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Ownership structure in Japanese banking industry:**Evolution and effects****Bing Li**^{1,2}

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corresponding author*Abstract:**

Banks play an important role in the Japanese economy. This paper addresses some recent changes in Japanese banking industry over the past decade by focusing on the ownership structure of Japanese commercial banks. Ownership type, concentration and shareholder network are investigated to explore the structural changes and further demonstrate their effects on bank performance.

Key words: ownership structure; shareholder network; bank performance**JEL classification:** G21 G32 L14

1. Introduction

The Japanese economic system is famous for its institutional features such as corporate groups and main banks. Corporate groups (keiretsu) provide a governance mechanism to monitor member firms and a channel to share information and risks among member firms (e.g., Bernotas, 2005). Member firms of a corporate group were usually organized around a main bank that can hold both debt and equity shares of keiretsu firms (Prowse, 1992; Morck et al., 2000). Main bank have positive effects – such as access to capital and assistance in financial distress as well as corporate governance role – and meanwhile, are also criticized for their multiple roles as creditor and shareholder since their equity shareholding seems less important when compared with their debt claims and interest income earned (e.g., Yao and Ouyang, 2007).

Developing and evolving with corporate groups and main bank system, cross-shareholding is thus pervasive in the Japanese economy, especially intercorporate ownership within corporate groups and cross-shareholding between main banks and keiretsu firms (e.g., Lincoln et al., 1992). Some structural changes have occurred especially since the banking crisis in late 1997 (Miyajima and Kuroki, 2007), but it seems that the dominance of financial institutions including banks was remarkably stable (Grbic, 2007).

Obviously, the banking industry plays an important role in the Japanese economy. Comparing with the previous studies of ownership structure in Japanese corporate groups and cross-shareholding, this paper concentrates more on the ownership

structure in Japanese banking industry and its evolution over the past decade. Moreover, the effects of ownership structure on bank performance are investigated, rather than the effect of bank ownership on firm performance that has been extensively studied (e.g., Agarwal and Elston, 2001). Specifically, what is the current ownership structure in the Japanese banking industry? What is new feature emerging and how does it evolve over the past decade since 2005? Does ownership structure affect Japanese bank performance? These questions are exactly what this paper attempts to answer.

2. Ownership structure

The sample consists of 93 Japanese commercial banks out of 120 on the member list of Japanese Banker Association¹ due to data availability. The shareholder data and financial indicators of these banks are from the Bankscope database provided by Bureau Van Dijk. The years of 2005, 2010, 2015² are selected to show the change of ownership structure. Ownership type, concentration and shareholder network are used to reflect the bank's ownership structure.

2.1. Ownership type and concentration

[Table 1 The largest shareholder: type and statistics of shareholding percentage]

¹ <http://www.zenginkyo.or.jp/en/outline/list-of-members/#c17723>.

² The end of the fiscal year in Japanese accounting system is March 31. Therefore, the data used correspond with the dates of March 31, 2005/2010/2015.

[Table 2 Ownership concentration ratios]

Table 1 examines the largest shareholder's type and ownership variation. The percentage for the largest shareholder of bank type decreased in 2015, comparing with that in 2010 and 2005. But the mean and median values of shareholding percent increased significantly from 2005 to 2015, showing more ownership concentration of the largest shareholder of bank type. The largest shareholder of MPT type also showed a significant increase in the number and percentage. The type of insurance company showed little variation, reflecting their stable shareholding position aggregately.

Table 2 gives the statistics of the ratios about ownership concentration. The average shareholding percent of the first largest shareholder (csf) increased from about 12% in 2005 to 18% in 2015, showing the tendency of concentration. Similar are the sum of the shares of the top 3 shareholders (cs3) and the squared sum of the top 10 shareholders (hhi). The ratio of the share percent of the first largest shareholder to the second one (csr) also increased, indicating that the restriction between large controlling shareholders may decrease in the past decade.

2.2. Shareholder network

[Figure 1 Bank's shareholder network in 2015]

[Figure 2 Bank's cross-shareholding in 2015]

Beyond ownership type and concentration, shareholder network can describe more underlying relations that are direct or indirect (e.g., Gerlach, 1992; Grbic, 2007). Figure 1 delineates the shareholder network in 2015 by removing isolated nodes³. Figure 2 further illustrates the cross-shareholding between banks by removing non-bank nodes.

[Table 3 Properties of the bank's shareholder network]

Table 3 gives the properties of the shareholder networks⁴. The average path length⁵ and clustering coefficient⁶ experienced the same pattern of variation from 2005 to 2015, falling down in 2010 and increasing in 2015, which reflects the changing relations between these commercial banks and their shareholders.

Beside these network properties, centrality measures can be used to quantitatively gauge the positions of the banks or non-bank shareholders in the network. These centrality measures include degree, closeness, betweenness and eigenvector (Newman, 2003). Degree measures the number of ties between an actor and the other ones; closeness adversely measures the average geodesic distance from an actor to all the other ones; betweenness measures the intermediating role of an actor in the network;

³ These isolated nodes are banks or non-bank shareholders without (clear) direct shareholding information in the Bankscope database.

⁴ The graphs of the shareholder networks in 2010 and 2005 are not shown here for brevity.

⁵ Average path length (APL) denotes the average distance between any two nodes in the network.

⁶ Clustering coefficient (ClusterCoeff) denotes the connectedness of the neighbor nodes of any node; for the network, it is the average value of each node.

eigenvector measures the centrality of an actor by also considering the importance of its neighbors. Centrality metrics of degree and betweenness show the similar variation pattern with the network properties⁷.

3. Ownership effect on bank performance

The ownership effect on bank performance can be examined from ownership type (e.g., Bonin et al., 2005), concentration (e.g., Laeven and Levine, 2009) and shareholder network (e.g., Lincoln et al., 1992; Grbic, 2007). Centrality measures are used to quantitatively investigate the network effect.

3.1. The Empirical Model

Based on the previous discussion, the empirical model is constructed as the following:

$$PI_i = \alpha_0 + \sum_k \beta_{i,k} var_{i,k} + \sum_m \gamma_{i,m} con_{i,m} + \sum_n \delta_{i,n} dum_{i,n} + \varepsilon_i.$$

The independent variable, denoted as PI_i , representing performance indicator for the i^{th} bank, i.e., return on average assets (ROAA), and return on average equity (ROAE)⁸.

The network variable, denoted as $var_{i,k}$, represents the k^{th} centrality measure for the i^{th} bank, i.e., degree, closeness, betweenness and eigenvector. The control variable, denoted as $con_{i,m}$, represents the m^{th} control variable for the i^{th} bank, such as asset⁹,

⁷ The statistics of centrality measures are not shown here for brevity.

⁸ The performance indicators such as cost-to-income ratio (CIR) and net interest margin (NIM) are also examined in this research and the results are not listed for brevity.

⁹ The natural logarithm of the total assets is used for regression.

ear, csf, et al. The dummy variable, denoted as $dum_{i,n}$, represents year dummy 2015 (dm15) and 2010 (dm10) as well as type dummy for the largest shareholder (i.e., dmcsfBank, dmcsfMPT, dmcsfInsu). The corresponding coefficients are β , γ , δ and ε is the random error.

3.2. Result

There are 197 bank-year observations in the sample for regression. Table 4 is the result for ROAA. The ownership structure shows its effects on bank performance. The ownership type of insurance company as the largest shareholder (dmcsfInsu) has a negative effect on ROAA while the type of bank or MPT (dmcsfBank or dmcsfMPT) shows no significant influence. The ownership concentration of the first largest shareholder (csf) shows a positive effect on ROAA but this effect is not robust when year dummies are introduced. The closeness is negatively related to ROAA, meaning that closer relationship with other banks or shareholding firms results in worse performance in ROAA and thus demonstrating the effect of shareholder network on bank performance¹⁰.

The cost-to-income ratio (CIR) and net interest margin (NIM) are also examined. No significant effect is shown by ownership type or concentration. The closeness shows its negative effect on CIR while a positive effect on NIM although these effects are not robust with year dummies introduced.

¹⁰ These results are nearly the same with the regression for ROAE (not shown for brevity).

[Table 4 Major results - bank performance (ROAA)]

Besides, the control variables also influence bank performance. As the proxy for scale effect, an increase in the total assets tends to increase ROAA but to decrease CIR and NIM. The equity-to-asset ratio (ear) shows similar influence as the assets. The year dummy variables also have negative effects on ROAA and NIM while positive effects on CIR.

3.3. Discussion

The regression results show the influence of insurance company as the first largest shareholder. With a negative effect on ROAA, albeit no significant effect on CIR or NIM, it is pertinent to concern about the role that insurance companies play in the Japanese banking industry (Prowse, 1992; Grbic, 2007).

The ownership concentration of the largest shareholder shows no significant or robust effect on these performance indicators, which is consistent with the mixed results in previous studies since there exist contrasting effects of concentration, i.e., interest alignment vs. entrenchment (e.g., Morck et al., 2000).

The shareholder network demonstrates its effects on bank performance. The centrality of closeness shows its more significant and robust influence. To some extent, it can quantify the complex relationship among the Japanese financial institutions. The closeness tends to reduce cost and improve net interest margin, possibly resulting from its function of information sharing. But its effect on ROAA seems to play a

negative role when close relationship between banks and their shareholders leads to collusions and thus damages bank profitability. Therefore, the aggregate effect of shareholder network could be mixed for its benefits (such as resource and information sharing) and risks (such as collusion).

The total assets play a role in improving profitability and reducing cost. The year dummies indicate worse bank performance in 2015 and 2010 than in 2005, i.e., lower ratios of ROAA and NIM while higher CIR.

4. Conclusions

This paper concentrates on ownership structure in Japanese banking industry: its evolution over the past decade and its effect on bank performance. The banking corporations maintain their absolute control over the Japanese commercial banks, and the recent increase in equity shares indicates a stronger control or more capital injection¹¹. The insurance companies keep their stable position in holding the relatively stable percent of bank equities. The MPTs tend to increase their shareholding and raise their influence. Meanwhile, bank equity shares are more concentrated.

The temporal variation in the shareholder network also shows the changes in ownership structure. The average path length experienced a decrease in 2010 but later an increase in 2015, indicating the unwinding of cross-shareholding that may be caused by liquidity crunch in the financial crisis (selling bank equity shares for cash to

¹¹ This can be supported from the summary of bank equities held by banking corporations, i.e., more than 60% in 2015.

finance business or reduce risk exposure).

Moreover, the effects of ownership structure on bank performance are investigated from ownership type, concentration and shareholder network. To some extent, these ownership structural characteristics demonstrate their effects on bank performance with mixed empirical results. The insurance company as the first largest shareholder can influence bank performance. The effect of shareholder network on bank performance is two-sided since there exist benefits and risks in the network, such as information sharing and collusion, both of which result from the close relationship between the banks and their shareholders. Limitation about this research is the sample that only includes Japanese commercial banks. It deserves more efforts to extend this sample and encompass more Japanese banking corporations.

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Table 1 The largest shareholder: type and statistics of shareholding percentage

YEAR	Type of the largest shareholder	mean	sd	max	min	median	n
Y2015 (N=83)	Bank	33.98	39.73	100.00	3.59	9.63	29
	Mutual & Pension Fund/Nominee/Trust/Trustee	7.04	2.66	12.98	2.72	6.16	33
	Insurance company	4.85	1.14	7.75	3.59	4.73	11
Y2010 (N=63)	Bank	23.09	33.73	100.00	2.34	7.23	35
	Mutual & Pension Fund/Nominee/Trust/Trustee	5.51	1.45	8.55	3.07	5.37	10
	Insurance company	4.46	0.80	5.69	3.07	4.60	12
Y2005 (N=51)	Bank	14.15	24.71	100.00	2.28	5.55	32
	Mutual & Pension Fund/Nominee/Trust/Trustee						0
	Insurance company	4.38	0.70	5.56	3.35	4.38	11

For data availability, the number of the commercial banks in 2015 is 83; Similarly, 63 in 2010 and 51 in 2005. The last column (n) shows the number of the three important types as the largest shareholders in the corresponding year.

Table 2 Ownership concentration ratios

year	concen	mean	sd	max	min	median
Y2015 (N=83)	csf	18.35	29.70	100.00	2.72	6.16
	cs3	25.02	27.70	100.00	5.14	14.34
	hhi	0.1266	0.3088	1.0000	0.0025	0.0106
	csr	11140.68	31254.51	100000.00	1.00	1.51
Y2010 (N=63)	csf	17.20	27.77	100.00	2.34	5.43
	cs3	24.11	27.37	100.00	2.34	13.25
	hhi	0.1128	0.2769	1.0000	0.0005	0.0099
	csr	10892.06	28982.27	100000.00	1.00	1.38
Y2005 (N=51)	csf	12.14	20.81	100.00	2.28	4.86
	cs3	19.76	22.11	100.00	2.28	12.24
	hhi	0.0676	0.2047	1.0000	0.0005	0.0086
	csr	5996.88	21223.29	100000.00	1.00	1.26

* This table gives the statistics of the ratios about ownership concentration: csf - the percentage of shares owned by the largest shareholder; cs3 - the sum of the percentage of shares owned by the largest three shareholders; hhi - the Herfindahl–Hirschman index, defined as the sum of the squared ownership shares of the ten largest shareholders of the bank; csr - the ratio between the shareholding percentages of the first largest shareholder and the second one

Table 3 Properties of bank's shareholder network

Year	APL	ClusterCoeff
Y2015	3.4629	0.0312
Y2010	3.4091	0.0176
Y2005	3.4625	0.0270

* This table gives the properties of the shareholder networks: APL - average path length, indicating the average distance between any two nodes in the network; ClusterCoeff - clustering coefficient, indicating the connectedness of the neighbor nodes of any node; for a network, it is the average values of each node.

Table 4 Major results - bank performance (ROAA)

ROAA	Model 1.0	Model 2.0	Model 3.0	Model 2.1	Model 3.1
(Intercept)	0.1085 (0.1269)	-0.3929* (-1.7078)	-0.258 (-1.0919)	-0.1243** (-2.2602)	-0.3928** (-2.0583)
asset	0.2457 (0.616)	0.016 (1.0836)	0.0335** (2.1998)		0.0453*** (4.1052)
income	0.0743*** (16.4769)				
deposit	-0.2595 (-0.7381)				
equity	-0.0273 (-0.1287)				
ear	0.0244 (0.6212)	0.0627*** (6.1804)	0.0532*** (4.9978)	0.0674*** (7.2501)	0.0478*** (5.204)
csf	-0.0024 (-0.8718)	0.0016*** (2.8226)	0.0006 (0.9989)	0.002*** (4.5565)	
cs3	0.0023 (1.1044)				
cst	0.0000* (1.6702)				
csr	0.0000* (-1.8277)				
degree	-0.0006 (-0.0992)	0.0054 (0.5866)	0.0045 (0.4908)		
close	-0.1197 (-1.4568)	0.0397 (0.8868)	-0.3177*** (-2.7872)		-0.3406*** (-4.0102)
between	0.0000 (0.2483)	0.0000 (0.4256)	0.0000 (0.281)		
eigen	-0.1494 (-0.343)	-0.7178 (-1.0636)	-0.2765 (-0.4086)		
dm15	-0.1423** (-2.4865)		-0.2732*** (-3.4265)		-0.2533*** (-4.0587)
dm10	-0.1265*** (-3.4129)		-0.2175*** (-4.0532)		-0.2299*** (-5.1429)
dmcsfBank	-0.0332 (-1.4063)		-0.0225 (-0.6143)		
dmcsfMPT	-0.0059 (-0.2102)		0.0207 (0.4741)		
dmcsfInsu	-0.0567* (-1.9731)		-0.0907** (-2.0458)		-0.0953*** (-3.309)
R-squared	0.7546	0.2561	0.3449	0.2342	0.3288
Adjusted R-squared	0.7298	0.2285	0.3022	0.2263	0.3076
F-statistic	30.4082***	9.293***	8.0734***	29.6672***	15.5098***
Residual standard error	0.0948	0.1601	0.1523	0.1604	0.1517

* Significance level: *** 0.01; ** 0.05; * 0.10. The dependent variable is the return on average assets (ROAA). Model 1.0 is just for reference and cannot be used as the final model since there exists severe multicollinearity among the variables. Model 2.0 includes centralities while removing some closely correlated variables. Model 3.0 further introduces dummy variables. Model 2.1 and 3.1 are the stepwise regression results for Model 2.0 and 3.0 respectively, which are more concerned since there exists no multicollinearity in these models. The variables are explained as below: asset - the natural logarithm of the bank's total assets; income/deposit/equity - the natural logarithm of the bank's income/deposit/equity; ear - equity-to-assets ratio; csf, cs3, hhi, csr - the same meanings as previously explained in Table 2; degree, close, between, eigen - denoting the centrality measures of degree, closeness, betweenness and eigenvector respectively.

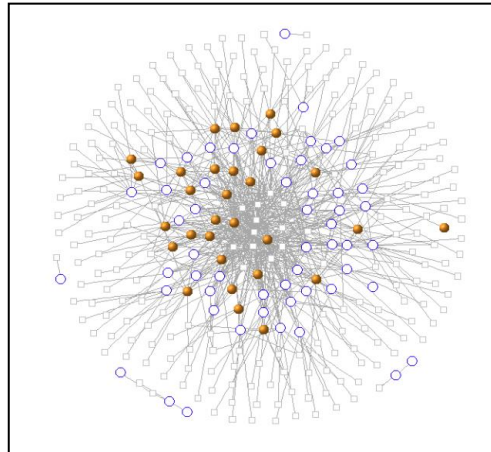


Figure 1 Bank's shareholder network in 2015

* The squares are non-bank shareholders while the spheres and circles are all banks. Further, spheres are banks that hold shares of other banks; the circles are banks that hold no shares of other banks.

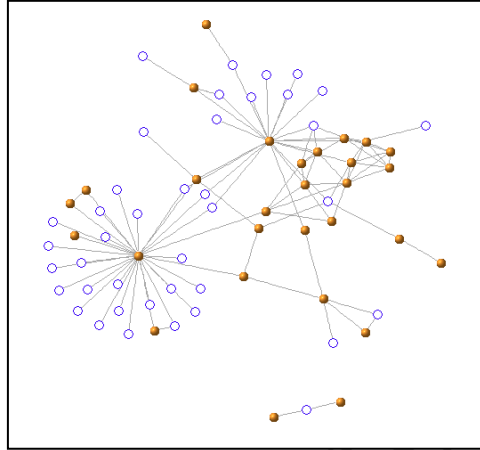


Figure 2 Bank's cross-shareholding in 2015