the lack the deposit insurance system, the financial system was continuously exposed to the risk of bank. In this sense, we can conclude that bank consolidations contributed to the stability of the financial system. On the other hand, we cannot obtain any evidence indicating a positive impact of consolidations on the profitability of banks. Especially, in the case of the merger of equals, a strongly negative effect on the profitability was observed, which suggest that inasmuch as the enhanced ability to collect deposits, mergers of equals might have a negative effect on the financial system in the long run.<sup>1</sup> However, mainly due to the data problems, we must leave this to

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<sup>1</sup> Seven banks out of fifty-two banks, generated by newly established mergers, exited from the market afterwards because of the dissolution or the suspension of operation, which are considered to be the same

be investigated in future research.<sup>1</sup>

**[Reference]**

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as failure.

<sup>1</sup> Since it was not a rare case that the bank which had experienced M&A took part in another M&A within several years from first consolidation, we will lose many samples.

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