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An Analysis of Mergers between Credit Associations
and Credit Cooperatives in Japan*

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Abstract

This article intends to examine the performance of 9 cases of mergers between credit associations and credit cooperatives which occurred between 1968 and 1975 in Japan. We compared the statistically significant differences of 19 financial ratios before and after mergers, and differences of the matching non-merging credit associations.

The gross earnings margin of deposits to loans ratios and the gross earnings margin to total assets ratios exhibit rather negative merger effects but the income ratio after tax shows a positive merger effect.

The financial characteristics of non-merging credit associations are superior to those of merging credit associations in terms of profitability, liquidity and cost-related ratios.

In terms of relative financial ratios, by using the difference between merging and non-merging institutions, the net equity ratio and the deposit per association's member ratio are found to have negative merger effects and the income ratio after tax shows a positive merger effect.

Thus, the overall effect of mergers among different types of financial institutions, credit union and credit associations is rather positive, because income ratio after tax is vitally important to measure the performance of merger.

It is also consistent with a result of survey that the objective of merger is to increase the efficiency of management and to increase size.

I Introduction

On June 1, 1968, the so-called Two Financial Laws, namely the "Law on Reforming a Part of the Mutual Loan and Savings Banks and Credit Associations etc." and the "Law on Mergers and Conversions

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among Financial Institutions" were enacted. The former was intended to cope with financial internationalization and to improve the efficiency of small and medium-sized financial institutions in Japan. The latter was intended to promote financial reorganization, mergers and conversions to raise efficiency not only among the same type, but also among different types of financial institutions.

Following the enactment of these laws the number of mergers and conversions of small and medium-sized financial institutions has increased. Of the number of mergers among different types of financial institutions: 16 mergers between Credit Associations and Credit Cooperatives, 21 mergers between Mutual (Loan and Savings) Banks and Credit Cooperatives, 4 mergers between Ordinary Banks and Mutual Banks, 2 between Mutual Banks and Credit Associations, and only one between an Ordinary Bank and a Credit Cooperative for the period between 1968 and 1988 in Japan.

The performance of mergers between different types of financial institutions in Japan has never been investigated quantitatively. In this paper we analyze whether the performance of mergers is positive or not and whether financial differences between merging financial institutions and non-merging financial institutions exist or not.

In Section II, data used for the performance comparison of mergers between credit associations and credit cooperatives are described. Five null hypotheses are developed and the approach employed is explained.

Section III is a comparison of before and after merger performance between the credit associations and credit cooperatives

corresponding to row 0-0 in Figure I. The comparison between before and after non-merging credit associations corresponding to row 3-3 in the figure are conducted by univariate analysis with F and t test, and also by discriminant analysis. The same relative comparisons are applied between merging credit associations and non-merging credit associations before merger, corresponding to 0-3 in the figure; and between merging credit associations and non-merging credit associations after merger, corresponding to 2-3 in the figure.

Section IV shows merger performance with relative financial ratios, namely, the differences in the financial ratios between merging and paired non-merging credit associations. General comparisons of the financial characteristics between merging and non-merging credit associations, 3-3, and general changes in the financial characteristics of credit associations before and after the merger year, 0-3, are analyzed.

II Data, Hypotheses and Approach

The Credit Associations analyzed consist of credit association and credit cooperative mergers which took place from 1969 to 1975. There are 9 cases as shown in Appendix I, which is the maximum available number of cases with financial data. The financial data of credit cooperatives are not provided publicly before 1968. Therefore, we only use data for credit associations, not the combined data of merging credit associations and credit cooperatives. Corresponding to each merging credit association, the non-merging credit association with the closest size of deposit base

in the same prefecture or metropolitan area is chosen to make a pair for comparison.

Nineteen financial ratios are compiled for the years between 1963 and 1980 to measure the effects of mergers among credit associations and credit cooperatives.

A comparative ratio analysis is employed to analyze groups of:-

1. merging credit associations before and after merger;
2. non-merging credit associations before and after the year of merger of merging associations;
3. merging and non-merging credit associations before merger;
4. merging and non-merging credit associations after merger; and
5. overall merging and non-merging credit associations.

Five null hypotheses, that there were no differences between the ratios of each paired group, are tested using both univariate and multivariate analysis.

Group 1 shows the effects of mergers but may also include changes in financial position due to other factors, such as general economic performance and internal growth. Group 2 presents changes due to factors other than mergers. The comparison in group 3 indicates whether there are differences in the values of the financial ratios between those associations which subsequently merge and those that do not merge prior to any merger effects. Likewise, group 4 shows the effect of mergers, as well as the differences in financial ratios between merging and non-merging associations before

mergers. Group 5 gives general comparisons of the financial ratios between merging and non-merging associations including the effects of mergers. It also describes the original differences between the two groups before merger.

III The Performance of Mergers

We test the differences of each of the 19 financial ratios** of merging credit associations before and after merger, and those of non-merging credit associations by using paired difference t-tests. The results are shown in Table 1.

When both merging and non-merging credit associations have significant differences in their means, or when both have no differences, then no change of financial position from before the merger to after the merger is observed, that is, no change is caused by the merger.

There are two financial ratios which have statistically significant differences in their means with respect to either merging credit associations in Column (I) or non-merging credit associations in Column (II).

The non-personnel expenses ratio (6) has 0.60% vs. 0.73% for its means before and after merger with a statistically significant difference only for Column (II), not for Column (I). Relatively

**There are 15 missing values. As a merging credit association, Tsuwano credit association has missing values for 1964, 1965, 1967, 1968 in Shimane prefecture (6), as shown in Appendix I. As non-merging associations, Akita credit association has missing values for 1967, Hamada credit association for 1964, 1967-1970, Narita credit association for 1967, Kouzu credit association for 1968, 1969, 1972 and Yanagawa credit association for 1963. We made a complete paired samples by deleting corresponding values for those missing values.

speaking, this indicates a lowering effect of this ratio by the merger, which is positive performance.

The loan-deposit ratio (14) is 82.12% vs. 80.40% for merging credit associations with significant difference only in Column (I), meaning that the merger reduced this ratio, a negative effect.

As for standard deviations, the yield on loan (3) is 1.06% vs. 0.79% in the before and after merger periods for non-merging credit associations, with a statistically significant difference. However, no significant difference is obtained in the before and after periods for corresponding merging credit associations. This indicates enlarging effect of this ratio by merger, that is, destabilizing effect relatively. Exactly, the same trend is observed for five other ratios such as the expense ratio (4) (0.52% vs. 0.36%), the gross earnings margin of deposits to loans ratio (9) (0.81% vs. 0.47%), the gross earnings margin to total assets ratio (12) (0.58% vs. 0.26%), the loan-deposit ratio (14) (11.12% vs. 7.43%), and the ratio of current expense to current income (15) (5.20% vs. 3.61%). The non-personnel expenses ratio (6) and the net equity ratio (13) have opposite trend in that only merging credit associations have higher values before merger than after merger with a significant difference. This shows a stabilizing merger effect.

By comparing Columns (III) and (IV), the personnel expenses ratio (5) has a statistically significant difference only in Column (IV) with means, 1.89% vs. 1.75% for merging and non-merging credit associations after merger. But, no difference before merger is obtained which shows negative effect of merger, relatively. However, the non-personnel expenses ratio (6) has a significant

difference only in Column (III), with means, 0.75% vs. 0.60% for merging and non-merging credit association before the merger period. This is a positive merger effect. These off-setting positive effect against negative effect indicate a neutral merger performance on cost related ratios.

The tax ratio (7) has a significant difference in means only in Column (III) with 0.4% vs. 0.45% for merging and non-merging credit associations before the merger period, which indicates a negative effect of merger.

The gross earnings margin of deposits to loans (9), and gross earnings margin to total assets (12) have significant differences in means only in Column (IV), with 1.17% vs. 1.32% and 0.89% vs. 1.04%, for merging and non-merging credit associations, after the merger period respectively, meaning negative effects of mergers.

The loan-deposit ratio (14) and ratio of current expense to current income (15) have significant differences for merging and non-merging credit associations after the merger period in Column (IV), with 80.40% vs. 77.05% and 87.02% vs. 85.18%, respectively. The former has a positive and the latter has a negative effects.

The income ratio after tax (16) has differences in means with 18.40% vs. 21.17% only for merging and non-merging credit associations before the merger period (III). This indicates that the merger has a positive effect.

As far as standard deviations are concerned, there are two groups of relevant financial ratios. In one group, mergers increase destabilization; these ratios include the non-personnel expenses ratio (6), the tax ratio (7), the yield on total assets (10), the

gross earnings margin to total assets (12), and the deposit per association's member (19). In the other group, merger leads to destabilizing effects for the yield on loan (3) and the net equity ratio (13).

Column (V) compares financial characteristics among merging and non-merging credit associations generally without considering the period of merger. Non-merging credit associations show superior characteristics for the means of three cost-related ratios namely, the expense ratio (4), (2.76% vs. 2.56%), the personnel expenses ratio (5) (1.74% vs. 1.61%), the non-personnel expenses ratio (6) (0.77% vs. 0.68%). Improvement also occurs for two profitability-related ratios, the yield on total assets (10) (6.86% vs. 7.07%), the gross earnings margin to total assets (12) (1.09% vs. 1.24%). Finally the net equity ratio (13) (5.40% vs. 5.73%) and the ratio of current expense to current income (15) (84.10% vs. 82.50%) also improve for non-merging associations.

Merging credit associations display superiority only for the loan-deposit ratio (14) (81.11% vs. 77.79%). Therefore, non-merging credit associations are superior to merging credit associations financially.

Column (VI) shows the general trend of productivity-related ratios are influenced by economic growth and inflation. The profitability and cost related ratios deteriorate.

The classification and accuracy computed by discriminant analysis is given in Table 2. The numbered panels from (I) to (VI) correspond to the columns of Table 1. The accuracy of the merging credit association classification before and after merger (I) is

94.37%, which is 4.23% higher than the non-merging credit association (II) classification, indicating the presence of a merger effect. The discrimination accuracy of merging and non-merging credit association before merger (III) is 89.22%, which is 14.52% higher than that after merger (IV). This indicates little merger effect. Therefore, the overall merger effect is not clearly demonstrated by data.

The discrimination accuracy of merging and non-merging credit association is 66.20%. Accuracy for credit association before and after merger is 91.20%, which indicates the suitability of discriminant analysis.

A financial comparison of merging associations from one to nine years before and after mergers is shown in Table 3. There are no statistically significant differences one year before and after merger.

There are four financial ratios with significant differences in their means two years before and after merger in the second year. The means of personnel expenses ratio (5) are 1.46% vs. 1.75% before and after merger. The trend continues for nine years before and after merger. The gross earnings margin of deposits to loans (9) has a lower value after merger and continues to the end. These two ratios indicate negative merger effect on performance.

The tax ratio (7) and the deposit per full-time officer and employee ratio (18) have the same statistical differences, indicating a positive merger effect.

Three years before and after merger, five other ratios become statistically significant. They are the yield on interest paid (2)

(3.52% vs. 3.85%), the gross earnings margin to total assets ratio (12) (1.31% vs. 1.07%), the net equity ratio (13) (6.08% vs. 5.43%), the ratio of current expense to current income (15) (80.65% vs. 84.19%), and the deposit per association's member (19) (1933 vs. 2673 thousand yen).

The deposit-cost ratio (8) (6.12% vs. 6.49%) and the total assets cost ratio (11) (5.43% vs. 5.79%) have significant differences in their means four years before and after merger. This significant difference continues for remaining years, indicating a deterioration of their performance.

The (1) yield on interest received (4.61% vs. 5.49%), (2) yield on interest paid (3.48% vs. 3.96%) have differences from five years before and after merger, indicating a positive merger effect.

The income ratio after tax (16) has a difference in its means from seven years (17.64% vs. 15.75%) to nine years (18.65% vs. 15.14%) before and after merger, showing a negative merger effect. This temporal effect does not appear in Column (I) of Table 1 as described before.

IV Comparative Analysis by Relative Financial Ratios

The relative financial ratios are compiled from the differences in absolute financial ratios between merging and non-merging credit associations as follows:

$$d_{ijk} = M_{ijk} - N_{ijk}$$

d_{ijk} : relative financial ratio k ($k = 1, \dots, 19$) of i th

($i = 1, \dots, 9$) credit association at the j th ($j = 1963, \dots, 1980$) year

M_{ijk} : financial ratio k of i th merging credit association at the j th year.

N_{ijk} : corresponding financial ratio k of i th non-merging credit association at the j th year

Table 4 compares credit associations before and after merger for the whole year. There are four financial ratios with statistically significant differences in their means. They are the non-personnel expenses ratio (6) with means of 0.15% vs. 0.05% before and after merger, and the income ratio after tax (16), (-2.77% vs. -0.22%), both of which indicate a positive effect after merger. The net equity ratio (13) (0.23% vs. -0.74%), and the deposit per association's member ratio (19) (-164 vs. -526 thousand yen) are lower values after merger, showing a negative effect.

As for standard deviations for all years there are seven ratios with statistically significant lower values after merger. These include the yield on loan (3) (0.81% vs. 0.44%), the tax ratio (7) (0.15% vs. 0.07%), the yield on total assets (10) (0.76% vs. 0.38%), the gross earnings margin to total assets ratio (12) (0.61% vs. 0.32%), the loan-deposit ratio (14) (8.57% vs. 6.74%), the ratio of current expense to current income (15) (5.44% vs. 4.29%) and the income ratio after tax (16) (7.07% vs. 3.90%). This indicates stabilizing effect of financial ratios by merger. However, three productivity-related ratios have just the opposite trend with significant increases. They are the deposits per office ratio (17)

(1167 vs. 2431 million yen), the deposit per full-time officer and employee ratio (18) (116 vs. 242 ten thousands yen) and the deposit per association's member ratio (19) (788 vs. 998 thousand yen).

Yearly comparison of relative ratios are also shown in Table 4. The net equity ratio (13) has statistically significant differences in its means from one to nine years before and after merger, and on its standard deviations from two to seven years before and after merger. The non-personnel expenses ratio (6) has significant differences in its means from three to nine except in the eighth year. The income ratio after tax (16) and the deposit per association's member ratio (19) have significant differences in their means from four to nine years. This exhibits the variety of the timing and duration of the effect by merger.

Conclusions

Firstly, by comparing financial ratios of merging and non-merging credit associations before and after merger, the gross earnings margin of deposits to loans (9), and the gross earnings margin to total assets ratios (12) exhibit rather negative merger effects, but the income ratio after tax (16) shows a positive merger effect.

Secondly, the financial characteristics of non-merging credit associations are superior to those of merging credit association in terms of profitability, liquidity and cost-related ratios.

Thirdly, in terms of relative financial ratios, by using the difference between merging and non-merging institutions, the net equity ratio (13) and the deposit per association's member (19) are

found to have negative merger effects, and the income ratio after tax (16), shows a positive merger effect.

Thus, the overall effect of mergers among different types of financial institutions, credit union and credit associations is rather positive, because income ratio after tax is vitally important to measure the performance of merger.

Hoshino [3, 4, 5] has demonstrated that merger brings negative performance for the same type of financial institutions such as credit associations, credit cooperatives in Japan. Therefore, this is the first study to find that merger between credit association and credit cooperative have rather positive effects on financial ratios as a whole.*** It is also consistent with the results of survey conducted by Nihon Keizai Shimbunsha [13] that the objective of merger is to increase the efficiency of management and to increase size.

***Hoshino [7] demonstrated that mergers between mutual banks and credit cooperatives in Japan exhibit positive merger effects.

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Figure I

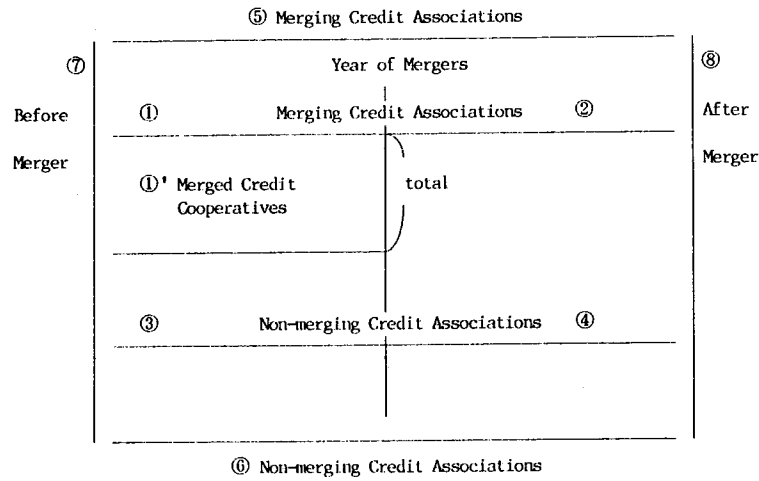


Table 1 Comparison of Merging and Non-merging Credit Associations

	(I) Merging Credit Associations		(II) Non-merging Credit Associations		(III) Before Merger		(IV) After Merger		(V) Merging Non-merging Credit Assoc.		(VI) Before Merger	
	Before Merger	After Merger	Before Merger	After Merger	Merging Credit Assoc.	Non-merging Credit Assoc.	Merging Credit Assoc.	Non-merging Credit Assoc.	Merging Credit Assoc.	Non-merging Credit Assoc.	Before Merger	After Merger
Financial ratio	8.13	7.95	8.00	7.98	8.13	8.00	7.95	7.98	8.02	7.99	8.06	7.96
(3) Yield on loan	0.79	0.68	1.06	0.79	0.79	1.06	0.68	0.79	0.73	0.91	0.93	0.73
(4) Expense ratio	2.70	2.80	2.47	2.62	2.70	2.47	2.80	2.62	2.76	2.56	2.59	2.71
(5) Personnel expenses ratio	0.43	0.43	0.52	0.36	0.43	0.52	0.43	0.36	0.43	0.43	0.49	0.40
(6) Non-personnel expenses ratio	1.54	1.89	1.42	1.75	1.54	1.42	1.89	1.75	1.74	1.61	1.48	1.82
(7) Tax ratio	0.32	0.36	0.37	0.34	0.32	0.37	0.36	0.34	0.36	0.39	0.35	0.35
(8) Gross earnings margin of deposits to loans	0.75	0.78	0.60	0.73	0.75	0.60	0.78	0.73	0.77	0.68	0.68	0.75
(9) Yield on total assets	0.18	0.14	0.18	0.17	0.18	0.18	0.14	0.17	0.16	0.19	0.20	0.16
(10) Gross earnings margin to total assets	0.41	0.13	0.45	0.14	0.41	0.45	0.14	0.15	0.25	0.27	0.43	0.14
(11) Net equity ratio	0.25	0.11	0.27	0.15	0.25	0.27	0.11	0.15	0.23	0.26	0.26	0.13
(12) Yield on total assets	1.95	1.17	2.02	1.32	1.95	2.02	1.17	1.32	1.49	1.61	1.98	1.25
(13) Gross earnings margin to total assets	0.64	0.51	0.81	0.47	0.64	0.81	0.51	0.47	0.64	0.72	0.73	0.50
(14) Loan-deposit ratio	6.83	6.89	7.07	7.07	6.83	7.07	6.89	7.07	6.86	6.72	6.94	6.98
(15) Ratio of current expense current income	0.35	0.84	0.79	0.88	0.35	0.79	0.84	0.88	0.80	0.80	0.69	0.66
(16) Income ratio after tax	1.37	0.89	1.53	1.04	1.37	1.53	1.04	1.04	1.09	1.24	1.45	0.96
(17) Deposit per association's member	0.34	0.27	0.58	0.26	0.34	0.58	0.27	0.26	0.39	0.49	0.48	0.28
(18) Net equity ratio	5.71	5.17	5.48	5.92	5.71	5.48	5.17	5.92	5.40	5.73	5.60	5.54
(19) Loan-deposit ratio	1.23	0.77	0.88	0.91	1.23	0.88	0.91	0.91	1.02	0.92	1.07	0.92
(20) Ratio of current expense current income	82.12	80.40	78.84	77.05	82.12	78.84	80.40	77.05	81.11	77.79	80.18	78.72
(21) Income ratio after tax	5.58	4.77	11.12	7.43	5.58	11.12	4.77	7.43	3.18	3.18	8.91	6.45
(22) Deposit per association's member	79.98	87.02	78.72	85.18	79.98	78.72	87.02	85.18	84.10	82.50	79.35	86.10
(23) Net equity ratio	4.74	4.11	5.20	3.61	4.74	5.20	4.11	3.61	5.38	5.38	4.99	3.97
(24) Income ratio after tax	18.40	14.38	21.17	14.60	18.40	21.17	14.38	14.60	16.05	17.33	19.79	14.49
(25) Loan-deposit ratio	6.81	4.30	7.15	4.15	6.81	7.15	4.30	4.15	5.81	6.45	7.09	4.22
(26) Deposit per association's member	1574	3734	1739	4260	1574	1739	3734	4260	2912	3301	1656	3997
(27) Net equity ratio	1022	1757	1322	2297	1022	1322	1757	2297	1845	2328	1179	2056

1) a indicates the statistically significant difference at the 5% level; b at the 1% level; c at the 0.1% level.
 2) The unit of measure for columns, (1) ~ (16) is %, (17) million yen, (18) ten thousands yen, (19) thousand yen.

Table 2 Classification and Accuracy of Merging and Non-merging Credit Associations by Discriminant Analysis

(I) Before and After of Merging CA				(II) Before and After Merger of Non-merging CA			
Actual \ Predicted	Before Merger	After Merger	Total	Actual \ Predicted	Before Merger	After Merger	Total
Before Merger	55	4	59	Before Merger	50	9	59
After Merger	4	79	83	After Merger	5	78	83
Total	59	83	142	Total	55	87	142
Accuracy = 94.37%				Accuracy = 90.14%			
(III) Merging and Non-merging CA Before Merger				(IV) Merging and Non-merging CA After Merger			
Actual \ Predicted	Merging CA	Non-merging CA	Total	Actual \ Predicted	Merging CA	Non-merging CA	Total
Merging CA	44	7	51	Merging CA	63	20	83
Non-merging CA	4	47	51	Non-merging CA	22	61	83
Total	48	54	102	Total	85	81	166
Accuracy = 89.22%				Accuracy = 74.70%			
(V) Merging and Non-merging MB				(VI) Before and After Merger			
Actual \ Predicted	Merging CA	Non-merging CA	Total	Actual \ Predicted	Before Merger	After Merger	Total
Merging CA	102	40	142	Before Merger	104	14	118
Non-merging CA	56	86	142	After Merger	11	155	166
Total	158	126	286	Total	115	169	284
Accuracy = 66.20%				Accuracy = 91.20%			

Table 3 continued

Financial ratios	Stat.	Six Years		Seven Years		Eight Years		Nine Years	
		Before Merger	After Merger	Before Merger	After Merger	Before Merger	After Merger	Before Merger	After Merger
(1) Yield on interest received	Means Stand.dev.	4.52 1.35	c 5.53 c 0.77	4.44 1.36	c 5.64 c 0.87	4.39 1.40	c 5.69 c 0.91	4.28 1.46	c 5.68 c 0.89
(2) Yield on interest paid	Means Stand.dev.	3.51 0.44	c 3.99 a 0.63	3.48 0.45	c 4.00 a 0.62	3.47 0.44	c 4.04 a 0.62	3.49 0.45	c 3.98 b 0.65
(5) Personnel expenses ratio	Means Stand.dev.	1.49 0.33	c 1.85 c 0.40	1.49 0.32	c 1.87 c 0.39	1.51 0.32	c 1.89 c 0.37	1.52 0.32	c 1.90 a 0.37
(7) Tax ratio	Means Stand.dev.	0.44 0.24	c 0.15 c 0.14	0.44 0.24	c 0.14 c 0.13	0.45 0.23	c 0.14 c 0.12	0.42 0.25	c 0.14 c 0.12
(8) Deposit-cost ratio	Means Stand.dev.	6.19 0.64	c 6.72 c 0.84	6.16 0.64	c 6.76 c 0.81	6.17 0.64	c 6.84 c 0.83	6.19 0.66	c 6.79 c 0.83
(9) Gross earnings margin of deposits to loans	Means Stand.dev.	1.95 0.47	c 1.33 c 0.47	1.99 0.49	c 1.28 c 0.49	2.01 0.48	c 1.23 c 0.51	1.94 0.65	c 1.22 a 0.50
(11) Total assets cost ratio	Means Stand.dev.	5.45 0.53	c 5.96 a 0.72	5.43 0.33	a 5.98 c 0.71	5.46 0.55	c 6.04 c 0.71	5.46 0.54	c 6.00 a 0.70
(12) Gross earnings margin to total assets	Means Stand.dev.	1.36 0.35	c 0.99 a 0.25	1.35 0.35	c 0.97 a 0.25	1.36 0.34	c 0.93 a 0.27	1.38 0.35	c 0.92 a 0.27
(13) Net equity ratio	Means Stand.dev.	5.98 1.22	c 5.21 a 0.85	5.93 1.21	c 5.19 b 0.83	5.87 1.21	c 5.19 b 0.81	5.75 1.25	b 5.20 c 0.79
(15) Ratio of current expense to current income	Means Stand.dev.	80.04 4.91	c 85.63 c 3.89	80.13 4.85	c 85.96 c 3.85	80.11 4.73	c 86.55 c 4.15	79.83 4.81	c 86.56 c 4.04
(16) Income ratio after tax	Means Stand.dev.	17.77 5.38	a 16.08 a 3.72	17.64 5.36	a 15.75 a 3.83	17.99 5.53	b 15.39 b 3.99	18.55 6.77	c 15.14 c 3.97
(18) Deposit per full-time officer and employee	Means Stand.dev.	530 256	b 1247 b 408	522 251	c 1304 c 417	511 248	c 1361 c 429	495 247	c 1399 c 444
(19) Deposit per association's member	Means Stand.dev.	1682 1075	c 3144 c 1518	1647 1059	c 3254 c 1530	1605 1045	b 3369 b 1557	1598 1036	c 3476 b 1604

1) a indicates the statistically significant difference at the 5% level; b at the 1% level; c at the 0.1% level.
2) The unit of measure for columns, (1) ~ (16) is %, (17) million yen, (18) ten thousands yen, (19) thousand yen.

1) a indicates the statistically significant difference at the 5% level; b at the 1% level; c at the 0.1% level.
 2) The unit of measure for columns, (1) ~ (16) is %, (17) million yen, (18) ten thousands yen, (19) thousand yen.

Financial ratios	Stat.	One Year		Two Years		Three Years		Four Years		Five Years	
		Before Merger	After Merger	Before Merger	After Merger	Before Merger	After Merger	Before Merger	After Merger	Before Merger	After Merger
(1) Yield on interest received	Means Stand.dev.	4.90	4.99	5.38	5.19	5.24	5.28	4.83	5.53	4.61	5.49
(2) Yield on interest paid	Means Stand.dev.	3.55	3.90	3.56	3.87	3.52	3.85	3.51	3.86	3.48	3.96
(5) Personnel expenses ratio	Means Stand.dev.	1.50	1.48	1.46	1.75	1.47	1.76	1.48	1.77	1.49	1.92
(7) Tax ratio	Means Stand.dev.	0.35	0.33	0.39	0.21	0.41	0.17	0.44	0.16	0.48	0.15
(8) Deposit-cost ratio	Means Stand.dev.	6.11	6.49	6.11	6.53	6.10	6.48	6.12	6.49	6.18	6.65
(9) Gross earnings margin of deposits to loans	Means Stand.dev.	1.98	1.59	1.88	1.52	1.86	1.45	1.88	1.41	1.94	1.36
(11) Total assets cost ratio	Means Stand.dev.	5.53	5.74	5.46	5.81	5.42	5.78	5.43	5.79	5.47	5.91
(12) Gross earnings margin to total assets	Means Stand.dev.	1.17	1.15	1.31	1.09	1.31	1.07	1.27	1.02	1.32	1.00
(13) Net equity ratio	Means Stand.dev.	6.01	5.61	6.03	5.52	6.08	5.43	6.10	5.29	6.17	5.24
(15) Ratio of current expense to current income	Means Stand.dev.	82.67	83.15	80.73	83.96	80.65	84.19	81.08	84.92	80.64	85.44
(16) Income ratio after tax	Means Stand.dev.	17.89	16.52	17.25	16.56	16.59	16.60	16.07	16.08	16.48	16.00
(18) Deposit per full-time officer and employee	Means Stand.dev.	764	873	776	946	647	1037	600	1119	563	1194
(19) Deposit per association's member	Means Stand.dev.	2129	2176	2070	2405	1933	2673	1850	2865	1752	3040
		1117	1232	1092	1302	1083	1353	1093	1438	1084	1519

Table 4 Yearly Comparison of Merging and Non-merging Credit Associations by Relative Financial Ratios

Financial ratios	Stat.	All Years		One Year		Two Years		Three Years		Four Years	
		Before Merger	After Merger	Before Merger	After Merger	Before Merger	After Merger	Before Merger	After Merger	Before Merger	After Merger
(6) Non-personnel expenses ratio	Means Stand.dev.	0.15	0.05	0.18	0.10	0.15	0.11	0.12	0.12	0.19	0.14
(7) Tax ratio	Means Stand.dev.	0.11	0.10	0.11	0.10	0.11	0.10	0.11	0.10	0.11	0.10
(10) Yield on total assets	Means Stand.dev.	8.0	9.6	8.0	9.6	8.0	9.6	8.0	9.6	8.0	9.6
(12) Gross earnings margin to total assets	Means Stand.dev.	0.23	0.19	0.23	0.19	0.23	0.19	0.23	0.19	0.23	0.19
(13) Net equity ratio	Means Stand.dev.	0.23	0.19	0.23	0.19	0.23	0.19	0.23	0.19	0.23	0.19
(14) Loan-deposit ratio	Means Stand.dev.	8.57	6.0	7.7	6.0	7.7	6.0	7.7	6.0	7.7	6.0
(15) Ratio of current expense to current income	Means Stand.dev.	5.44	5.4	5.44	5.4	5.44	5.4	5.44	5.4	5.44	5.4
(16) Income ratio after tax	Means Stand.dev.	2.77	2.22	2.77	2.22	2.77	2.22	2.77	2.22	2.77	2.22
(17) Deposit per office	Means Stand.dev.	234	583	234	583	234	583	234	583	234	583
(18) Deposit per full-time officer and employee	Means Stand.dev.	116	242	116	242	116	242	116	242	116	242
(19) Deposit per association's member	Means Stand.dev.	164	526	164	526	164	526	164	526	164	526

1) a indicates the statistically significant difference at the 5% level; b at the 1% level; c at the 0.1% level.
 2) The unit of measure for columns, (6) ~ (16) is %, (17) million yen, (18) ten thousands yen, (19) thousand yen.

Appendix I
A List of Merging and Non-merging Credit
Associations and Credit Cooperatives

Prefecture	Merging C.A. Merged C.C.	Period of Merger	Name after Merger	Non-merging Credit Associations
(1)Kyoto	Fushimi C.A. Kyoto Daiichi C.C.	3/1/69	Fushimi C.A.	Minami Kyoto C.A. (Uji)
(2)Shimane	Kawamoto C.A. Totsuno C.C.	8/1/69	Shimane Chuo C.A.	Kouzu C.A.
(3)Fukuoka	Naokata C.A. Kotake Shoko C.C.	10/1/69	Naokata C.A.	Yanagawa C.A.
(4)Tokyo	Yachiyo C.A. Hinode C.C.	1/10/70	Yachiyo C.A.	Sugamo C.C.
(5)Aichi	Toyohashi C.A. Atsumi C.A.	2/2/70	Toyohashi C.A.	Toyokawa C.A.
(6)Shimane Yamaguchi	Tsuwano C.A. Seikyo C.C.	10/10/72	Tsuwano C.A.	Hamada C.A.
(7)Akita	Honjyo C.A. Yuzawa C.C.	10/16/72	Chokai C.A.	Akita C.A.
(8)Chiba	Ichikawa C.A. Toukatsu C.C.	2/16/73	Ichikawa Toukatsu C.A.	Narita C.A.
(9)Nara	Yamato C.A. Ikoma C.C.	11/1/75	Yamato C.A.	Nara Chuo C.A.

Table 4 Continued

Financial ratios	Stat.	Five Years		Six Years		Seven Years		Eight Years		Nine Years	
		Before Merger	After Merger	Before Merger	After Merger	Before Merger	After Merger	Before Merger	After Merger	Before Merger	After Merger
(6) Non-personnel expenses ratio	Means Stand.dev.	0.19 0.13	c 0.08 0.14	0.18 0.14	c 0.08 0.15	0.17 0.13	c 0.06 0.16	0.17 0.13	c 0.06 0.17	0.17 0.14	c 0.05 0.17
(7) Tax ratio	Means Stand.dev.	-0.02 0.15	-0.01 c 0.09	-0.02 0.15	-0.01 c 0.09	-0.03 0.15	-0.01 c 0.08	-0.02 0.15	-0.01 c 0.08	-0.03 0.14	-0.01 c 0.08
(10) Yield on total assets	Means Stand.dev.	-0.13 0.50	-0.16 c 0.42	-0.15 0.50	-0.17 c 0.41	-0.18 0.52	-0.17 c 0.39	-0.17 0.51	-0.19 c 0.39	-0.15 0.51	-0.18 c 0.37
(12) Gross earnings margin to total assets	Means Stand.dev.	-0.11 0.29	-0.15 c 0.35	-0.10 0.30	-0.13 c 0.34	-0.11 0.31	-0.15 c 0.34	-0.10 0.30	-0.16 c 0.33	-0.08 0.32	-0.16 c 0.33
(13) Net equity ratio	Means Stand.dev.	0.54 1.45	c b 0.91	0.40 1.41	c a 0.99	0.34 1.40	c a 1.07	0.28 1.38	c a 1.12	0.21 1.37	c a 1.12
(14) Loan-deposit ratio	Means Stand.dev.	2.67 7.53	4.79 7.57	2.42 7.50	4.68 7.11	2.60 7.60	4.67 6.73	2.57 7.97	4.40 6.52	2.74 8.10	4.03 6.59
(15) Ratio of current expense to current income	Means Stand.dev.	1.17 3.64	1.68 4.62	0.94 3.74	1.70 4.55	0.95 3.87	1.66 4.48	0.97 3.77	1.78 4.43	0.73 3.98	1.79 4.41
(16) Income ratio after tax	Means Stand.dev.	-2.80 5.09	a -0.14 4.50	-2.66 5.15	b -0.13 4.29	-2.72 5.08	b -0.06 4.28	-2.37 5.57	a -0.07 4.18	-2.01 6.07	a -0.13 4.10
(17) Deposit per office	Means Stand.dev.	-286 1369	b -696 2198	-257 1298	b -662 2248	-252 1268	b -607 2295	-244 1238	a -584 2349	-230 1198	a -585 2390
(18) Deposit per full-time officer and employee	Means Stand.dev.	-37 122	a -48 196	-36 121	a -44 196	-36 121	a -36 202	-32 120	a -28 205	-36 119	a -24 210
(19) Deposit per association's member	Means Stand.dev.	-141 809	a -700 1104	-146 807	a -643 1054	-143 810	a -607 1023	-139 805	a -577 1002	-150 800	a -533 995

1) a indicates the statistically significant difference at the 5% level; b at the 1% level; c at the 0.1% level.
2) The unit of measure for columns, (6) ~ (16) is %, (17) million yen, (18) ten thousands yen, (19) thousand yen.