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Governance and Performance of Banks in Prewar Japan:
Testing the "Organ Bank" Hypothesis Quantitatively

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Abstract

More than forty years ago, Kato[1957] posed the organ bank hypothesis. Namely, he stressed that in prewar Japan, many of the banks were tightly connected with certain industrial companies, and those banks loosely gave loans to the connected companies, which eventually resulted in the Showa Financial Crisis. This view has been widely accepted by economic historians. However, there has been no attempt to test the organ bank hypothesis quantitatively. In this paper, we tested the organ bank hypothesis using quantitative data and econometrical methodology.

First, we compiled a comprehensive database of company directors and auditors, based on *Zenkoku Shogaisha Yakuinroku* 1926 issue(Shogyo Koshinjo[1926]), and using the database we identified the interlocking of directors and auditors between banks and non-banking companies. Interlocking of directors and auditors between banks and non-banking companies was very pervasive. Nearly 90% of ordinary banks had more than one directors or auditors who were at the same time directors or auditors of non-banking companies, and average number of interlocking per bank was as large as 7.85. Observing by banks scale, we found that interlocking was more pervasive in the large-sized banks.

Second, using the interlocking variables, we examine the influence of interlocking on bank performance. Through regression analyses we found that interlocking tended to give negative effect on the liquidity performance and profitability of banks, and increased the probability of bank closures in 1927. Also, the interest rates of the deposits of those banks with interlocking were relatively high, while the interest rate of loans were not, and consequently profit margins of those banks were relatively small. It implies that the banks with interlocking should offer relatively high interest rate to gather deposits, because of the low evaluation of the financial market.

Those findings support the organ bank hypothesis. In prewar Japan, banks' business practices based on connection of the directors and auditors made the banking system unsound, and eventually caused the Showa Financial Crisis in 1927. On the other hand, many of the literature on the Asian Crisis in 1997 stress exploitation of the minority shareholders by the core members of the family-based companies. In this sense, the Showa Financial Crisis was a predecessor of the Asian Crisis in 1997

1.Introduction

As a background of the Asian financial crisis in 1997, corporate governance has been attracting attentions of researchers as well as policy makers. Corporate governance deals with the ways in which activities of corporate managers increase the profit of suppliers of finance to corporations (Shleifer and Vishney[1997]). Specifically, many of the literature on the Asian Crisis focuses on exploitation of the minority shareholders by the core members of the family-based companies (Claessens et al.[1998]; Lang[2001]). We do not suppose that the family-based companies always cause exploitation of minority shareholders, because the companies affiliated to zaibatsu in prewar Japan basically outperformed the other companies in terms of ROE (Okazaki[1999] and [2001]). However, zaibatsu is only one aspect of the prewar Japanese corporate system. Besides major zaibatsu, there existed many medium and small-sized corporate groups, and also there existed numerous medium and small-sized companies.

Concerning those corporate groups other than major zaibatsu, it is widely accepted by the economic historians that many banks were tightly connected with certain industrial companies. Those banks connected to the industrial companies are called "organ banks" (*kikan ginko*). According to the accepted view, those banks loosely gave loans to the connected companies, which came to be bad loans *ex post.* This means that the managers of organ banks tended to neglect interests of the depositors and minority shareholders. This agency problem of organ banks has been thought to be the major cause of the financial crisis in 1927 (Showa Financial Crisis) (Teranishi[2000]).

If this widely accepted view, the "organ bank hypothesis" hereafter, is the case, the minority shareholders and depositors of the "organ banks" were exploited by the core members of the corporate groups, and in this sense the Japanese financial crisis in 1927 was a predecessor of the Asian Financial Crisis in 1997. Testing this "organ bank hypothesis" is the basic motivation of our research. It is worth investigating, not only because it is relevant to the contemporary governance issue in Asian economy, but also because it is concerning the most fundamental hypothesis on the prewar Japanese financial history.

The literature which stressed the concept of the "organ bank" for the first time is Kato[1957]. According to Kato[1957], the organ bank was the bank which was established in order to raise funds for the industrial businesses of the bank founders, and therefore the organ bank was not managed only for the profit of the bank itself. Consequently, the organ bank tended to give large amount of long-term loans to the small number of the industrial companies which connected to the bank founders (Sugiyama[1976]; Murakami[1983]).

As mentioned above, the organ bank relationship has been regarded as a major cause of the Showa Financial Crisis. For example, just after the crisis, the Bank of Japan (BOJ) wrote

in its research report that the fundamental cause of the bankruptcy of the banks was "the weakness of our industrial organization and banking system"(Bank of Japan [1933], p.984). BOJ pointed out the following unsound practices of the banks. The bank directors participated in the other businesses and made use of the bank as an instrument for financing their businesses. And, as a result of the loan policy based on the connections, the banks gave large amount of loans to certain persons or companies without reliable collaterals. Also, Takahashi and Morigaki[1968], one of the most well-known book on the Showa Financial Crisis, identified the organ bank relationship as a major cause of it.

After Kato's seminal work, the research has progressed in the following two directions. The first direction is case studies of the organ bank relationship. In 1960's and 1970's, the main focus of the these researches was the characteristics of the banks affiliated to major zaibatsu. Kato[1957] discussed that most of the banks in prewar Japan, including those affiliated to major zaibatsu, had the characteristics of the organ bank in common. On the other hand, Shibagaki[1965] stressed that the zaibatsu affiliated banks did not gave large amount of loans to the core companies in the same groups. Owing to the contribution of Imuta[1966] and Sugiyama[1976], it has come to the consensus that apart from exceptional periods, the zaibatsu affiliated banks were not the organ banks of zaibatsu in Kato's sense (Murakami[1983]). Concerning non-zaibatsu banks, Imuta[1976a], Ishii[1999] and Yamazaki[2000] carried out case studies of several typical organ banks, based on the research by BOJ and the original documents.

The second direction is the statistical analysis of the bank performance. Imuta[1976b] classified banks into several groups by scale and location, and compared the basic financial indices among those groups to find that the financial conditions of the medium-sized banks in the cities were relatively bad. They were characterized by high loan-deposit ratio, high borrowing-deposit ratio etc. Teranishi[1982] reported the similar results, using the more comprehensive data set. Meanwhile, Yabushita and Inoue[1993] analyzed the influence of bank performance on bank closure in 1927. Thorough Probit analysis of bank closures, they found that low equity-deposit ratio, high loan-deposit ratio and low ROE increased the probability of bank closure.

Based on the brief survey, in this paper, we intend to integrate those two directions of the researches. For this purpose, first, we construct the variables which objectively indicate the organ bank relationship. As is explained in detail later, we compile a comprehensive database of directors and auditors in 1926, just before the Showa Financial Crisis, and using it, we identify interlocking of directors and auditors between banks and non-banking companies. Then we transform the interlocking information into some variables indicating each bank's relationship with non-banking companies. This is the first attempt to measure

the extension of organ bank relationship quantitatively. Next, using those interlocking variables, we check the influence of the organ bank relationship on the bank performance, in order to test the above mentioned organ bank hypothesis.

This paper is organized as follows. Section 2 briefly addresses the prewar history of the Japanese banking industry. Section 3 summarizes the characteristics of the market structure of the banking industry in 1926. In section 4, we explain our database of directors and auditors, and the findings derived from it, concerning the interlocking between banks and non-banking companies. Section 5 econometrically analyzes the influence of the interlocking on the bank performance. Section 6 concludes the paper.

2. A brief history of the prewar baking industry

The modern history of the banking industry in Japan started in 1873, when the National Bank Act was enacted. National banks were the private banks which were privileged to issue bank notes. Inasmuch as this privilege, at first, few applications for establishing national banks were submitted to the government. This was basically because the national bank notes were convertible to gold, and therefore national banks should have large amount of gold reserve (Asakura[1988] pp.34-36).

In order to stimulate establishment of national banks, the government revised the National Bank Act in 1876. By the revision, convertibility of the national bank notes was suspended, and at the same time, government non-convertible notes were authorized to be the reserve of the national bank, which made it profitable as a business (Asakura [1988] pp.36-37; Teranishi [1982] pp.35-37). After that, number of national banks increased rapidly to be 153, the upper limit prescribed by the National Bank Act in 1879(Figure 1). While ex-samurai were the major shareholders of national banks at first, the share of merchants and landowners increased gradually (Teranishi [1982] pp.74-78).

In 1882, the Bank of Japan was established as the central bank, and corresponding to it, the National Bank Act was revised again, which obliged each national bank to transform into an ordinary bank within twenty years from its establishment. By 1899, 122 of the 153 national banks converted into ordinary banks, 16 were merged, and the others were dissolved or closed (Teranishi[1982] p.37).

Based on those measures, the government enacted the Bank Act in 1893, which brought about rapid increase of ordinary banks (Figure 1). At the end of 1901, the number of ordinary banks came to be as large as 1890, which was the peak in the prewar period. Many ordinary banks located in Kanagawa, Hyogo, Niigata, Miyagi, Sizuoka, Nagano etc as well as in the two major cities, Tokyo and Osaka. Kanagawa and Hyogo had the international ports, and the other prefectures were specialized in agriculture, which

suggests that the major activities of ordinary banks in early times were related to the international trade and agriculture (Asakura [1988] pp.51-52).

Besides the Bank Act, the legal framework for the savings bank, the Savings Bank Act, was provided in 1893. The savings bank was prescribed as the bank which gathered funds by small lots deposits less than 5 yen per lot and loaned them with national bonds as collateral. By the revision of the Savings Bank Act in 1895, the restriction of fund application was removed (Aasakura[1988] pp.57-64).

While deposits, as well as the number, of ordinary banks increased, the ratio of deposits to banks' equity remained low until early twentieth century (Figure 2). In fact, the equity accounted for 36 % of the total liabilities of ordinary banks in 1901. In other words, one aspect of the ordinary banks' activities in those days, was loaning their own funds, and in this sense their attribute was different from that of the modern banks based on deposits.

The ratio of deposits increased remarkably in 1900's. Since 1897, the Bank of Japan changed its lending policy. Until then, it easily gave loans to the private banks. As a result, ordinary banks heavily depended upon borrowings from BOJ, and they earned profits by the interest rate spread between the borrowings from BOJ and loans to private companies. In 1897, BOJ started loaning to the non-banking companies and individuals, in order to checking the banks to earn profit from the spread between the BOJ's interest rate and the market rate (Bank of Japan [1983a] p.16). This policy change urged ordinary banks to decrease borrowings from BOJ and gather deposits seriously.

At the same time, concentration rate of the banking industry started to rise (Figure 3). As mentioned above, since 1901, number of ordinary banks began to decrease. The Major reason of decrease in 1900's was close, bankruptcy and dissolution (Table 1). Many banks were bankrupted and closed in the bank panics in 1901, 1907 etc.

In 1910's, the First World War gave substantial influence on the banking industry, as well as on the Japanese economy as a whole. In this period, bank deposits increased rapidly, due to expansion of the economy and the loose monetary policy based on huge surplus of international balance of payments. Consequently, the ratio of deposit to the total liabilities of ordinary banks came to be around 80% at the end of 1910's, while that of the equity became less than 20 % (Figure 2). In other words, the Japanese ordinary banks came close to the modern banks based on deposits in terms of the composition of the liabilities.

On the other hand, many ordinary banks gave large amount of loans to those companies which rapidly expanded businesses, especially the business of heavy and chemical industries, in the boom during the War. In many cases, those businesses were faced with difficulties, when the War ended and the international competition renewed,

which, in turn, made the bank loans bad credit. Because the ratio of deposits to the total liabilities had risen in 1910's as mentioned above, the deterioration of the banks' assets made the financial conditions of the banks seriously bad, which came to be the basic condition of the instability of the financial market in 1920's

Teranishi and Yokoyama[1998] estimated the gross value-added (GVA) of the banking sector in prewar Japan. Figure 4 shows GVA of the ordinary banks from 1919 to 1940. The decrease of GVA in the second half of 1920's indicates the difficulty of the banking industry in this period.

In the bank panic in 1920, many banks, especially small-sized banks, were obliged to be closed. In order to secure stability of the financial market, the government started to reform the industrial organization of the banking industry in early 1920's. To begin with, the Savings Bank Law was promulgated in 1921, which strengthened the restriction on fund application of the savings banks again (Asakura[1988] pp.124-125). Corresponding to the new law, many of the savings banks converted into ordinary banks, which was reflected in the increase of ordinary banks in Figure 1.

However, the earthquake which attacked Tokyo in 1923, made the financial market still more instable. By the earthquake, huge amount of assets which were collateral of bank loans, or were expected to produce cash flow to repay the loans, were destroyed and burnt down. Just after the earthquake, the government enacted the "Act for Compensation of the Deficit by Discounting the Earthquake Bills", and according to it, instructed BOJ to discount the bills of the banks in Tokyo area, in order to prevent bank panics. The bills discounted by this measure were called the "Earthquake Bills." Contrary to the intension of the government, this measure retarded the disposal of bad credit of banks, because those bills recognized as the "Earthquake Bills" included the deteriorated bills not relating to the earthquake (Bank of Japan [1983b] pp.58-61; Takahashi and Morigaki [1968] pp.141-149).

In 1926, the government intended to take fundamental measures to restructure the financial system. For this purpose, the government proposed two law drafts to dispose of the "Earthquake Bills," and meanwhile prepared the draft of the new Bank Law. However, the diet opposed to the two law drafts, on the ground that they were favorable for the capitalists connected to the government. And in the discussion at the diet, the Minister of Finance made a notorious slip of tongue to say that a certain bank had closed that morning, which caused the financial crisis in 1927.

The Showa Financial Crisis in 1927 was the largest crisis in the financial history of Japan. 45 banks were closed because of the rush for repaying deposits (Table 2). The share of closed banks was 2.91 % of ordinary banks and savings banks in terms number, and 9.02 % in terms of deposits amount. Among the closed banks was Jugo Bank, which was

one of the top ten banks, and had a transaction with the Imperial Family. Also, Taiwan Bank was the special bank for developing Taiwan, and was the central bank there. Magnitude of the financial crisis can be observed quantitatively thorough shift of deposits from banks to the postal bureau. In 1927, while the outstanding of the total deposits of the all banks decreased, the postal deposits increased by 30.1 % (Figure 4).

After the crisis, the new Bank Law was enacted in 1928. By the Bank Law, the ordinary bank should have a form of joint-stock company, and the paid-in capital should be over one million yen[1]. The existing banks whose paid-in capital was under the lower limit, "unqualified banks," should clear it within seven years. When the Bank Law was enacted, 617 of 1,283 ordinary banks became "unqualified banks, and eventually the number of "unqualified banks" came to be 631 because of capital decrease (Bank of Japan [1983b] pp.280-281).

At the same time, the ordinary bank was prohibited from the other businesses except those relating to the banking business. Also, the executive directors and managers of the ordinary bank were prohibited from the other businesses. The restriction of the subsidiary businesses of the bank itself and its directors reflected the recognition of the government that the organ bank relationship was the basic cause of the unsound financial system.

Concerning the "unqualified banks," the government did not approve increase of capital by itself in principle, and urged them to merge with other banks. Therefore, 340 of 631 "unqualified banks," were merged, while only 50 banks cleared the criterion by capital increase. Most of the others were dissolved. Consequently, number of ordinary banks decreased swiftly since late 1920's, to be 424 in 1936. In this sense, the financial crisis and the Bank Law drastically changed the organization of the banking industry. In the next section, we summarize the characteristics of the industrial organization just before the change.

3. Summary of the industrial organization in 1926

According to Ministry of Finance [1928], there were 1,420 ordinary banks at the end of 1926, over 10 times as many as 136 banks in 2000. Out of the 1,420 ordinary banks, we select 1,402 banks for our primary samples, whose financial data in Ministry of Finance[1928]are complete.

In Figure 5, the vertical axis denotes the logarithm value of [deposit + equity], and the horizontal axis denotes the rank of banks in terms of [deposit + equity]. The slope of the diagram indicates the distribution of the bank scale. While the slope is steep both in higher

[1] Two million yen in Tokyo and Osaka, while five hundred thousand yen in the town and village whose population was smaller that ten thousand.

ranks and in lower ranks, the slope in between is relatively flat, which means that there were math of medium-sized banks. The Herfindahl index of loan was 0.016 in 1926, and that of deposit was 0.019. The highly competitive market structure is the remarkable characteristics of the banking industry in prewar Japan.

The literatures have paid attention to the relation between the bank performance and the scale. To examine this point, we regressed each bank's financial indices on its scale in terms of [deposit + equity]. The indices we use are CAPDEP (=equity / deposit), LOANDEP (=loan / deposit) and RESDEP (=reserve / deposit). CAPDEP indicates solvency to depositors. LOANDEP is an index of the liquidity. If LOANDEP is over 1, the bank was in the situation of "over-loan."

RESDEP is another index of liquidity, while it indicates also solvency to depositors at the same time. Table 3 shows the descriptive statistics of these three financial indices, the correlation matrix of the variables, and the results of OLS regression. The skewness and excess kurtosis are very high. This suggests there might be outliers in our observations, which should be taken into account in executing regression analysis .

In Equation-1 (the dependent variable is CAPDEP), the coefficient of scale is negative and statistically significant (p-value is 0.00). In other words, the ratio of equity to deposits tends to be smaller in larger banks. In Equation-2 (the dependent variable is LOANDEP), the estimated coefficient of scale is not statistically significant. As shown in descriptive statistics, the average LOANDEP is 2.06 and the median of that is 1.21. This implies that banks over half of all were in the situation of over-loan, regardless of scale. In other words, over-loan was universal in the banking industry in prewar Japan. In Equation-3 (the dependent variable is RESDEP), the coefficient of scale is negative and statistically significant, although the significance level is not high. This implies that liquidity was lower in larger banks, which is consistent with the result concerning CAPDEP.

In order to examine the relation between the closure of each bank in 1927 and its scale, we split our 1,402 observations into three groups in terms of paid-in capital following Teranishi[1982], namely, LARGE, MEDIUM and SMALL. ALL is the group which includes all of these three groups. There were numerous small-sized banks whose paid-in capital was less than 1 million yen. Table 4 shows the number of bank closure in each group. In LARGE, 25 banks closed in 1927, which are over half of the bank closures in ALL. In other words, the damage of the financial crisis in 1927 was more serious for the larger banks. This is not surprising, because solvency of banks in higher ranks were worse than that in lower banks according to Table 2.

4.Governance structure of the ordinary banks

As we pointed out in Section 1, there has been no attempt to measure the extension of the organ bank relationship quantitatively. We approach this task by compiling a comprehensive database of directors and auditors of banks and non-banking companies. The data source is Shogyo Koshinjo [1926] (*Zenkoku Shogaisha Yakuinroku*, 1926 issue). Shogyo Koshinjo was the first private credit bureau established in Japan. It published *Zenkoku Shogaisha Yakuinroku* every year from 1893 to 1944. *Zenkoku Shogaisha Yakuinroku* is remarkable, not only because it continued to be published for a long time, but also because it had rich information of the wide-ranging companies (Yui and Asano [1989]. It covers large number of banks, non-banking joint-stock companies, and non-banking partnership companies in Japan, and also it provided with the information of company name, establishment year, capital, name and address of the directors, auditors and major employees, concerning each of those banks and companies.

We have already several important literature which utilized *Zenkoku Shogaisha Yakuinroku*. Wada, Kobayakawa and Shiomi [1992a], [1992b], [1993], and Kobayakawa, Suzuki and Wada [1999a], [1999b], compiled the databases of directors based on 1898, 1907, 1918 issues of the *Zenkoku Shogaisha Yakuinroku* to identify the networks of directors and investors in each period. Meanwhile, using the database of Kobayakawa, Suzuki and Wada [1999a], Miwa and Ramseyer [2000] analyzed the monitoring role of the "prominent directors," namely those who had the post of directors of multiple companies, in the cotton spinning industry in late nineteenth century.

On the other hand, in this paper, we focus on the interlocking between banks and non-banking companies, and we not only identify the interlocking, but also examine the influence of the interlocking on bank performance using the database. Since our primary purpose is testing the organ bank hypothesis, as the object year we select 1926, just before the Showa Financial Crisis, which has been believed to be caused by the organ bank relationship. We newly compiled a database of directors, based on the 1926 issue of *Zenkoku Shogaisha Yakuinroku*.

There are the data of 16,558 companies including banks in Shogyo Koshinjo [1926]. 15,060 of them were in the today's territory of Japan, and the other 1,498 were located in Karafuto, Taiwan, Korea, Manchuria and other foreign countries. Out of 15,060 companies in Japan, 1427 were banks, 11,578 were non-banking joint-stock companies and 2,055 were non-banking partnership companies. We can check the coverage of Shogyo Kishinjo [1926], by comparing the number of observations mentioned above, with the number of companies in Ministry of Industry and Commerce [1928] (*Kaisha Tokeihyo*, 1926 issue). Kaisha Tokeihyo was the corporate statistics, edited by the Ministry of Industry and Commerce, based on the census survey, in accordance with the Corporate Statistics Act.

According to Ministry of Industry and Commerce [1928], there were 36,068 companies including banks in Japan[2] at the end of 1926 (Table 5). 1,506 of them were banks, 16,251 were non-banking joint-stock companies, and 18,311 were non-banking partnership companies. Therefore, the coverage ratio of Shogyo Koshinjo [1926] is 41.8 % (15,060 / 36,068) in terms of company number. The coverage ratio of banks and the non-banking joint-stock companies are as high as 94.8% and 71.2% respectively. On the other hand, that of non-banking partnership companies is only 11.2 %. The low coverage ratio of non-banking partnership companies is a weakness of Shogyo Koshinjo [1926], especially for researches concerning family-based companies. However, according to Ministry of Industry and Commerce [1928], in terms of capital amount, the share of non-banking partnership companies was only 10.4% of the total[3]. Small capital share of the non-banking partnership companies mitigates the weakness of Shogyo Koshinjo [1926].

In identifying the interlocking between banks and non-banking companies using our database of directors and auditors, we select the common set of the ordinary banks in Shogyo Koshinjo [1926] and those in Ministry of Finance [1928] as our sample banks. In the common set are 1,191 ordinary banks. Since we excluded 9 observations of which CAPDEP are over 9.4 (the average plus one S.E.) as outliers out of the 1,191 observations, then our sample banks comes to be 1,182. The basic statistics of the 1,182 observations is reported in Table 6.

Table 7 shows the extension of interlocking between banks and non-banking companies. Those banks more than one of whose directors or auditors had the post of directors or auditors, were as many as 87.3 % of the total observations[4]. Also, the average number of interlocking per bank was as large as 7.85 (Table 8-a). We can safely say that most of the ordinary banks were connected with non-banking companies thorough interlocking of directors and auditors.

Table 8-a also shows the data broken down by the position in the non-banking companies. We classified the positions of directors and auditors into four categories, namely 1) top manager (president, chairman, etc), 2) executive director, 3) ordinary director, and 4) auditor[5]. While it is natural that the ratio and number of interlocking are large concerning ordinary directors of the non-banking companies, remarkably enough, in 46.5 % of the observations, more than one of directors or auditors were the top managers of the

[2] The territory of Japan today.
[3] The share of banks is 16.2%, and that of non-banking joint-stock companies is 73.4 %.
[4] If we use data of Shibuya et al.[1983], the percentage is 58.8%. The implication of it will be discussed in Appendix1.
[5] Some companies did not have a president or chairman. In this case, we identified the executive director as a top manager.

non-banking companies.

Table 7-b,c,d,e show the data broken down by the position in the banks. In 57.7% of the observations, top managers of the banks had the position of director or auditor of the non-banking companies. Also, the average number of interlocking of banks' top managers was 2.11. The ratio of banks more than one of whose ordinary directors had the position of director or auditor of the non-banking companies, was 72.6 %. And the ratio of the banks, more than one of whose ordinary directors were the top managers of the non-banking companies was 29.4 %.

Table 8 is a break down of Table 7 by the scale of banks. Like in Section 3, we divided the 1,182 observations into three groups in terms of paid-in capital, following Teranishi[1982]. There were numerous small-sized banks whose paid-in capital was less than 1 million yen. The first point to be stressed in Table 8 is that interlocking with non-banking companies was quite pervasive in all of the three groups. In other words, interlocking was universal phenomenon across the groups of banks classified by scale.

Second, at the same time, relatively speaking, interlocking was clearly more pervasive in the large-sized group. The ratio of the banks with interlocking as well as the average number of interlocking, were largest in the large-sized group, and smallest in the small-sized group.

The same characteristics is observed, when we break down the data by the position in the non-banking companies. In any sub-category of the data, both the ratio of the banks with interlocking and the average number of interlocking, were largest in the large-sized group (Table 8-a). Furthermore, even when we break down the data by the position in the banks, the situation is the same (Table 8-b,c,d,e).

Those results extracted from our database are really striking. Nearly 90% of ordinary banks were connected to non-banking companies thorough interlocking of directors and auditors. Also, interlocking was more pervasive in the large-sized banks. Our result supports the conjecture of Kato [1957] concerning pervasiveness of the organ bank relationship.

5. Influence of the governance structure to the bank performance

In this section, in order to test the "organ bank" hypothesis, we quantify the influence of the governance structure of each bank on its performance. For this purpose, the following three regression analyses are executed. First, we analyze the causality between the governance structure of each bank and its probability of closure in the financial crisis of 1927. In this analysis, we construct the interlocking variable based on our database, and add the variables to the framework of Yabushita and Inoue [1993]. Second, we regress the

basic financial indices of each bank on its interlocking variables. Third, we regress the interest rates of each bank on its interlocking variables to check the influence of the governance structure of each bank on its evaluation in the financial market.

First, Yabushita and Inoue [1993] reported the results of Probit analysis that low CAPDEP, high LOANDEP, low RESDEP and low ROE increased the probability of bank closure in 1927. In order to identify the influence of the interlocking, we add the interlocking variables to the independent variables of Yabushita and Inoue [1993].

The model to be estimated by Probit analysis is,

$$P(C) = \hat{a}_1(CAPDEP) + \hat{a}_2(LOANDEP) + \hat{a}_3(RESDEP) + \hat{a}_4(ROE) + \hat{a}_5(FORM) + \hat{a}_6(SCALE) + \hat{a}_7(INTERLOCK) + \hat{a}_8(SCALE \times INTERLOCK) + \hat{a}_9(STAKE) + \hat{a}_{10}(ZAIBATSU) \quad (1)$$

P(C) expresses the probability of bank closure. In estimating the model (1), following Yabushita and Inoue [1993], we use a latent variable CL, which equals 1 if the bank closed in 1927, and 0 otherwise.

The definitions of independent variables are shown in Table 10. We use the dummy variable "FORM" as Yabushita and Inoue[1993]. While most of the ordinary banks were joint-stock companies, our 1182 samples have 30 partnership companies. To discriminate them, the model (1) includes "FORM". “SCALE” is the sum of deposit and own-capital. While Yabusita and Inoue[1993] used the dummy variable, which could discriminate between medium-scale banks and other banks, we use “SCALE” as the continuous variable.

The new variables we add are INTERLOCK, STAKE, ZAIBATSU and REGION. INTERROCK represents for 50 types of variables, namely INSIDER, DINSIDER, TOP, DTOP, EXECUTIVE, DEXECUTIVE etc., indicating the interlocking between each bank and non-banking companies as shown in Table 9. The variable STAKE indicates the number of shareholders normalized by the paid-in capital. On the other hand, there are 11 banks affiliated to major zaibatsu (Mitsui, Mitsubishi, Sumitomo, Yasuda). Okazaki [1999] and [2001] pointed out that the companies affiliated to zaibatsu outperformed other companies in terms of profitability. To control the zaibatsu effect, we use the dummy variable "ZAIBATSU."

Results of the Probit analysis are reported in Table 10. The estimated coefficients of CAPDEP and PROCAP are negative and statistically significant at 1% level in all equations. This is consistent with results of Yabushita and Inoue[1993]. We can reconfirm that both solvency and profitability affected on the probability of the bank closure.

In Estimation-1, Estimation-2 and Estimation-3, the estimated coefficients of

INTERLOCK are not significant. However, in Estimation-4, the estimated coefficient of DORDINARY is positive and statistically significant at 10% level. This indicates that the probability of bank closure was higher, if an ordinary director of the bank had the position of directors or auditors of the non-banking companies.

And the estimated coefficients of the intersection term (SCALE× DORDINARY) is negative and statistically significant at 10%, while that of SCALE is not significant. This indicates DORDINARY had substitutive relation with SCALE. Even if some ordinary directors have positions of directors or auditors of the non-banking companies, the probability of closure would be lower when scale of the bank was large.

The Probit analyses in this section have two problems. One is the problem of disproportionate sampling (see Maddala[1992],pp.330-331). As explained above, we excluded 220 samples out of 1420 samples in Ministry of Finance [1928]. Banks, which closed in 1927 and other banks, would be sampled at different rates in our Probit analysis. To avoid this problem we tried Logit analyses, but we couldn't estimate coefficients of the Logit model. Because the log-likelihood function is decreasing, the maximum value of the log-likelihood function couldn't be computed. Another problem is that, some banks might be able to avoid the bankruptcy because of moratorium in 1927. In the Probit analyses, CL of such a banks will be zero. In this sense, CL does not directly indicate the quality of bank management.

In order to explore relation between interlocking and bank performance more in detail, we next regress each bank's financial indices on its governance variables. The model for estimation is expressed as the follow.

$$\text{The performance} = \text{constant} + \tilde{a}_1(\text{INTERLOCK}) + \tilde{a}_2(\text{CROSS}) + \tilde{a}_3(\text{FORM}) + \tilde{a}_4(\text{SCALE}) + \tilde{a}_5(\text{STAKE}) + \tilde{a}_6(\text{ZAIBATSU}) \quad (2)$$

The dependent variables are four: CAPDEP, RESDEP, LOANDEP and ROE (=profit/equity). Since there are 50 types of "INTERLOCK", the model (2) can be expressed in 200 ways in all. While we computed all equations, here, we focus on the signs and statistical significance of the estimated coefficients of INTERLOCK.

The results are summarized in the eight matrices (5×5) in Table 11, and the complete results are reported in the Appendix2. The elements of the matrices are the estimated coefficients of INTERLOCK. Matrix-1 and Matrix-2 shows the results of regressing CAPDEP on the independent variables explained above. While in Matrix-1 INTEROCK is a continuous variable, in Matrix-2 INTEROCK is a dummy variable. Matrix-3 and Matrix-4 shows the results of regressing LOANDEP on the independent variables. In Matrix-5 and

in Matrix-6, the dependent variable is RESDEP. And in Matrix-7 and in Matrix-8, the dependent variable is ROE.

In Matrix-1, the coefficients of INTEROCK are negative and statistically significant in 18 cases. Also in Matrix-2, the coefficients INTEROCK are negative and statistically significant in 18 cases. These results indicate that the balance sheet condition of those banks with interlocking were relatively risky for the depositors.

In Matrix-3 there is no case in which the coefficient of INTERLOCK of which is statistically significant. And in Matrix-4, some of the interlocking variables are negative and statistically significant, which means over-loan was less serious than others. In other words, in terms of over loan, we cannot confirm the organ bank hypothesis.

Matrix-5 and Matrix-6 show the results consistent to Matrix-1 and Matrix-2. Some coefficients are negative and statistically significant. Especially in case auditors of a bank served directors of non-banking companies, liquidity of the bank was relatively low.

Matrix-7 and -8 show relation between banks' profitability and interlocking. In these equations, we use the Tobit model, because some observations of profit (those banks whose profit were negative) are censored in Ministry of Finance [1928]. While the coefficients of DAUDITOR3 and DAUDITOR are positive and statistically significant, in other significant cases, the coefficients are negative. These results indicate that interlocking reduced the banks' profitability.

So far, we have confirmed relatively instable financial conditions of the banks with interlocking. If so, why did depositors deposit money to those banks ? The natural conjecture is that the interest rates of deposits were higher for those banks. To check this conjecture, we regress interest rates of deposits on the interlocking variables. The source of the interest rate data is Toyo Keizai Shinposha [1928]. This book contains the financial data of 126 banks, and concerning 115 of them, the profit and loss accounts are available. We use the samples of 114 banks, the common set of these 115 banks and our 1182 samples explained above. Although it is difficult to avoid the issue of sample selection bias, we conceder this is the best solution, taking into account of data availability.

. The results of the regressions are reported in Table 12. In the equations with the interest rates of deposits as a dependent variable, the coefficients of TOP, ORDINARY and INSIDER are positive and statistically significant, which implies that depositors in the financial market evaluate the deposits of the banks with interlocking relatively risky. On the other hand, in the equations with the interest rates of loans as a dependent variable, the coefficients of interlocking variables are not statistically significant.

While the banks with interlocking should pay risk premium to the depositors to gather deposits, they could not earn higher interest rates from loans. In other words, the profit

margins of those banks were relatively small. This result is consistent with the results reported in Matrix-7 and Matrix-8 of Table 11.

6. Concluding remarks

More than forty years ago, Kato[1957] posed the organ bank hypothesis, which has been one of the most basic hypotheses on the financial history of prewar Japan. In this paper, we tested the organ bank hypothesis using quantitative data and econometrical methodology.

First, we compiled a comprehensive database of company directors and auditors, based on *Zenkoku Shogaisha Yakuinroku* 1926 issue(Shogyo Koshinjo[1926]), and using the database we identified the interlocking of directors and auditors between banks and non-banking companies. Interlocking of directors and auditors between banks and non-banking companies was very pervasive. Nearly 90% of ordinary banks had more than one directors or auditors who were at the same time directors or auditors of non-banking companies, and average number of interlocking per bank was as large as 7.85. Observing by banks scale, we found that interlocking was more pervasive in the large-sized banks.

Second, using the interlocking variables, we examine the influence of interlocking on bank performance. Through regression analyses we found that interlocking tended to give negative effect on the liquidity performance and profitability of banks, and increased the probability of bank closures in 1927. Also, the interest rates of the deposits of those banks with interlocking were relatively high, while the interest rate of loans were not, and consequently profit margins of those banks were relatively small. It implies that the banks with interlocking should offer relatively high interest rate to gather deposits, because of the low evaluation of the financial market.

Those findings support the organ bank hypothesis. In prewar Japan, banks' business practices based on connection of the directors and auditors made the banking system unsound, and eventually caused the Showa Financial Crisis in 1927. In this sense, as we mentioned in section 1, the Showa Financial Crisis was a predecessor of the Asian Crisis in 1997. On the other hand, in 2001, the Bank Law will be revised to legalize the entry into the banking industry from the other industries in Japan. We should carefully examine its implication to the financial system, learning from the prewar experiences.

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Appendix 1: Analysis of *Dai-Shisanka Meibo*

In section 4, we pointed out the banks more than one of whose directors or auditors had the post of directors or auditors, were as many as 87.3 % of the total observations. We can check this result by comparing it with the data based on Shibuya et al.[1982]. Shibuya et al.[1983] carries the data of large asset holders whose assets were over 500 thousand yen. Since the data include names, addresses, occupation and positions in companies of the large asset holders in 1917, we can calculate how many bank managers with large assets had the post of directors or auditors of non-banking companies.

The result is shown in Table A. The percentage is 58.8 (lower than 87.3% inTable 7). If we assume these percentages were stable before 1927, even the bank managers, whose assets were not over 500 thousand yen, also had the post of directors or auditors of non-banking companies. This implies that interlocking of bank managers was pervasive across their asset levels.

Appendix 2: Results of estimating the model (2) in Section 5

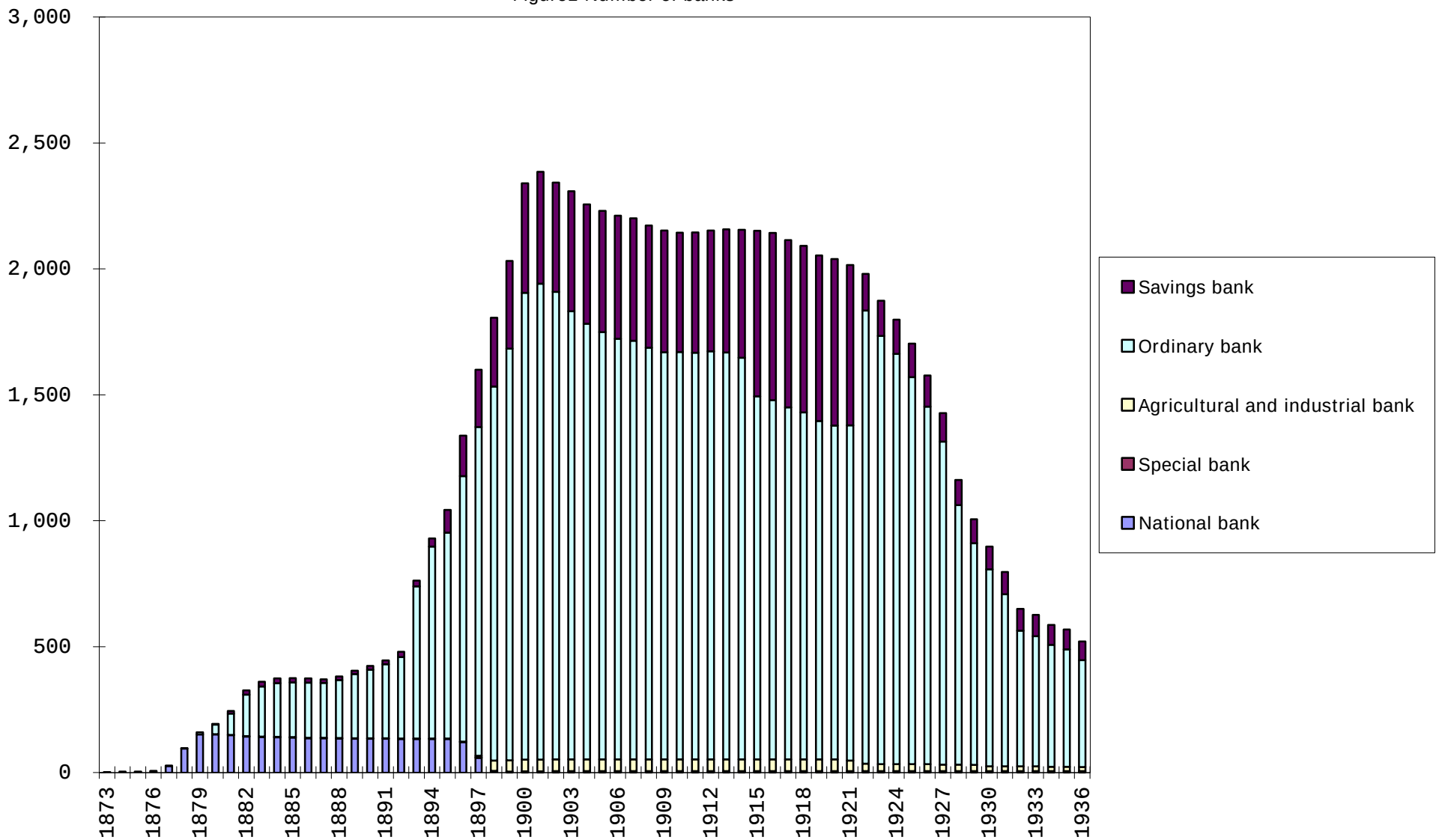
In Table B, the dependent variable is CAPDEP. The estimated coefficients of

intersection term are positive and statistically significant in some cases. This indicates relation between INTERLOCK and SCALE was complementary in terms of the effect to solvency. As compared to results of estimating the model (1) or analysis by Yabushita and Inoue[1993], the estimated coefficients of FORM are positive and statistically significant. Solvency of was higher when the bank was a joint-stock company than otherwise

In Table C, the dependent variable is LOANDEP. Most of estimated coefficients are not significant. In Table D, the dependent variable is RESDEP. The estimated coefficients of the intersection term are positive and statistically significant in some cases. However, the estimated coefficients of FORM are not significant in all cases. What is remarkable is that the estimated coefficients of STAKE are negative and statistically significant. This indicates that the liquidity performance was better, if the number of shareholders normalized by the paid-in capital was larger.

In Table E, the dependent variable is ROE. There is no case that the estimated coefficient of INTERLOCK or that of cross term are significant. On the other hand, the estimated coefficients of FORM are negative and statistically significant in most of the cases. Contrary to the results concerning solvency in Table B, those banks with the form of partnership had higher profitability.

Figure1 Number of banks



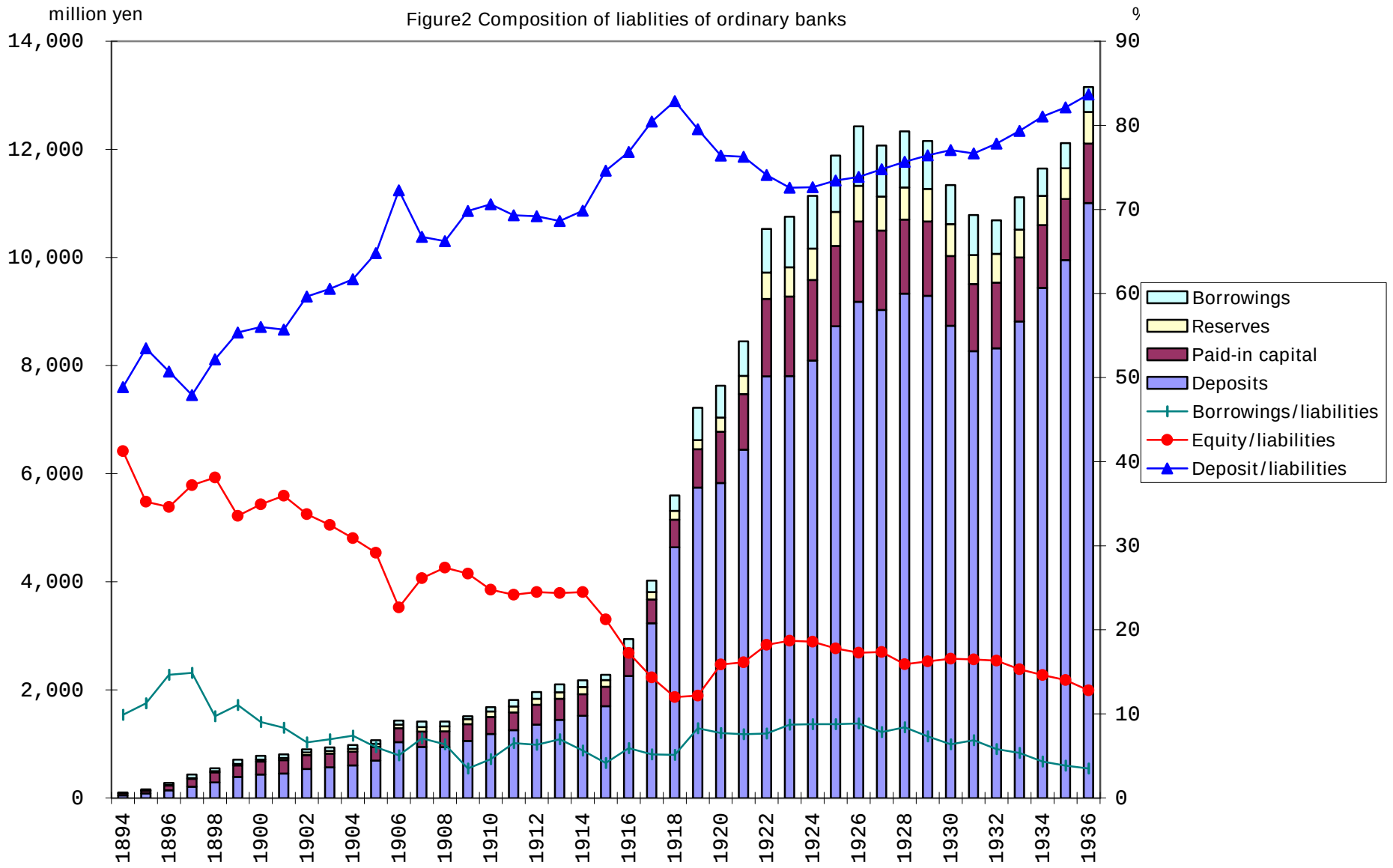

million yen
Figure2 Composition of liablities of ordinary banks
%
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
90
80
70
60
50
40
30
20
10
0
1894
1896
1898
1900
1902
1904
1906
1908
1910
1912
1914
1916
1918
1920
1922
1924
1926
1928
1930
1932
1934
1936
Borrowings
Reserves
Paid-in capital
Deposits
Borrowings/liabilities
Equity/liabilities
Deposit/liabilities

Figure3 Share of top five banks in deposits

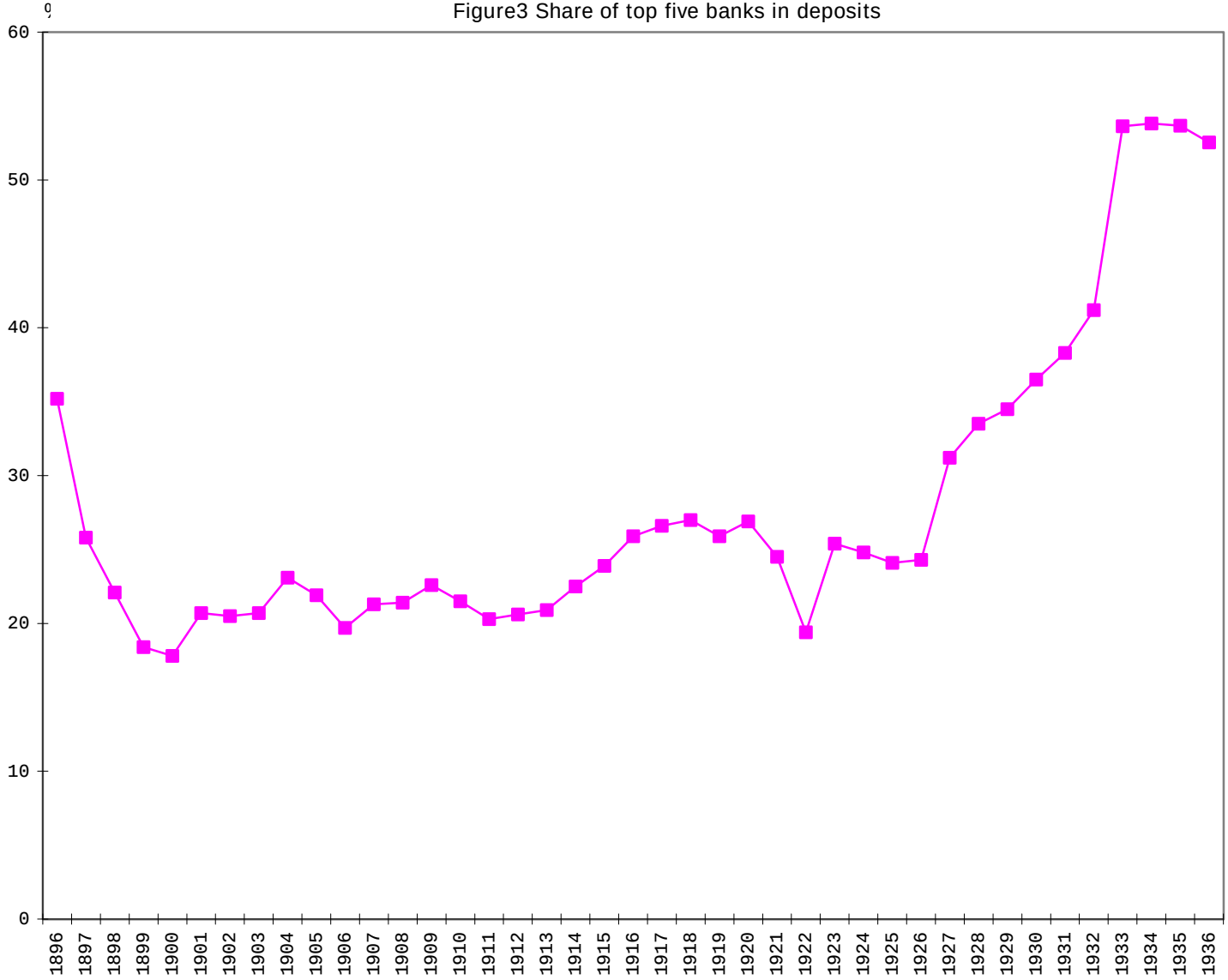
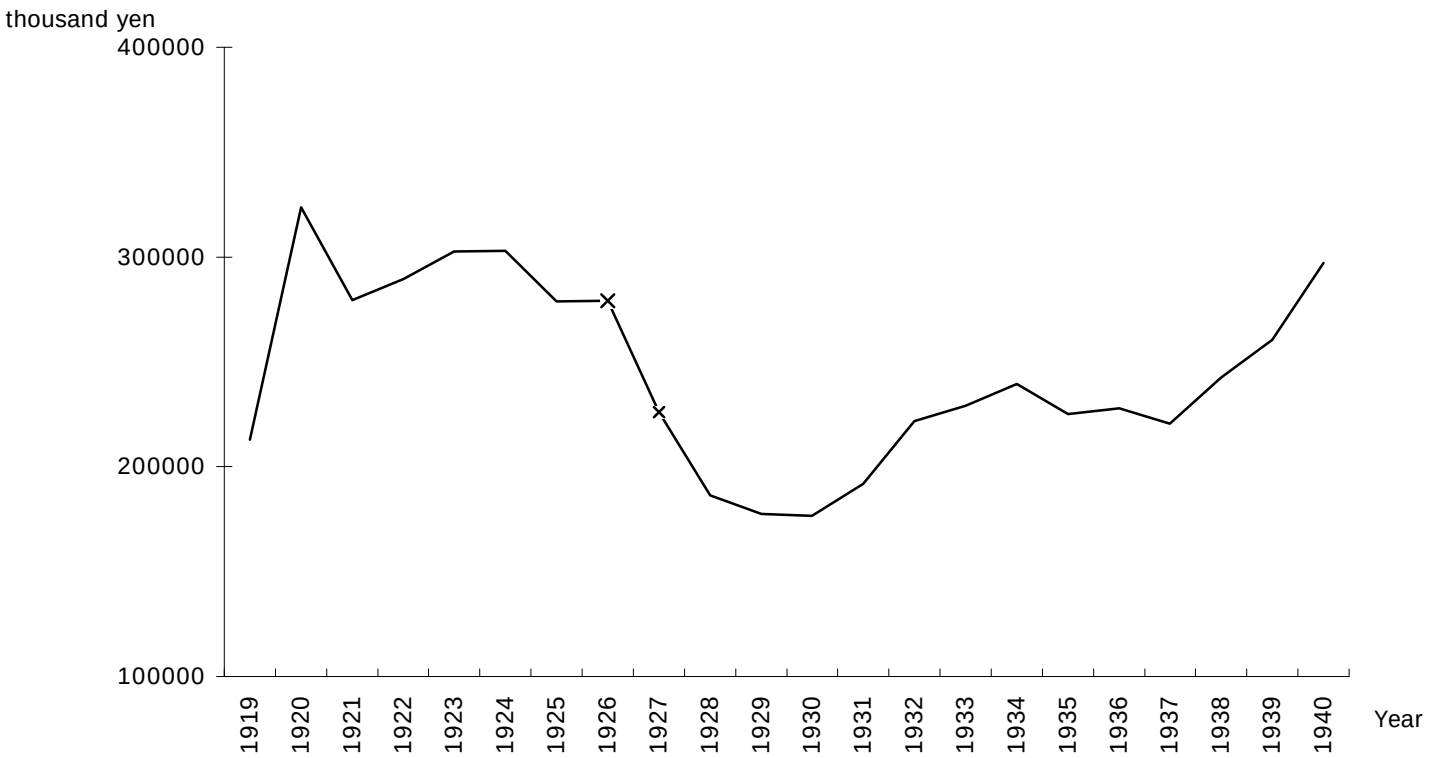


Figure 4 Gross Value-Added of banking sector



Source: Teranishi and Yokoyama [1998]

Figure 5 Scale distribution of the ordinary banks

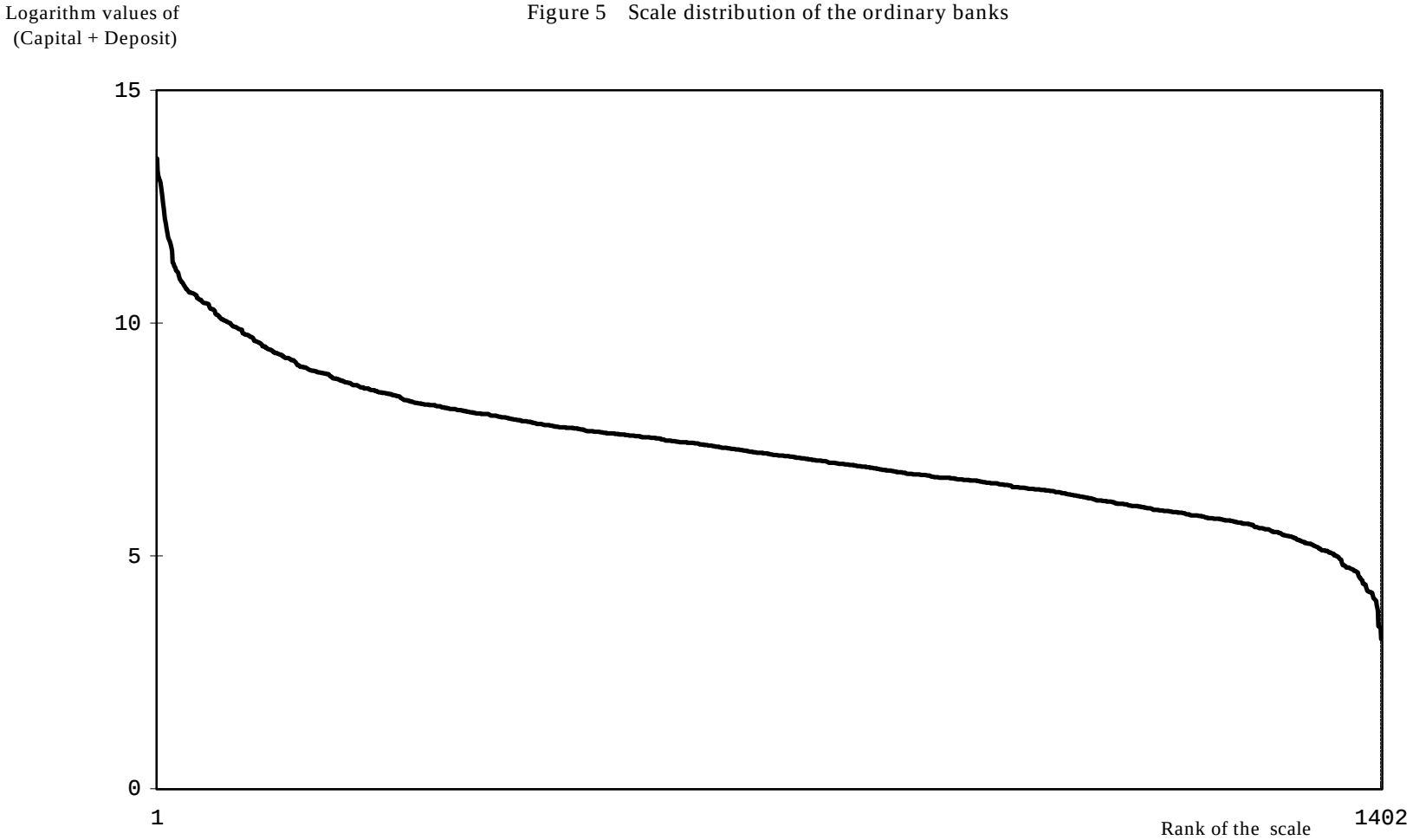


Table1 Decomposition of decrease of the number of ordinary banks

	1901-1910	1911-1920	1921-1930	1931-1936
Net increase	-236	-292	-544	-358
Establishment	181	174	137	37
Convert from other form	31	29	545	0
Close, dissolusion and bankruptcy	-283	-124	-360	-216
Merger and acquisition	-44	-121	-864	-179
Convert to other form	-121	-250	-2	0

Source: Goto[1970].

Table 2 List of the banks closed in 1927

Name	Prefecture	Deposits outstandings at the end of 1926 thousand yen	Deposits share %
Total		923,934	9.017
Jugo	Tokyo	368,434	3.596
Omi	Osaka	137,135	1.338
Taiwan	Taiwan	92,807	0.906
Murai	Tokyo	60,059	0.586
Nakai	Tokyo	45,551	0.445
Tokyo Watanabe	Tokyo	37,005	0.361
Dai Rokujugo	Hyogo	28,172	0.275
Souda	Kanagawa	21,753	0.212
Hachijuyon	Tokyo	17,798	0.174
Imabari Shogyo	Ehime	13,684	0.134
Fukushima Shogyo	Fukushima	8,724	0.085
Nakazawa	Tokyo	8,686	0.085
Tokushima	Tokushima	7,705	0.075
Taisho	Tokyo	7,602	0.074
Awata	Shiga	6,239	0.061
Kagoshima Kinken	Kagoshima	6,050	0.059
Kurate	Fukuoka	5,842	0.057
Akaji Chochiku	Tokyo	5,349	0.052
Tango Shoko	Kyoto	5,243	0.051
Hirobe	Tokyo	4,757	0.046
Asanuma	Gifu	4,598	0.045
Hiroshima Sangyo	Hiroshima	4,366	0.043
Nishiebara	Okayama	2,695	0.026
Noto Sangyo	Ishikawa	2,665	0.026
Fukaya Shogyo	Saitama	2,333	0.023
Tokushima Chochiku	Tokushima	2,007	0.020
Tokatsu	Chiba	1,927	0.019
Gamou	Shiga	1,658	0.016
Kuki	Saitama	1,656	0.016
Kawaizumi	Osaka	1,639	0.016
Senyo	Osaka	1,513	0.015
Yamashiro	Kyoto	1,379	0.013
Ashishina	Hiroshima	1,230	0.012
Akashi Shoko	Hyogo	1,040	0.010
Uozumi	Hyogo	761	0.007
Wakasa	Fukui	729	0.007
Tango Kyoritsu	Kyoto	634	0.006
Takeda Waribiki	Tokyo	585	0.006
Soeda	Fukuoka	533	0.005
Kuwafune	Kyoto	306	0.003
Tamashima Shogyo	Okayama	299	0.003
Shikano	Yamaguchi	260	0.003
Aichi	Saga	250	0.002
Moji	Fukuoka	148	0.001
Hojubana	Saitama	128	0.001

Source: Bank of Japan [1969], pp.81-82; Bank Bureau of Ministry of Finance [1928]
Note: The denominator of the share is the total deposits of ordinary banks and savings banks.

Table 3 The bank performance and scale

Descriptive statistics

	capdep	loandep	resdep
N	1402	1402	1402
average	1.27	2.09	0.25
st.dev	9.13	10.13	4.08
median	0.40	1.21	0.03
max	188.56	310.45	141.07
min	0.01	0.10	0.00
skewness	18.1	23.5	31.0
excess kurtois	346.5	651.8	1035.3

Correlation matrix of variables

	capdep	loandep	resdep	scale
capdep	1.00			
loandep	0.49	1.00		
resdep	0.70	0.44	1.00	
scale	-0.09	-0.03	-0.05	1.00

OLS regression

Equation-1	dependent variable: capdep		
	the coefficient	t-ratio	p-value
scale	-0.36	-3.28	0.00
constant	6.30	4.05	0.00
		adj- R squares	0.01

Equation-2	dependent variable: loandep		
	the coefficient	t-ratio	p-value
scale	-0.12	-1.02	0.31
constant	3.81	2.20	0.03
		adj- R squares	0.00

Equation-3	dependent variable: resdep		
	the coefficient	t-ratio	p-value
scale	-0.09	-1.89	0.06
constant	1.55	2.22	0.03
		adj- R squares	0.00

Table 4 Relation between closure and scale

LARGE

	capdep	loandep	resdep	bank closure in 1927
N	17	17	17	1
average	0.30	1.01	0.01	1÷17=
st.dev	0.29	0.60	0.01	5.9%

MEDIUM

	capdep	loandep	resdep	bank closure in 1927
N	196	196	196	10
average	0.57	3.63	0.17	10÷196=
st.dev	1.30	23.14	1.64	5.1%

SMALL

	capdep	loandep	resdep	bank closure in 1927
N	1189	1189	1189	30
average	1.40	1.85	0.26	30÷1189=
st.dev	9.89	5.70	4.38	2.5%

All observations

	capdep	loandep	resdep	bank closure in 1927
N	1402	1402	1402	41
average	1.27	2.09	0.25	41÷1402=
st.dev	9.13	10.13	4.08	2.9%

note

LARGE :banks of which paid-in capital are over ten million yen.
MEDIUM :banks of which paid-in capital are from one million to ten million yen.
SMALL :banks of which paid-in capital are less than one million yen.

Table 5 Coverage of Zenkoku Shogaisha Yakuinroku

	Categories of the companies	Number of data
A. Zenkoku Shogaisha Yakuinroku, 1926 issue	Total	15,060
	Banks	1,427
	Non-banking joint-stock companise	11,578
	Non-banking companise of the other form	2,055
B. Kaisha Tokei Hyo, 1926 issue	Total	36,068
	Banks	1,506
	Non-banking joint-stock companise	16,251
	Non-banking companise of the other form	18,311
C. Coverage (A/B*100)	Total	41.8
	Banks	94.8
	Non-banking joint-stock companise	71.2
	Non-banking companise of the other form	11.2

Note: All the data are concerning the companies in today's territory of Japan. As mentioned in the text, there are the data of 1498 companies in the other area in Zenkoku Shogaisha Yakuinroku.

Table 6 Discriptive Statistics

All observations

	N	MEAN	ST.DEV	MINIMUM	MAXIMUM
CAPDEP	1191	1.13	8.25	0.02	188.56
RESDEP	1191	0.14	1.66	0	51.989
LOANDEP	1191	2.04	10.28	0.10	310.45
ROE	1191	0.15	0.95	0	1.1076

excluding 9 outliers

	N	MEAN	ST.DEV	MINIMUM	MAXIMUM
CAPDEP	1182	0.64	0.84	0.02	8.49
RESDEP	1182	0.07	0.12	0.00	1.86
LOANDEP	1182	1.57	3.04	0.10	83.80
ROE	1182	0.15	0.09	0.00	1.11

Table 7 Interlocking of directors and auditors between banks and non-banking companies

a. All directors and auditors of 1,182 banks

Positions in the non-banking companies	Number of banks with interlocking	Ratio to all observations	Number of cases of interlocking	Average per bank
Total	1,032	87.3	9,280	7.85
Top executives	550	46.5	1,323	1.12
Executive directors	194	16.4	260	0.22
Ordinary directors	940	79.5	5,225	4.42
Auditors	797	67.4	2,472	2.09

b. Top executives of 1,182 banks

Positions in the non-banking companies	Number of banks with interlocking	Ratio to all observations	Number of cases of interlocking	Average per bank
Total	682	57.7	2,496	2.11
Top executives	188	15.9	306	0.26
Executive directors	66	5.6	76	0.06
Ordinary directors	536	45.3	1,337	1.13
Auditors	420	35.5	777	0.66

c. Executive directors of 1,182 banks

Positions in the non-banking companies	Number of banks with interlocking	Ratio to all observations	Number of cases of interlocking	Average per bank
Total	257	21.7	722	0.61
Top executives	52	4.4	67	0.06
Executive directors	30	2.5	34	0.03
Ordinary directors	183	15.5	387	0.33
Auditors	140	11.8	234	0.20

d. Ordinary directors of 1,182 banks

Positions in the non-banking companies	Number of banks with interlocking	Ratio to all observations	Number of cases of interlocking	Average per bank
Total	858	72.6	4,499	3.81
Top executives	347	29.4	634	0.54
Executive directors	93	7.9	114	0.10
Ordinary directors	738	62.4	2,635	2.23
Auditors	528	44.7	1,116	0.94

e. Auditors of 1,182 banks

Positions in the non-banking companies	Number of banks with interlocking	Ratio to all observations	Number of cases of interlocking	Average per bank
Total	514	43.5	1562	1.32
Top executives	202	17.1	316	0.27
Executive directors	31	2.6	36	0.03
Ordinary directors	377	31.9	865	0.73
Auditors	224	19.0	345	0.29

Table 8 Interlocking of directors and auditors between banks and non-banking companies by scale of banks

Table 8 (1)

a. All directors and auditors of 1,182 banks

Positions in the non-banking companies	Classes by paid-in capital	Number of observations	Number of banks with interlocking	Ratio to all observations(%)	Average per bank
Total	Total	1,182	1,032	87.3	7.9
	-1,000 thousand yen	976	834	85.5	5.7
	1,000-10,000	189	181	95.8	16.6
	10,000-	17	17	100.0	34.5
Top executives	Total	1,182	682	57.7	2.1
	-1,000 thousand yen	976	515	52.8	1.5
	1,000-10,000	189	151	79.9	4.4
	10,000-	17	16	94.1	11.2
Executive directors	Total	1,182	257	21.7	0.6
	-1,000 thousand yen	976	160	16.4	0.4
	1,000-10,000	189	85	45.0	1.6
	10,000-	17	12	70.6	2.5
Ordinary directors	Total	1,182	858	72.6	3.8
	-1,000 thousand yen	976	677	69.4	2.8
	1,000-10,000	189	164	86.8	7.8
	10,000-	17	17	100.0	15.7
Auditors	Total	1,182	514	43.5	1.3
	-1,000 thousand yen	976	381	39.0	1.0
	1,000-10,000	189	118	62.4	2.7
	10,000-	17	15	88.2	5.1

b. Top executives of 1,182 banks

Positions in the non-banking companies	Classes by paid-in capital	Number of observations	Number of banks with interlocking	Ratio to all observations(%)	Average per bank
Total	Total	1,182	682	57.7	17.1
	-1,000 thousand yen	976	515	52.8	1.5
	1,000-10,000	189	151	79.9	4.4
	10,000-	17	16	94.1	11.2
Top executives	Total	1,182	188	15.9	2.5
	-1,000 thousand yen	976	104	10.7	0.2
	1,000-10,000	189	73	38.6	0.6
	10,000-	17	11	64.7	1.7
Executive directors	Total	1,182	66	5.6	0.6
	-1,000 thousand yen	976	40	4.1	0.0
	1,000-10,000	189	22	11.6	0.1
	10,000-	17	4	23.5	0.5
Ordinary directors	Total	1,182	536	45.3	8.6
	-1,000 thousand yen	976	390	40.0	0.8
	1,000-10,000	189	131	69.3	2.4
	10,000-	17	15	88.2	5.4
Auditors	Total	1,182	420	35.5	5.4
	-1,000 thousand yen	976	293	30.0	0.5
	1,000-10,000	189	116	61.4	1.3
	10,000-	17	11	64.7	3.6

c. Executive directors of 1,182 banks

Positions in the non-banking companies	Classes by paid-in capital	Number of observations	Number of banks with interlocking	Ratio to all observations(%)	Average per bank
Total	Total	1,182	257	21.7	4.5
	-1,000 thousand yen	976	160	16.4	0.4
	1,000-10,000	189	85	45.0	1.6
	10,000-	17	12	70.6	2.5
Top executives	Total	1,182	52	4.4	0.2
	-1,000 thousand yen	976	36	3.7	0.0
	1,000-10,000	189	15	7.9	0.1
	10,000-	17	1	5.9	0.1
Executive directors	Total	1,182	30	2.5	0.1
	-1,000 thousand yen	976	17	1.7	0.0
	1,000-10,000	189	13	6.9	0.1
	10,000-	17	0	0.0	0.0
Ordinary directors	Total	1,182	183	15.5	2.5
	-1,000 thousand yen	976	111	11.4	0.2
	1,000-10,000	189	63	33.3	0.9
	10,000-	17	9	52.9	1.4
Auditors	Total	1,182	140	11.8	1.7
	-1,000 thousand yen	976	76	7.8	0.1
	1,000-10,000	189	55	29.1	0.6
	10,000-	17	9	52.9	1.1

Table 8 (2)

d. Ordinary directors of 1,182 banks

Positions in the non-banking companies	Classes by paid-in capital	Number of observations	Number of banks with interlocking	Ratio to all observations(%)	Average per bank
Total	Total	1,182	858	72.6	26.3
	-1,000 thousand yen	976	677	69.4	2.8
	1,000-10,000	189	164	86.8	7.8
	10,000-	17	17	100.0	15.7
Top executives	Total	1,182	347	29.4	4.5
	-1,000 thousand yen	976	228	23.4	0.4
	1,000-10,000	189	105	55.6	1.2
	10,000-	17	14	82.4	2.9
Executive directors	Total	1,182	93	7.9	0.6
	-1,000 thousand yen	976	57	5.8	0.1
	1,000-10,000	189	32	16.9	0.2
	10,000-	17	4	23.5	0.4
Ordinary directors	Total	1,182	738	62.4	14.7
	-1,000 thousand yen	976	563	57.7	1.7
	1,000-10,000	189	158	83.6	4.5
	10,000-	17	17	100.0	8.5
Auditors	Total	1,182	528	44.7	6.5
	-1,000 thousand yen	976	387	39.7	0.7
	1,000-10,000	189	124	65.6	1.9
	10,000-	17	17	100.0	3.9

e. Auditors of 1,182 banks

Positions in the non-banking companies	Classes by paid-in capital	Number of observations	Number of banks with interlocking	Ratio to all observations(%)	Average per bank
Total	Total	1,182	514	43.5	8.8
	-1,000 thousand yen	976	381	39.0	1.0
	1,000-10,000	189	118	62.4	2.7
	10,000-	17	15	88.2	5.1
Top executives	Total	1,182	202	17.1	1.9
	-1,000 thousand yen	976	132	13.5	0.2
	1,000-10,000	189	59	31.2	0.6
	10,000-	17	11	64.7	1.2
Executive directors	Total	1,182	31	2.6	0.2
	-1,000 thousand yen	976	22	2.3	0.0
	1,000-10,000	189	7	3.7	0.0
	10,000-	17	2	11.8	0.1
Ordinary directors	Total	1,182	377	31.9	4.4
	-1,000 thousand yen	976	273	28.0	0.6
	1,000-10,000	189	92	48.7	1.5
	10,000-	17	12	70.6	2.4
Auditors	Total	1,182	224	19.0	2.2
	-1,000 thousand yen	976	151	15.5	0.2
	1,000-10,000	189	64	33.9	0.6
	10,000-	17	9	52.9	1.4

Table 9 The difinitions of Variables

CAPDEP	= own-capital/deposit	FORM	= 1 if the bank is stock company, otherwise 0.
LOANDEP	= loan/deposit	SCALE	= own-capital+deposit
RESDEP	= reserve/deposit	STAKE	= Shareholders/own-capital
ROE	= profit/own-capital	ZAIBATSU	= 1 if the bank affiliated to zaibatsu , otherwise 0.

INTERLOCK(Continuous variables)		INTERLOCK(Dummy variables)	
TOP1 :	How many companies the top manager of the bank would be the top of non-bank cc	DTOP1	=1 if TOP1>0, otherwise 0.
TOP2 :	How many companies the top manager of the bank would be the second manager of	DTOP2	=1 if TOP2>0, otherwise 0.
TOP3 :	How many companies the top manager of the bank would be the officer of non-bar	DTOP3	=1 if TOP3>0, otherwise 0.
TOP4 :	How many companies the top manager of the bank would be the auditor of non-bar	DTOP4	=1 if TOP4>0, otherwise 0.
TOP :	=TOP1+TOP2+TOP3+TOP4	DTOP5	=1 if TOP>0, otherwise 0.
EXECUTIVE1 :	How many companies the second manager of the bank would be the top of non-bank	DEXECUTIVE1	=1 if SECOND1>0, otherwise 0.
EXECUTIVE2 :	How many companies the second manager of the bank would be the second manager	DEXECUTIVE2	=1 if SECOND2>0, otherwise 0.
EXECUTIVE3 :	How many companies the second manager of the bank would be the officer of non-	DEXECUTIVE3	=1 if SECOND3>0, otherwise 0.
EXECUTIVE4 :	How many companies the second manager of the bank would be the auditor of non-	DEXECUTIVE4	=1 if SECOND4>0, otherwise 0.
EXECUTIVE :	=SECOND1+SECOND2+SECOND3+SECOND4	DEXECUTIVE	=1 if SECOND>0, otherwise 0.
ORDINARY1 :	How many companies the officer of the bank would be the top of non-bank compar	DORDINARY1	=1 if OFFICER1>0, otherwise 0.
ORDINARY2 :	How many companies the officer of the bank would be the second manager of non-	DORDINARY2	=1 if OFFICER2>0, otherwise 0.
ORDINARY3 :	How many companies the officer of the bank would be the officer of non-bank cc	DORDINARY3	=1 if OFFICER3>0, otherwise 0.
ORDINARY4 :	How many companies the officer of the bank would be the auditor of non-bank cc	DORDINARY4	=1 if OFFICER4>0, otherwise 0.
ORDINARY :	=OFFICER1+OFFICER2+OFFICER3+OFFICER4	DORDINARY	=1 if OFFICER>0, otherwise 0.
AUDITOR1 :	How many companies the auditor of the bank would be the top of non-bank compar	DAUDITOR1	=1 if AUDITOR1>0, otherwise 0.
AUDITOR2 :	How many companies the auditor of the bank would be the second manager of non-	DAUDITOR2	=1 if AUDITOR2>0, otherwise 0.
AUDITOR3 :	How many companies the auditor of the bank would be the officer of non-bank cc	DAUDITOR3	=1 if AUDITOR3>0, otherwise 0.
AUDITOR4 :	How many companies the auditor of the bank would be the auditor of non-bank cc	DAUDITOR4	=1 if AUDITOR4>0, otherwise 0.
AUDITOR5 :	=AUDITOR1+AUDITOR2+AUDITOR3+AUDITOR4	DAUDITOR5	=1 if AUDITOR>0, otherwise 0.
INSIDER1 :	=TOP1+SECOND1+OFFICER1+AUDITOR1	DINSIDER1	=1 if INSIDER1>0, otherwise 0.
INSIDER2 :	=TOP2+SECOND2+OFFICER2+AUDITOR2	DINSIDER2	=1 if INSIDER2>0, otherwise 0.
INSIDER3 :	=TOP3+SECOND3+OFFICER3+AUDITOR3	DINSIDER3	=1 if INSIDER3>0, otherwise 0.
INSIDER4 :	=TOP4+SECOND4+OFFICER4+AUDITOR4	DINSIDER4	=1 if INSIDER4>0, otherwise 0.
INSIDER5 :	=INSIDER1+INSIDER2+INSIDER3+INSIDER4	DINSIDER5	=1 if INSIDER>0, otherwise 0.

Table 10 Results of Probit Model Estimation

DEPENDENT VARIABLE: CLS

observations at one	38
observations at zero	1144
total observations	1182

	Estimation-retesting Yabushita and Inc		Estimation-1		Estimation-2	
variables	The estimated Coefficie	t-ratio	The estimated Coefficie	t-ratio	The estimated Coefficie	t-ratio
CAPDEP	-0.89	-3.22 ***	-0.87	-3.06 ***	-0.85	-3.03 ***
LOANDEP	0.03	1.27	0.04	1.28	0.03	1.25
RESDEP	-0.54	-0.67	-0.49	-0.60	-0.50	-0.62
PROCAP	-4.37	-3.45 ***	-4.61	-3.49 ***	-4.46	-3.35 ***
FORM	4.53	0.01	2.11	0.63	2.05	0.61
SCALE	0.00	1.19	0.00	-0.23	0.00	1.37
INSIDER			0.00	0.49		
INSIDER*SCALE			0.00	0.94		
DINSIDER					0.20	0.66
DINSIDER*SCALE					0.00	-1.24
STAKE			63.43	-0.63	-52.89	-0.54
ZAIBATSU			5.80	-1.26	-3.19	-0.79
constant	-5.42	-0.01	-2.97	-0.89	-3.10	-0.92
Log-likelihood Function		-153.2		-150.2		-150.3
Maddala R-squares		0.02		0.03		0.03

	Estimation-3		Estimation-4	
variables	The estimated Coefficie	t-ratio	The estimated Coefficie	t-ratio
CAPDEP	-0.91	-3.16 ***	-0.86	-2.99 ***
LOANDEP	0.04	1.33	0.04	1.49
RESDEP	-0.53	-0.66	-0.56	-0.69
PROCAP	-5.23	-3.80 ***	-4.85	-3.43 ***
FORM	2.10	0.65	1.83	0.57
SCALE	0.00	-0.27	0.00	1.49
TOP	0.03	0.89		
EXECUTIVE	0.06	1.20		
ORDINARY	0.01	0.37		
AUDITOR	-0.05	-1.17		
TOP*SCALE	0.00	1.31		
EXECUTIVE*SCALE	0.00	0.14		
ORDINARY*SCALE	0.00	-1.30		
AUDITOR*SCALE	0.00	0.88		
DTOP			0.07	0.33
DEXECUTIVE			0.08	0.40
DORDINARY			0.51	1.89 *
DAUDITOR			-0.18	-1.03
DTOP*SCALE			0.00	0.70
DEXECUTIVE*SCALE			0.00	-0.49
DORDINARY*SCALE			0.00	-1.72 *
DAUDITOR*SCALE			0.00	0.06
STAKE	-79.01	-0.76	-57.31	-0.57
ZAIBATSU	-3.56	-0.56	-3.61	-0.83
constant	-2.87	-0.88	-3.06	-0.95
Log-likelihood Function		-145.0		-147.03
Maddala R-squares		0.04		0.03

Table 11 Result of Regression of the model (2)

Matrix-1

	1	2	3	4	5
TOP	-0.026	0.102	-0.023 *	-0.037 *	-0.014 *
EXECUTIVE	-0.180 *	-0.114	-0.076 ***	-0.108 ***	-0.050 ***
ORDINARY	-0.030	-0.053	-0.022 ***	-0.038 **	-0.013 ***
AUDITOR	-0.126 ***	-0.170	-0.064 ***	-0.102 ***	-0.047 ***
INSIDER	-0.036 ***	-0.039	-0.017 ***	-0.034 ***	-0.010 ***

Matrix-2

	1	2	3	4	5
DTOP	-0.157 **	0.117	-0.096 *	-0.073	-0.057
DEXECUTIVE	-0.218 *	-0.157	-0.213 ***	-0.192 **	-0.225 ***
DORDINARY	-0.157 ***	-0.082	-0.181 ***	-0.148 ***	-0.191 ***
DAUDITOR	-0.271 ***	-0.161	-0.209 ***	-0.217 ***	-0.276 ***
DINSIDER	-0.297 ***	0.045	-0.215 ***	-0.154 ***	-0.259 ***

Matrix-3

	1	2	3	4	5
TOP	0.033	0.088	-0.031	0.106	0.006
EXECUTIVE	-0.314	-0.131	-0.112	-0.158	-0.073
ORDINARY	-0.113	-0.109	-0.045	-0.111	-0.033
AUDITOR	-0.168	-0.295	-0.042	-0.034	-0.036
INSIDER	-0.068	-0.084	-0.027	-0.029	-0.015

Matrix-4

	1	2	3	4	5
DTOP	0.253	0.093	-0.058	0.054	-0.020
DEXECUTIVE	-0.425	-0.200	-0.378	-0.303	-0.383
DORDINARY	-0.307	-0.109	-0.367 *	-0.346 *	-0.457 **
DAUDITOR	-0.335	-0.346	-0.067	-0.214	-0.176
DINSIDER	-0.205	-0.141	-0.053	-0.208	-0.072

Matrix-5

	1	2	3	4	5
TOP	0.005	0.004	0.000	-0.001	0.000
EXECUTIVE	0.001	0.025	-0.002	-0.009	-0.002
ORDINARY	0.002	-0.013	-0.002 **	-0.005 *	-0.001 *
AUDITOR	-0.001	-0.018	-0.007 ***	-0.005	-0.003 **
INSIDER	0.002	-0.005	-0.002 **	-0.003 *	-0.001 *

Matrix-6

	1	2	3	4	5
DTOP	-0.006	0.004	0.005	-0.011	-0.005
DEXECUTIVE	0.008	0.044	-0.004	-0.002	-0.006
DORDINARY	-0.004	-0.022	-0.011	-0.014 *	-0.009
DAUDITOR	-0.003	-0.024	-0.021 ***	-0.015	-0.011
DINSIDER	0.001	-0.007	-0.006	-0.016 **	-0.008

Matrix-7

	1	2	3	4	5
TOP	-0.002	-0.018 *	-0.001	-0.003	-0.001
EXECUTIVE	0.006	-0.012	-0.001	0.003	0.000
ORDINARY	-0.003	-0.020 **	-0.002 ***	-0.003	-0.002 ***
AUDITOR	0.000	0.013	0.002	0.001	0.001
INSIDER	-0.001	-0.011 *	-0.001	-0.001	0.000

Matrix-8

	1	2	3	4	5
DTOP	0.000	-0.021	-0.002	-0.005	-0.007
DEXECUTIVE	-0.003	-0.018	-0.009	0.003	-0.004
DORDINARY	-0.008	-0.021 *	-0.013 **	-0.010	-0.015 **
DAUDITOR	0.006	0.003	0.012 *	0.005	0.014 **
DINSIDER	0.002	-0.016 *	-0.012	-0.012 *	-0.005

note 1) Elements of each matrices are the estimmated coefficients of Interlocking variables.
ex. in Matrix-A, the estimated coefficient of EXECUTIVE1 is -0.180.
in Matrix-B, the estimated coefficient of DINSIDER is -0.259.

note 2) *** :significant at 1% level.
** :significant at 5% level.
* :significant at 10% level.

Table 12 Risk-premium on the deposit of the banks with interlocking

Dependent Variable: deposit rate

Estimation-1 loan_rate= ã1(Interlocking variables) +ã2(loan)+constant

variables	the estimated	t-value		the estimated	t-value		the estimated	t-value		the estimated	t-value		the estimated	t-value	
TOP				2.63E-04	0.99										
SECOND							-3.07E-04	-0.68							
OFFICER										1.98E-04	1.24				
AUDITOUR													2.15E-04	0.84	
INSIDER	1.15E-04	1.24													
loan	-6.05E-11	-3.82	***	-6.14E-11	-3.67	***	-5.32E-11	-3.52	***	-5.79E-11	-3.79	***	-5.53E-11	-3.66	***
constant	6.22E-02	26.55	***	6.32E-02	31.97	***	6.48E-02	36.8	***	6.25E-02	28.56	***	6.36E-02	34.87	***
adj-R squares		0.10			0.10			0.09			0.10			0.09	

Estimation-2 deposit_rate= ã3(Interlocking variables) +ã4(deposit)+constant

variables	the estimated	t-value		the estimated	t-value		the estimated	t-value		the estimated	t-value		the estimated	t-value	
TOP				3.52E-04	1.82	*									
SECOND							3.97E-05	0.12							
OFFICER										2.54E-04	2.20	**			
AUDITOUR													2.66E-04	1.42	
INSIDER	1.67E-04	2.49	**												
deposits	-4.59E-11	-4.60	***	-4.62E-11	-4.36	***	-3.80E-11	-3.90	***	-4.20E-11	-4.33	***	-3.94E-11	-4.06	***
constant	4.55E-02	26.89	***	4.71E-02	32.64	***	4.85E-02	37.43	***	4.62E-02	29.07	***	4.77E-02	35.91	***
adj-R squares		0.15			0.13			0.10			0.14			0.12	

Table A

	Dai-Shisanka	Bank maneger(1)	Interlocking(2)	(2)/(1) (%)
The Number (%)	2130 (100%)	648 (30.4%)	381 (17.9%)	58.8%

Table B

CAPDEP= ã1(INTERLOCK) +ã2 (CROSS) +ã3 (FORM)
+ã4 (SCALE) +ã5 (STAKE) +ã6 (ZAIBATSU) +constat

INTERLOCK	ã1	ã2	ã3	ã4	ã5	ã6	constant	adj R-squares
TOP1	-0.026	0.000 *	0.345 **	-14.981	0.000 ***	-0.179	0.344 **	0.01
TOP2	0.102	0.000	0.326 **	-9.645	0.000 ***	-0.162	0.342 **	0.01
TOP3	-0.023 *	0.000 **	0.366 **	-17.766	0.000 ***	-0.231	0.345 **	0.01
TOP4	-0.037 *	0.000	0.359 **	-15.000	0.000 ***	-0.160	0.343 **	0.01
TOP	-0.014 *	0.000 ***	0.370 **	-19.383	0.000 ***	-0.267	0.346 **	0.01
EXECUTIVE1	-0.180 *	0.000	0.331 **	-13.146	0.000 ***	-0.133	0.354 **	0.01
EXECUTIVE2	-0.114	0.000	0.339 **	-12.758	0.000 ***	-0.128	0.342 **	0.01
EXECUTIVE3	-0.076 ***	0.000 **	0.359 **	-16.961	0.000 ***	0.144	0.347 **	0.02
EXECUTIVE4	-0.108 ***	0.000	0.355 **	15.323	0.000 ***	-0.165	0.343 **	0.01
EXECUTIVE	-0.050 ***	0.000 **	0.361 **	17.721	0.000 ***	-0.159	0.349 **	0.02
ORDINARY1	-0.030	0.000 *	0.353 **	-15.270	0.000 ***	-0.196	0.344 **	0.01
ORDINARY2	-0.053	0.000	0.338 **	-11.675	0.000 ***	-0.121	0.342 **	0.01
ORDINARY3	-0.022 ***	0.000 **	0.383 **	-17.664	0.000 ***	-0.246	0.348 **	0.02
ORDINARY4	-0.038 **	0.000 ***	0.375 **	-19.644	0.000 ***	-0.315	0.350 **	0.02
ORDINARY	-0.013 ***	0.000 **	0.388 ***	-20.083	0.000 ***	-0.291	0.349 **	0.02
AUDITOR1	-0.126 ***	0.000 **	0.349 **	-23.161	0.000 ***	-0.272	0.369 **	0.02
AUDITOR2	-0.170	0.000	0.339 **	-12.029	0.000 ***	-0.150	0.342 **	0.01
AUDITOR3	-0.064 ***	0.000 **	0.353 **	-24.026	0.000 ***	-0.126	0.379 ***	0.02
AUDITOR4	-0.102 ***	0.000	0.348 **	-18.324	0.000 ***	-0.087	0.359 **	0.01
AUDITOR	-0.047 ***	0.000 ***	0.362 **	-28.767	0.000 ***	-0.208	0.388 ***	0.02
INSIDER1	-0.036 ***	0.000 ***	0.374 **	-24.204	0.000 ***	-0.262	0.355 **	0.02
INSIDER2	-0.039	0.000	0.342 **	-12.285	0.000 ***	-0.158	0.342 **	0.01
INSIDER3	-0.017 ***	0.000 ***	0.408 ***	-26.214	0.000 ***	-0.272	0.359 **	0.02
INSIDER4	-0.034 ***	0.000 ***	0.404 ***	-24.667	0.000 ***	-0.273	0.354 **	0.02
INSIDER	-0.010 ***	0.000 ***	0.416 ***	-29.220	0.000 ***	-0.336	0.360 **	0.02
DTOP1	-0.157 **	0.000	0.362 **	-17.450	0.000 ***	-0.133	0.344 **	0.01
DTOP2	0.117	0.000	0.325 **	-9.061	0.000 ***	-0.145	0.342 **	0.01
DTOP3	-0.096 *	0.000	0.378 **	-15.312	0.000 **	-0.095	0.345 **	0.01
DTOP4	-0.073	0.000 *	0.362 **	-14.791	0.000 ***	-0.226	0.347 **	0.01
DTOP	-0.057	0.000 *	0.365 **	-14.456	0.000 ***	-0.174	0.350 **	0.01
DEXECUTIVE	-0.218 *	0.000	0.329 **	-13.143	0.000 ***	-0.136	0.357 **	0.01
DEXECUTIVE	-0.157	0.000	0.340 **	-12.953	0.000 ***	-0.128	0.342 **	0.01
DEXECUTIVE	-0.213 ***	0.000 **	0.365 **	-18.108	0.000 ***	-0.094	0.352 **	0.02
DEXECUTIVE	-0.192 **	0.000 *	0.359 **	-15.409	0.000 ***	-0.152	0.344 **	0.01
DEXECUTIVE	-0.225 ***	0.000 **	0.365 **	-20.087	0.000 ***	-0.066	0.368 **	0.02
DORDINARY	-0.157 ***	0.000 **	0.383 **	-17.007	0.000 ***	-0.216	0.347 **	0.02
DORDINARY2	-0.082	0.000	0.339 **	-11.835	0.000 ***	-0.126	0.342 **	0.01
DORDINARY3	-0.181 ***	0.000 ***	0.422 ***	-21.370	0.000 ***	-0.165	0.401 ***	0.03
DORDINARY4	-0.148 ***	0.000 ***	0.400 ***	-24.939	0.000 ***	-0.144	0.390 ***	0.03
DORDINARY	-0.191 ***	0.000 ***	0.428 ***	-18.592	0.000 ***	-0.154	0.416 ***	0.02
DAUDITOR1	-0.271 ***	0.000 ***	0.347 **	-25.309	0.000 ***	-0.294	0.391 ***	0.02
DAUDITOR2	-0.161	0.000	0.337 **	-11.603	0.000 ***	-0.149	0.342 **	0.01
DAUDITOR3	-0.209 ***	0.000	0.331 **	-24.177	0.000 ***	-0.067	0.421 *	0.02
DAUDITOR4	-0.217 ***	0.000	0.357 **	-19.823	0.000 **	-0.033	0.364 **	0.02
DAUDITOR	-0.276 ***	0.000 ***	0.342 **	-33.300	0.000 ***	-0.181	0.475 ***	0.03
DINSIDER1	-0.297 ***	0.000 ***	0.413 ***	-33.688	0.000 ***	-0.155	0.452 ***	0.04
DINSIDER2	0.045	0.000	0.340 **	-11.942	0.000 ***	-0.135	0.342 **	0.01
DINSIDER3	-0.215 ***	0.000 ***	0.401 ***	-19.169	0.000 ***	-0.145	0.465 ***	0.02
DINSIDER4	-0.154 ***	0.000 ***	0.402 ***	-20.854	0.000 ***	-0.152	0.402 ***	0.02
DINSIDER	-0.259 ***	0.000 ***	0.401 ***	-17.017	0.000 ***	-0.146	0.514 ***	0.02

Table C

LOANDEP= ã1(INTERLOCK) +ã2 (CROSS) +ã3 (FORM)
+ã4 (SCALE) +ã5 (STAKE) +ã6 (ZAIBATSU) +constat

INTERLOCK	a1	a2	a3	a4	a5	a6	constant	adj R-squares
TOP1	0.033	0.000	0.425	-105.150	0.000	0.041	1.258 **	0.00
TOP2	0.088	0.000	0.423	-104.240	0.000	0.068	1.256 **	0.00
TOP3	-0.031	0.000	0.471	-113.880	0.000	-0.049	1.259 **	0.00
TOP4	0.106	0.000	0.356	-93.718	0.000	0.138	1.256 **	0.00
TOP	0.006	0.000	0.422	-105.910	0.000	-0.025	1.260 **	0.00
EXECUTIVE1	-0.314	0.000	0.427	-109.570	0.000	0.053	1.277 **	0.00
EXECUTIVE2	-0.131	0.000	0.437	-107.820	0.000	0.064	1.256 **	0.00
EXECUTIVE3	-0.112	0.000	0.467	-114.140	0.000	0.042	1.263 **	0.00
EXECUTIVE4	-0.158	0.000	0.462	-112.100	0.000	0.028	1.257 **	0.00
EXECUTIVE	-0.073	0.000	0.471	-115.530	0.000	0.022	1.266 **	0.00
ORDINARY1	-0.113	0.000	0.497	-118.760	0.000	0.036	1.259 **	0.00
ORDINARY2	-0.109	0.000	0.441	-107.490	0.000	0.067	1.256 **	0.00
ORDINARY3	-0.045	0.000	0.530	-117.570	0.000	0.012	1.265 **	0.00
ORDINARY4	-0.111	0.000	0.540	-123.880	0.000	-0.170	1.269 **	0.00
ORDINARY	-0.033	0.000	0.561	-124.440	0.000	-0.048	1.267 **	0.00
AUDITOR1	-0.168	0.000	0.450	-121.500	0.000	-0.082	1.292 **	0.00
AUDITOR2	-0.295	0.000	0.439	-107.440	0.000	0.044	1.256 **	0.00
AUDITOR3	-0.042	0.000	0.442	-113.750	0.000	0.093	1.280 **	0.00
AUDITOR4	-0.034	0.000	0.436	-108.520	0.000	0.131	1.262 **	0.00
AUDITOR	-0.036	0.000	0.451	-118.910	0.000	0.064	1.291 **	0.00
INSIDER1	-0.068	0.000	0.501	-127.840	0.000	-0.076	1.278 **	0.00
INSIDER2	-0.084	0.000	0.449	-108.930	0.000	0.068	1.256 **	0.00
INSIDER3	-0.027	0.000	0.541	-126.820	0.000	-0.028	1.279 **	0.00
INSIDER4	-0.029	0.000	0.489	-116.740	0.000	-0.036	1.266 **	0.00
INSIDER	-0.015	0.000	0.543	-129.280	0.000	-0.095	1.279 **	0.00
DTOP1	0.253	0.000	0.384	-96.629	0.000	0.206	1.258 **	0.00
DTOP2	0.093	0.000	0.423	-103.900	0.000	0.087	1.256 **	0.00
DTOP3	-0.058	0.000	0.456	-108.300	0.000	0.119	1.260 **	0.00
DTOP4	0.054	0.000	0.411	-106.210	0.000	-0.045	1.261 **	0.00
DTOP	-0.020	0.000	0.439	-107.680	0.000	0.025	1.264 **	0.00
DEXECUTIVE1	-0.425	0.000	0.422	-109.950	0.000	0.049	1.285 **	0.00
DEXECUTIVE2	-0.200	0.000	0.438	-108.130	0.000	0.063	1.256 **	0.00
DEXECUTIVE3	-0.378	0.000	0.483	-116.950	0.000	0.091	1.272 **	0.00
DEXECUTIVE4	-0.303	0.000	0.469	-112.000	0.000	0.067	1.258 **	0.00
DEXECUTIVE	-0.383	0.000	0.483	-120.210	0.000	0.135	1.298 **	0.00
DORDINARY1	-0.307	0.000	0.525	-115.380	0.000	0.018	1.258 **	0.00
DORDINARY2	-0.109	0.000	0.439	-106.840	0.000	0.074	1.256 **	0.00
DORDINARY3	-0.367 *	0.000	0.643	-103.500	0.000	0.114	1.259 **	0.00
DORDINARY4	-0.346 *	0.000	0.578	-115.900	0.000	0.076	1.280 **	0.00
DORDINARY	-0.457 **	0.000	0.746	-95.793	0.000	0.112	1.242 **	0.00
DAUDITOR1	-0.335	0.000	0.443	-122.300	0.000	-0.051	1.315 **	0.00
DAUDITOR2	-0.346	0.000	0.439	-107.010	0.000	0.045	1.256 **	0.00
DAUDITOR3	-0.067	0.000	0.428	-109.290	0.000	0.098	1.281 **	0.00
DAUDITOR4	-0.214	0.000	0.456	-115.120	0.000	0.158	1.278 **	0.00
DAUDITOR	-0.176	0.000	0.432	-118.960	0.000	0.092	1.340 **	0.00
DINSIDER1	-0.205	0.000	0.485	-122.360	0.000	0.046	1.345 **	0.00
DINSIDER2	-0.141	0.000	0.455	-109.910	0.000	0.114	1.256 **	0.00
DINSIDER3	-0.053	0.000	0.437	-108.630	0.000	0.063	1.304 **	0.00
DINSIDER4	-0.208	0.000	0.528	-118.230	0.000	0.037	1.329 **	0.00
DINSIDER	-0.072	0.000	0.445	-107.570	0.000	0.068	1.311 **	0.00

Table D

RESDEP= ã1(INTERLOCK) +ã2 (CROSS) +ã3 (FORM)
+ã4 (SCALE) +ã5 (STAKE) +ã6 (ZAIBATSU) +constat

INTERLOCK	ã1	ã2	ã3	ã4	ã5	ã6	constant	adj R-squares
TOP1	0.005	0.000	0.004	-11.144 ***	0.000	-0.025	0.079 ***	0.01
TOP2	0.004	0.000	0.005	-11.271 ***	0.000	-0.027	0.079 ***	0.01
TOP3	0.000	0.000	0.006	-11.627 ***	0.000	-0.032	0.079 ***	0.01
TOP4	-0.001	0.000	0.006	-11.441 ***	0.000 **	-0.025	0.079 ***	0.01
TOP	0.000	0.000	0.005	-11.604 ***	0.000 **	-0.034	0.079 ***	0.01
EXECUTIVE1	0.001	0.000	0.005	-11.330 ***	0.000 **	-0.025	0.079 ***	0.01
EXECUTIVE2	0.025	0.000	0.005	-11.404 ***	0.000 **	-0.024	0.079 ***	0.01
EXECUTIVE3	-0.002	0.000	0.006	-11.530 ***	0.000 *	0.000	0.079 ***	0.01
EXECUTIVE4	-0.009	0.000	0.007	-11.688 ***	0.000 *	-0.026	0.079 ***	0.01
EXECUTIVE	-0.002	0.000	0.006	-11.577 ***	0.000 *	-0.025	0.079 ***	0.01
ORDINARY1	0.002	0.000	0.004	-11.179 ***	0.000 **	-0.031	0.079 ***	0.01
ORDINARY2	-0.013	0.000	0.006	-11.599 ***	0.000 *	-0.025	0.079 ***	0.01
ORDINARY3	-0.002 **	0.000	0.010	-12.058 ***	0.000 **	-0.034	0.079 ***	0.01
ORDINARY4	-0.005 *	0.000 *	0.010	-12.276 ***	0.000 **	0.000	0.080 ***	0.01
ORDINARY	-0.001 *	0.000	0.010	-12.209 ***	0.000 **	-0.038	0.079 ***	0.01
AUDITOR1	-0.001	0.000	0.005	-11.417 ***	0.000 **	-0.029	0.079 ***	0.01
AUDITOR2	-0.018	0.000	0.006	-11.470 ***	0.000 **	-0.028	0.079 ***	0.01
AUDITOR3	-0.007 ***	0.000	0.007	-12.747 ***	0.000 **	-0.021	0.083 ***	0.01
AUDITOR4	-0.005	0.000	0.006	-11.721 ***	0.000 *	-0.020	0.080 ***	0.01
AUDITOR	-0.003 **	0.000	0.007	-12.608 ***	0.000 **	-0.028	0.082 ***	0.01
INSIDER1	0.002	0.000	0.004	-11.073 ***	0.000 **	-0.033	0.079 ***	0.01
INSIDER2	-0.005	0.000	0.006	-11.555 ***	0.000 **	-0.027	0.079 ***	0.01
INSIDER3	-0.002 **	0.000	0.011	-12.662 ***	0.000 **	-0.037	0.080 ***	0.01
INSIDER4	-0.003 *	0.000	0.010	-12.393 ***	0.000 *	0.000	-0.035 ***	0.01
INSIDER	-0.001 *	0.000	0.011	-12.607 ***	0.000 **	-0.041	0.080 ***	0.01
DTOP1	-0.006	0.000	0.006	-11.585 ***	0.000 *	-0.024	0.079 ***	0.01
DTOP2	0.004	0.000	0.005	-11.256 ***	0.000 **	-0.024	0.079 ***	0.01
DTOP3	0.005	0.000	0.002	-11.106 ***	0.000	-0.021	0.079 ***	0.01
DTOP4	-0.011	0.000	0.009	-11.851 ***	0.000 **	-0.036	0.079 ***	0.01
DTOP	-0.005	0.000	0.007	-11.643 ***	0.000 *	-0.029	0.080 ***	0.01
DEXECUTIVE	0.008	0.000	0.005	-11.277 ***	0.000 **	-0.026	0.078 ***	0.01
DEXECUTIVE	0.044	0.000	0.004	-11.289 ***	0.000 **	-0.024	0.079 ***	0.01
DEXECUTIVE	-0.004	0.000	0.006	-11.532 ***	0.000 *	-0.021	0.079 ***	0.01
DEXECUTIVE	-0.002	0.000	0.005	-11.400 ***	0.000 *	-0.026	0.079 ***	0.01
DEXECUTIVE	-0.006	0.000	0.006	-11.570 ***	0.000	-0.021	0.079 ***	0.01
DORDINARY1	-0.004	0.000	0.006	-11.527 ***	0.000	-0.029	0.079 ***	0.01
DORDINARY2	-0.022	0.000	0.007	-11.667 ***	0.000 **	-0.026	0.079 ***	0.01
DORDINARY3	-0.011	0.000	0.011	-11.657 ***	0.000	-0.025	0.081 ***	0.01
DORDINARY4	-0.014 *	0.000	0.011	-12.056 ***	0.000	-0.024	0.081 ***	0.01
DORDINARY	-0.009	0.000	0.010	-11.450 ***	0.000	-0.024	0.081 ***	0.01
DAUDITOR1	-0.003	0.000	0.005	-11.562 ***	0.000 **	-0.034	0.079 ***	0.01
DAUDITOR2	-0.024	0.000	0.006	-11.466 ***	0.000 **	-0.028	0.079 ***	0.01
DAUDITOR3	-0.021 ***	0.000	0.005	-12.664 ***	0.000	-0.018	0.087 ***	0.01
DAUDITOR4	-0.015	0.000	0.007	-12.020 ***	0.000	-0.018	0.080 ***	0.01
DAUDITOR	-0.011	0.000	0.005	-12.265 ***	0.000	-0.028	0.084 ***	0.01
DINSIDER1	0.001	0.000	0.005	-11.403 ***	0.000	-0.024	0.080 ***	0.01
DINSIDER2	-0.007	0.000	0.006	-11.546 ***	0.000 *	-0.025	0.079 ***	0.01
DINSIDER3	-0.006	0.000	0.007	-11.535 ***	0.000	-0.024	0.082 ***	0.01
DINSIDER4	-0.016 **	0.000	0.013	-12.192 ***	0.000	-0.025	0.083 ***	0.01
DINSIDER	-0.008	0.000	0.007	-11.538 ***	0.000	-0.024	0.084 ***	0.01

Table E

PROCAP= ã1(INTERLOCK) +ã2 (CROSS) +ã3 (FORM)
+ã4 (SCALE) +ã5 (STAKE) +ã6 (ZAIBATSU) +constat

TOBIT ANALYSIS, LIMIT= 0.00
56 LIMIT OBSERVATIONS
1126 NON-LIMIT OBSERVATIONS

INTERLOCK	a1	a2	a3	a4	a5	a6	constant	LOG-LIKELIHOOD FUNCTION
TOP1	-0.002	0.000	-0.034 *	-0.170	0.000	0.008	0.181 ***	947.4
TOP2	-0.018 *	0.000	-0.034 *	-0.096	0.000	0.012	0.181 ***	948.7
TOP3	-0.001	0.000	-0.034 *	-0.205	0.000	0.006	0.181 ***	947.5
TOP4	-0.003	0.000	-0.033 *	-0.219	0.000	0.008	0.181 ***	947.7
TOP	-0.001	0.000	-0.033 *	-0.399	0.000	0.005	0.181 ***	947.8
EXECUTIVE1	0.006	0.000	-0.035 *	0.190	0.000	0.013	0.180 ***	974.7
EXECUTIVE2	-0.012	0.000	-0.035 *	0.209	0.000	0.011	0.181 ***	947.7
EXECUTIVE3	-0.001	0.000	-0.035 *	-0.033	0.000	0.009	0.181 ***	947.4
EXECUTIVE4	0.003	0.000	-0.036 *	0.191	0.000	0.010	0.181 ***	947.4
EXECUTIVE	0.000	0.000	-0.035 *	0.081	0.000	0.009	0.181 ***	947.4
ORDINARY1	-0.003	0.000	-0.033 *	-0.373	0.000	0.008	0.181 ***	948.0
ORDINARY2	-0.020 **	0.000	-0.033 *	-0.379	0.000	0.006	0.181 ***	950.0
ORDINARY3	-0.002 ***	0.000	-0.030	-0.621	0.000	0.008	0.181 ***	950.8
ORDINARY4	-0.003	0.000	-0.032 *	-0.359	0.000	0.006	0.181 ***	948.3
ORDINARY	-0.002 ***	0.000	-0.029	-0.785	0.000	0.007	0.181 ***	950.5
AUDITOR1	0.000	0.000	-0.035 *	0.080	0.000	0.011	0.181 ***	947.2
AUDITOR2	0.013	0.000	-0.036 *	0.158	0.000	0.010	0.181 ***	947.6
AUDITOR3	0.002	0.000	-0.036 *	0.542	0.000	0.010	0.180 ***	947.9
AUDITOR4	0.001	0.000	-0.035 *	0.129	0.000	0.011	0.181 ***	947.3
AUDITOR	0.001	0.000	-0.036 *	0.496	0.000	0.013	0.180 ***	947.6
INSIDER1	-0.001	0.000	-0.034 *	-0.406	0.000	0.006	0.181 ***	947.6
INSIDER2	-0.011 *	0.000	-0.032 *	-0.447	0.000	0.007	0.181 ***	949.3
INSIDER3	-0.001	0.000	-0.032 *	-0.625	0.000	0.007	0.182 ***	948.4
INSIDER4	-0.001	0.000	-0.033 *	-0.395	0.000	0.008	0.181 ***	947.8
INSIDER	0.000	0.000	-0.031 *	-0.723	0.000	0.006	0.182 ***	948.4
DTOP1	0.000	0.000	-0.035 *	0.030	0.000	0.010	0.181 ***	947.2
DTOP2	-0.021	0.000	-0.034 *	-0.188	0.000	0.013	0.181 ***	948.5
DTOP3	-0.002	0.000	-0.034 *	-0.057	0.000	0.010	0.181 ***	947.3
DTOP4	-0.005	0.000	-0.033 *	-0.041	0.000	0.012	0.181 ***	947.7
DTOP	-0.007	0.000	-0.031 *	-0.225	0.000	0.008	0.181 ***	947.9
DEXECUTIVE	-0.003	0.000	-0.035 *	0.068	0.000	0.012	0.181 ***	947.4
DEXECUTIVE	-0.018	0.000	-0.035 *	0.181	0.000	0.011	0.181 ***	947.9
DEXECUTIVE	-0.009	0.000	-0.034 *	-0.193	0.000	0.010	0.181 ***	947.9
DEXECUTIVE	0.003	0.000	-0.036 *	0.150	0.000	0.011	0.181 ***	947.3
DEXECUTIVE	-0.004	0.000	-0.035 *	-0.055	0.000	0.010	0.181 ***	947.4
DORDINARY1	-0.008	0.000	-0.033 *	-0.232	0.000	0.007	0.181 ***	947.9
DORDINARY2	-0.021 *	0.000	-0.033 *	-0.285	0.000	0.008	0.181 ***	949.1
DORDINARY3	-0.013 **	0.000	-0.028	-0.084	0.000	0.010	0.182 ***	949.5
DORDINARY4	-0.010	0.000	-0.031 *	-0.218	0.000	0.010	0.181 ***	948.6
DORDINARY	-0.015 **	0.000	-0.027	-0.236	0.000	0.008	0.184 ***	949.5
DAUDITOR1	0.006	0.000	-0.035 *	0.368	0.000	0.010	0.180 ***	947.6
DAUDITOR2	0.003	0.000	-0.035 *	0.066	0.066	0.009	0.181 ***	947.3
DAUDITOR3	0.012 *	0.000	-0.035 *	0.867	0.000	0.007	0.176 ***	949.1
DAUDITOR4	0.005	0.000	-0.035 *	0.195	0.000	0.008	0.180 ***	947.5
DAUDITOR	0.014 **	0.000	-0.035 *	1.195	0.000	0.009	0.174 ***	950.1
DINSIDER1	0.002	0.000	-0.036 *	0.243	0.000	0.010	0.180 ***	947.3
DINSIDER2	-0.016 *	0.000	-0.032 *	-0.455	0.000	0.006	0.181 ***	949.1
DINSIDER3	-0.012	0.000	-0.031 *	-0.442	0.000	0.008	0.188 ***	949.0
DINSIDER4	-0.012 *	0.000	-0.029 *	-0.562	0.000	0.009	0.184 ***	948.8
DINSIDER	-0.005	0.000 *	-0.034 *	-0.176	0.000 *	0.009	0.185 ***	948.6

note) In Tobit Model
E(y)=óI, where I á â/ó
The parameter ó will be called "normalized coefficient".
In this paper, vector á is the estimated coefficient.