Analysis of Borrower Classifications Assigned to Shared Borrowers

(Summary)

This paper analyzes the borrower classifications (internal ratings) of shared borrowers, to which two or more banks extend loans, using granular loan-by-loan level data collected by the Common Data Platform. The results of the analysis suggest that loans extended to the shared borrowers outside the home region of banks (prefecture-wise cross-border loans) and loans which include major bank(s) in their creditors, are more likely to be rated as "normal" even after controlling the effects of the financial conditions of the borrowers. The FSA will continue to deepen its understanding of banks' credit risk management by analyzing the data from various perspectives.

I. Introduction

This paper focuses on the borrower classifications (internal ratings) of corporate borrowers[1] to which two or more banks extend loans (hereinafter defined as "shared borrowers") to better understand the credit risk management practices of banks. In general, borrower classification is determined based on a comprehensive assessment of a wide range of information, including both quantitative and qualitative information such as the borrower's financial condition, business continuity and profitability prospects, and the support provided by financial institutions. Thus, it is not uncommon for shared borrowers to be given different borrower classifications by different banks. Understanding the situation where such differences may likely to be seen would be useful to promote dialogues with financial institutions about the credit risk management practices.

In the following sections, the loan-by-loan level data collected through the Common Data Platform are used to examine the borrower classifications applied to shared borrowers. Specifically, whether a loan is a cross-border one (i.e., loans extended outside the home region/prefecture of banks) and whether major bank(s) is/are included in the creditors affect borrower classifications are examined.[2]

[1] Local governments are excluded.
[2] "Major banks" in this report refers to Mizuho Bank (the data of Mizuho Trust & Banking are included), MUFG Bank, SMBC, Sumitomo Mitsui Trust Bank, Resona Bank, Aozora Bank, and SBI Shinsei Bank. "Regional banks I" refers to Saitama Resona Bank and members of the Association of Regional Banks. "Regional banks II" refers to members of the Second Association of Regional Banks. "Regional banks" refers to both Regional banks I and Regional Banks II.

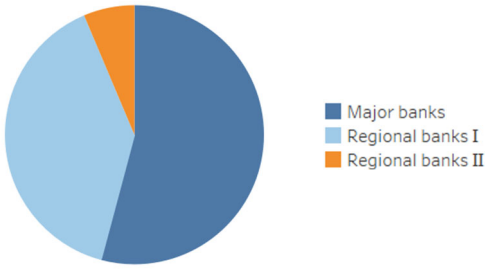
II. Profile of Shared Borrowers

Among the corporate borrowers other than local governments that can be identified through the Common Data Platform, shared borrowers take up approximately 50% in terms of the number of borrowers and 80% in terms of outstanding loan amount. These indicate that a considerable number of corporate borrowers have multiple banking relationships. This section examines the data on shared borrowers to ascertain under which circumstances their borrower classification varies.

I. Profile and Trend Score Calculation

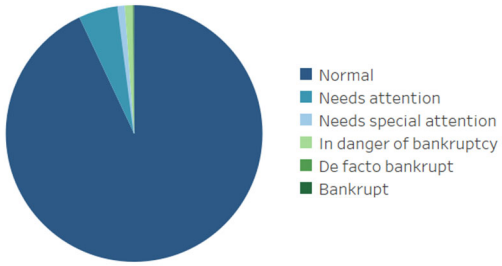
Figures 1 and 2 show that more than 50% of loans to shared borrowers are extended by major banks, and more than 90% of the outstanding loans are rated "normal"[3].

Figure 1: Proportion by bank type
(Outstanding amount basis)



bank type	n	Loan (1 T yen)	Rate
Major banks	89,194	169.3	54.2%
Regional banks I	346,255	123.4	39.5%
Regional banks II	111,729	19.8	6.4%

Figure 2: Proportion by borrower classification
(Outstanding amount basis)



borrower classification	n	Loan (1 T yen)	Rate
Normal	408,778	290.7	93.0%
Needs attention	102,039	15.6	5.0%
Needs special attention	7,755	2.7	0.9%
In danger of bankruptcy	24,057	3.1	1.0%
De facto bankrupt	3,087	0.4	0.1%
Bankrupt	1,462	0.2	0.1%

Figures 3 and 4 show whether there are variations in borrower classifications assigned to shared borrowers. “Same across banks” indicates that all creditor banks assign the same borrower classification, while “Different across banks” indicates that at least one creditor bank assigns different borrower classification compared to the other creditors. Figure 3 indicates that 15.2% (on an outstanding amount basis) of shared borrowers have “same across banks” borrower classifications. Major banks have the largest proportion of “same across banks” classifications, probably because major banks are more likely to extend loans to large, creditworthy corporate borrowers whose

[3] The classification categories are "Normal", "Need attention", "Special attention", "In danger of default", "Substantial default", and "Default".

borrower classifications are less subject to judgment. Figure 4 shows the proportion by industry, from which it is observed that the proportion of “same across banks” is slightly higher in the construction, retail, and service industries.

Figure 3: Classification variation by bank type

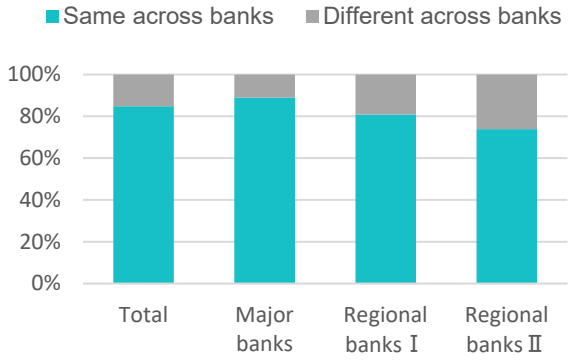
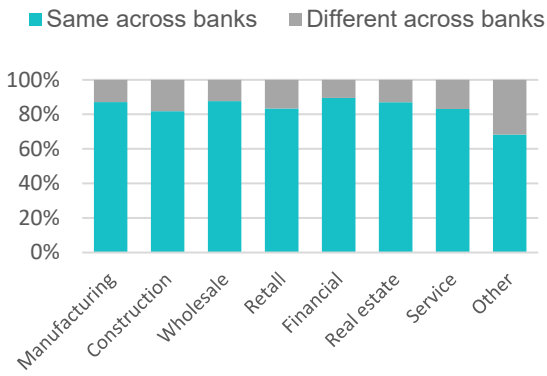


Figure 4: Classification variation by industry



To grasp whether there are differences in the assignment of borrower classification among banks, this paper attempted a scoring for each bank (the calculation methods are shown in Figure 5). First, the following points/rankings are assigned to each borrower classification: "Normal" = 1, "Need attention" = 2, "Special attention" = 3, "In danger of default" = 4, "Substantial default" = 5, and "Default" = 6. Then, the following two borrower classification trend scores are calculated for each bank:

(i) “Mean ΔBorrower Classification Score” which yields weighted average of difference/distance from the average (mean)[4] of borrower classifications assigned to multiple loan borrowers; and

(ii) “Top ΔBorrower Classification Score” which yields weighted average of difference/distance from the borrower classification assigned by a bank having the largest loan amount.

For both type of scores, a larger (smaller) number indicates a tendency to assign a relatively lower (higher) borrower classification among peers, taking into account their loan amount as a calculation weight. In the case of Figure 5, Bank B has the highest figure for both type of scores, indicating that Bank B assigns relatively lower borrower classification compared to the other peers. Bank C and Bank D assign the same borrower classification, however, their scores are not the same reflecting the difference between their loan amounts to Company E.

[4] Similar scoring using median value instead of mean value was also tested. It was confirmed that the result was similar to the one shown in this report.

Figure 5: Calculation method and example for Borrower Classification Trend Score

	total loan	Company E		rate of total loan
		loan	borrower classification	
bank A	1T yen	50B yen	Needs attention	5% (50B/1T)
bank B	0.5T yen	15B yen	Needs aspecial attention	3% (15B/0.5T)
bank C	0.5T yen	15B yen	Normal	3% (15B/0.5T)
bank D	0.5T yen	5B yen	Normal	1% (5B/0.5T)

(※)T：Trillion, B：Billion

(i) Mean ΔBorrower classification Score

Company E's mean borrower classification points

⇨ (2+3+1+1)/4=1.75

Bank A's Mean ΔBorrower Classification Score

(2-1.75) x 0.05 = 0.0125

Bank B's Mean ΔBorrower Classification Score

(3-1.75) x 0.03 = 0.0375

Bank C's Mean ΔBorrower Classification Score

(1-1.75) x 0.03 = -0.0225

Bank D's Mean ΔBorrower Classification Score

(1-1.75) x 0.01 = -0.0075

(ii) Top ΔBorrower classification Score

Company E's Top borrower classification points

⇨ Bank A's "Needs attention" = 2

Bank A's Top ΔBorrower Classification Score

(2-2) x 0.05 = 0

Bank B's Top ΔBorrower Classification Score

(3-2) x 0.03 = 0.03

Bank C's Top ΔBorrower Classification Score

(1-2) x 0.03 = -0.03

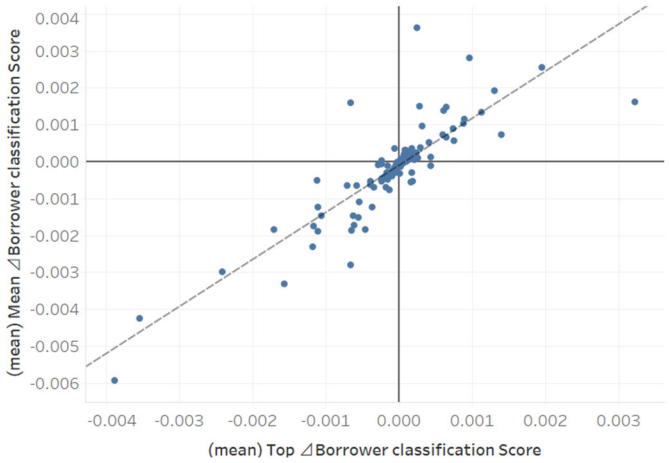
Bank D's Top ΔBorrower Classification Score

(1-2) x 0.01 = -0.01

Figure 6 plots the two types of scores of each bank, which have been calculated by averaging the score obtained from each shared borrower. The figure suggests that there is a certain variation among banks, i.e., there exist some banks that assign lower/higher borrower classifications among peers.

Although this figure shows the tendency to assign higher/lower borrower classifications, other relevant factors and detailed information need to be closely examined to evaluation risks of each bank. For example, although the difference between "Normal" and "Need attention", and that of "Special attention" and "In danger of bankruptcy" are both calculated to be 1 (as numerical values ranging from 1 to 6 are assigned to each borrower classification), the gap of “riskiness” would be higher in the latter case. In addition, not only the average score but also the variance of scores among the relevant shared borrowers for each bank should also be evaluated to capture the trends in more detail. Furthermore, the weight, i.e., the loan amount for each borrower within the bank’s portfolio, also influences the final average score.

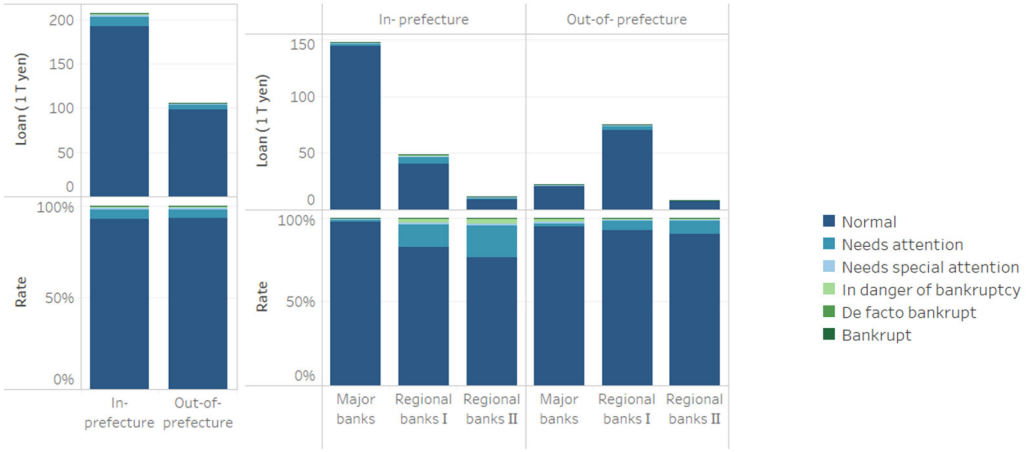
Figure 6: Borrower Classification Trend Score for each bank



II. Borrower Classification of Prefecture-wise Cross-border Loans

Figure 7 shows the borrower classification of shared borrowers by whether they are cross-border borrowers or not. Hereinafter, a loan is defined as a “cross-border” loan if a borrower and its creditor bank locate in different prefectures (the location of a bank is determined on a branch location basis for major banks that operate across Japan and on a head office basis for regional banks that operate mainly in each prefecture). Otherwise, a loan is classified as “within-the-home” loans. The proportion of shared borrowers rated normal is higher in cross-border loans than otherwise (i.e., in within-the-home loans) in the case of regional banks.

Figure 7: Distribution of borrower classification of cross-border loans



The characteristics of cross-border loans should differ depending on the distance between borrowers and creditors. To examine this point, cross-border borrowers are classified into Tokyo, local city (or major regional block city), neighboring prefecture and others as indicated in Figure 8. Figures 9 and 10 show the outstanding loan amount and borrower classifications, respectively, for each cross-border category, suggesting that most of the regional banks' cross-border loans are extended to Tokyo located borrowers, whose borrower classifications are rated “normal” with a high probability.

Figure 8: Cross-border classification[5]

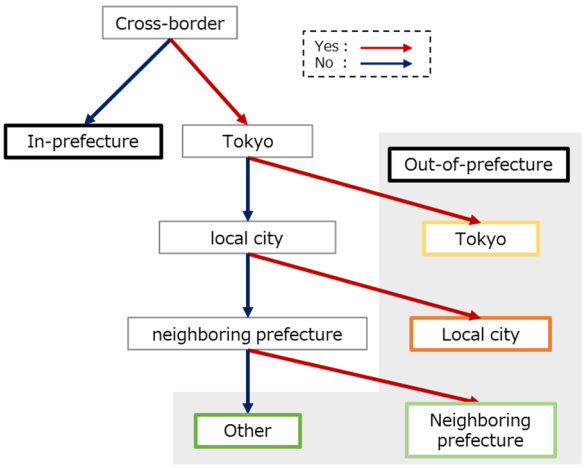


Figure 9: Outstanding loan amount for each cross-border classification

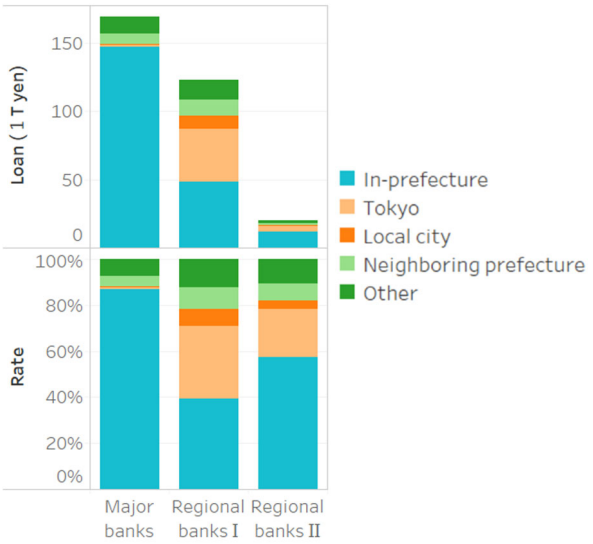
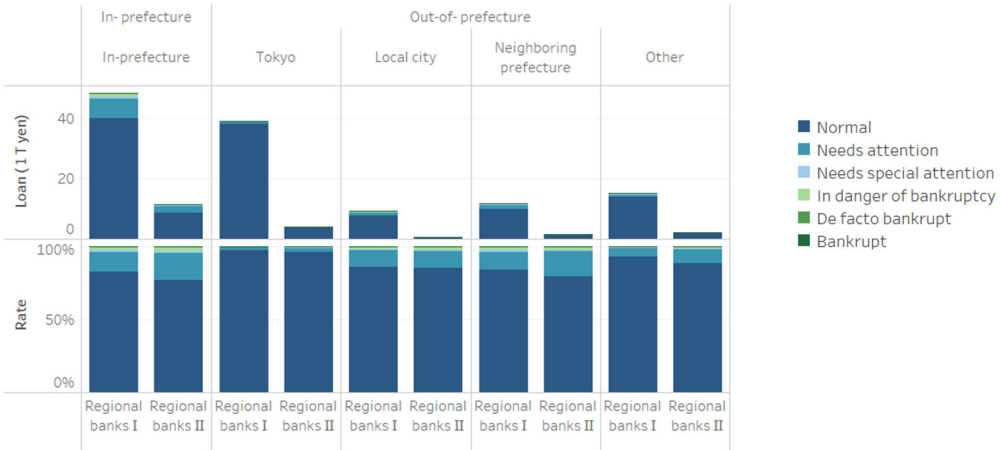


Figure 10: Distribution of borrower classification for each cross-border classification



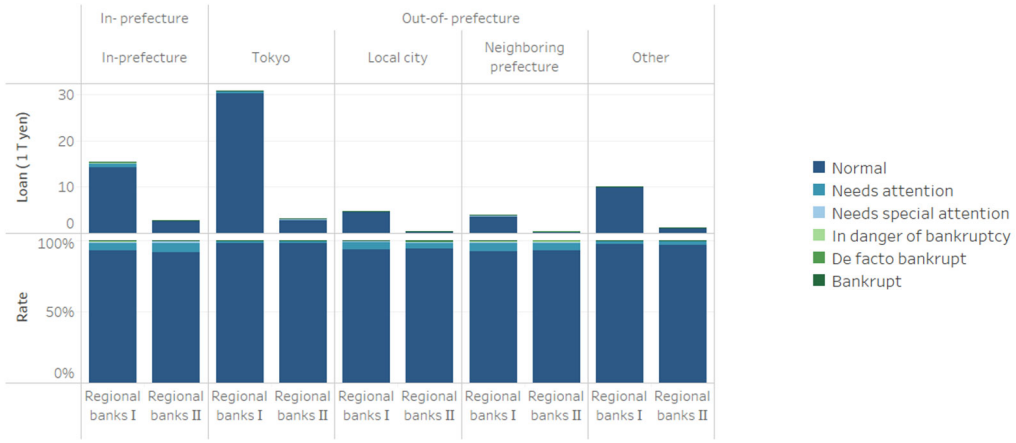
[5] "Local city" indicates a prefecture where a major city of the banks’ home region exists, i.e., Miyagi Prefecture for Tohoku region, Ishikawa Prefecture for Hokuriku region, Aichi Prefecture for Tokai region, Osaka Prefecture for Kinki region, Hiroshima Prefecture for Chugoku region, Kagawa Prefecture for Shikoku region, Fukuoka Prefecture for Kyushu region. "Neighboring prefecture" refers to adjoining prefectures, including those with bridges and tunnels.

III. Breakdown by Type of Creditors

Shared borrowers of the regional banks are categorized into two types: (i) “major banks’ borrowers”, whose creditors include major bank(s) and (ii) “regional banks dominant borrowers”, whose creditors consist of regional banks only.

Figure 11 shows the borrower classifications of major banks' borrowers, while Figure 12 shows those of regional banks dominant borrowers. Overall, borrower classifications of regional banks dominant borrowers, including those of Tokyo located borrowers, tend to be lower than those of major banks’ borrowers. Financial indicators of shared borrowers presented in Figure 13 indicate that major banks' borrowers exhibit higher profitability (high ROA) and more stable debt conditions (low interest rate expense and low debt ratio). However, no characteristics are observed which suggest that the financial indicators for Tokyo located borrowers are particularly favorable.[6]

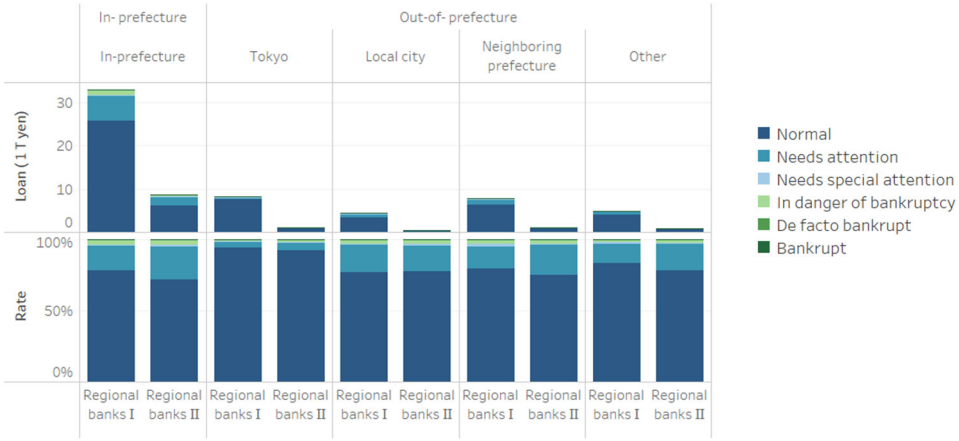
Figure 11: Borrower classifications of major banks' borrowers



type of creditors	bank type	borrower classification	In- prefecture	Out-of- prefecture			
			In-prefecture	Tokyo	Local city	Neighboring prefecture	Other
Major banks’ borrowers	Regional banks I	Normal	93.12%	98.19%	93.67%	91.94%	97.20%
		Needs attention	4.83%	1.47%	5.37%	6.26%	2.29%
		Needs special attention	0.96%	0.12%	0.20%	0.68%	0.21%
		In danger of bankruptcy	0.92%	0.14%	0.54%	0.96%	0.25%
		De facto bankrupt	0.13%	0.03%	0.06%	0.12%	0.03%
		Bankrupt	0.04%	0.05%	0.16%	0.05%	0.01%
	Regional banks II	Normal	91.25%	97.66%	93.85%	92.62%	96.58%
		Needs attention	7.03%	2.04%	4.77%	5.75%	2.92%
		Needs special attention	0.74%	0.04%	0.13%	0.18%	0.10%
		In danger of bankruptcy	0.80%	0.12%	0.74%	0.61%	0.21%
		De facto bankrupt	0.13%	0.04%	0.04%	0.84%	0.08%
		Bankrupt	0.06%	0.10%	0.47%		0.11%

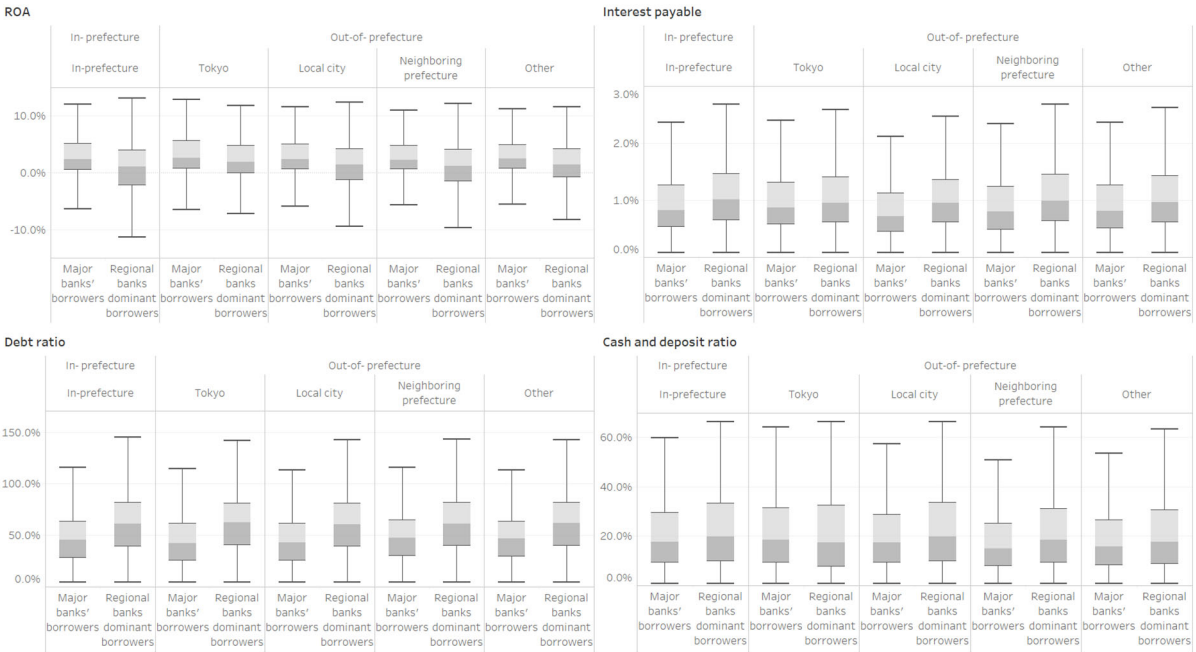
[6] Financial indicators are as of September 2023. In this paper, financial information reported by Regional Banks I and Teikoku Data Bank., Ltd. are used, while assuming that all creditor banks have the access to the same financial information for a shared borrower.

Figure 12: Borrower classifications of regional banks dominant borrowers



type of creditors	bank type	borrower classification	In- prefecture	Out-of- prefecture			
			In-prefecture	Tokyo	Local city	Neighboring prefecture	Other
Regional banks dominant borrowers	Regional banks I	Normal	78.15%	93.96%	77.10%	79.53%	83.52%
		Needs attention	16.96%	4.66%	18.67%	15.35%	13.22%
		Needs special attention	1.25%	0.29%	0.86%	1.78%	0.98%
		In danger of bankruptcy	3.02%	0.60%	2.91%	2.98%	1.87%
		De facto bankrupt	0.50%	0.14%	0.31%	0.24%	0.23%
		Bankrupt	0.12%	0.34%	0.15%	0.13%	0.19%
	Regional banks II	Normal	71.83%	92.08%	77.35%	75.17%	78.05%
		Needs attention	22.98%	6.08%	18.11%	20.87%	18.63%
		Needs special attention	1.09%	0.05%	0.96%	0.52%	0.61%
		In danger of bankruptcy	3.45%	1.38%	2.55%	3.01%	2.17%
		De facto bankrupt	0.53%	0.10%	0.90%	0.35%	0.25%
		Bankrupt	0.12%	0.29%	0.13%	0.08%	0.29%

Figure 13: Financial Indicators of shared borrowers



III. Verification by Logistic Regressions

From the figures in the previous section, the following three points are observed: (i) cross-border loans are more likely to be rated “normal” compared to within-the-home loans; (ii) major banks’ borrowers are more likely to be rated “normal” than regional banks dominant borrowers; and (iii) the financial indicators of major banks’ borrowers are better than those of regional banks dominant borrowers. On the other hand, it is difficult to discern whether phenomenon (i) and (ii) resulted from the high creditworthiness of borrowers (as is shown in (iii)) or other factors.

In this section, therefore, a statistical examination is conducted to confirm whether the probability of shared borrowers to be rated “normal” in the case of cross-border loans or major banks’ borrowers becomes higher or not, while controlling the factors that may affect borrower classification, such as borrowers’ financial information.[7]

First, the probability of a shared borrower, excluding a borrower who only take loans from banks located in the same prefecture, to be rated “normal” is estimated by using the following regression equation. The variables and estimation results are shown in Tables 1 and 2, respectively. In addition to the borrowers’ financial information, a financial institution dummy and an industry dummy are also included as control variables to eliminate differences in the decision-making policy for borrower classification among financial institutions and different characteristics of different industries.

$$log\frac{p_i}{1-p_i} = \beta_0 + \beta_1 With\ major\ Dummy_i + \beta_2 Cross\ border\ Dummy_i + \beta_3 With\ major\ Dummy_i$$

$$* Cross\ border\ Dummy_i + Control_i + \varepsilon_i,\quad \varepsilon_i \sim N(0, \sigma^2)$$

Table 1: List of variables

Object variable	p_i	Normal destination probability
Explanatory variable	1.With major Dummy	"1" : major banks’ borrower, "0" : otherwise
	2.Cross border Dummy	"1" : cross-border borrower, "0" : otherwise
	3.With major Dummy*Cross border Dummy	interaction term of 1 and 2
Control	ROA	operating income/total assets
	Interest payable	interest expense/(short-term debt + long-term debt)
	Debt ratio	(short-term debt + long-term debt)/total assets
	Cash and deposit ratio	cash deposits/total assets
	Size	company size（ordinary logarithm of capital)
	Industry Dummy	manufacturing,construction,wholesale,retall,financial,real estate,service
	Bank Dummy	regional banks dummy

[7] The correlation coefficient between cross-border loans and major banks borrowers is 0.13.

Table 2: Estimation Results

	Coefficient	Std.Error	
With major Dummy	0.4054	0.033	***
Cross border Dummy	0.1186	0.014	***
*With major Dummy*Cross border Dummy*	-0.0426	0.039	
n	237,793		
pseudo-R^2	0.2937		

***,** and * indicate significance at the 0.1%,1%,5% levels

As shown in Table 2, after controlling aforementioned factors, there was a positive correlation between the probability of rated "normal" and both $With\ major\ Dummy_i$ and $Cross\ border\ Dummy_i$. On the other hand, there was no statistically significant relationship between the probability of "normal" and the cross-term $With\ major\ Dummy_i * Cross\ border\ Dummy_i$, suggesting that no additional effects are observed even if a loan is applicable to both cross-border loan and major banks' borrower.

Next, cross-border loans are subdivided as has described in Figure 8, and then the following regression formula are applied to examine the results. The variable and the estimation results are shown in Tables 3 and 4, respectively.

$$log\frac{p_i}{1-p_i} = \beta_0 + \beta_1 With\ major\ Dummy_i + \beta_2 Tokyo\ Dummy_i + \beta_3 Local\ city\ Dummy_i + \beta_4 Neighbor\ Dummy_i + \beta_5 Other\ Dummy_i + \sum_{k=6}^{10} \beta_k\ Cross_i + Control_i + \varepsilon_i, \quad \varepsilon_i \sim N(0, \sigma^2)$$

Table 3: List of variables

Object variable	p_i	Normal destination probability
Explanatory variable	1.With major Dummy	"1" : major banks' borrower, "0" : otherwise
	2.Tokyo Dummy	"1" : borrower in Tokyo, "0" : otherwise
	3.Local city Dummy	"1" : borrower in local city, "0" : otherwise
	4.Neighbor Dummy	"1" : borrower in neighboring prefecture, "0" : otherwise
	5.Other Dummy	"1" : borrower in others, "0" : otherwise
	6~9.Cross	interaction term of 1 and 2, 1 and 3, 1 and 4, 1 and 5
Control	ROA	operating income/total assets
	Interest payable	interest expense/(short-term debt + long-term debt)
	Debt ratio	(short-term debt + long-term debt)/total assets
	Cash and deposit ratio	cash deposits/total assets
	Size	company size (ordinary logarithm of capital)
	Industry Dummy	manufacturing, construction, wholesale, retall, financial, real estate, service
	Bank Dummy	regional banks dummy

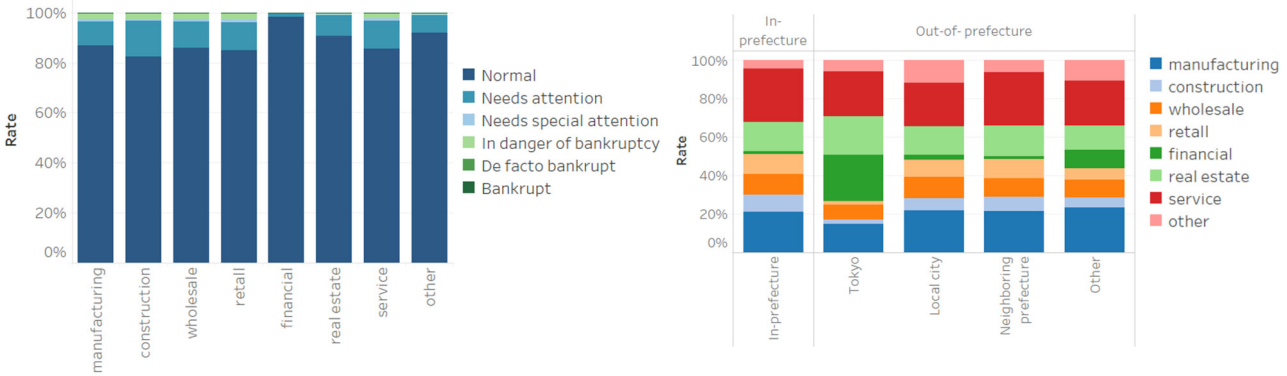
Table 4: Estimation results

	Coefficient	Std.Error	
With major Dummy	0.4014	0.033	***
Tokyo Dummy	-0.0362	0.031	
Local city Dummy	0.0876	0.025	***
Neighbor Dummy	0.1223	0.017	***
Other Dummy	0.2174	0.023	***
*With major Dummy*Tokyo Dummy*	0.0894	0.054	
*With major Dummy*Local city Dummy*	-0.1721	0.059	**
*With major Dummy*Neighbor Dummy*	-0.2206	0.057	***
*With major Dummy*Other Dummy*	0.1224	0.053	*
n	237,793		
pseudo-R^2	0.2942		

***,** and * indicate significance at the 0.1%,1%,5% levels

As shown in Table 4, a positive correlation with the probability of being "normal" was confirmed for every (non-cross-term) category other than $Tokyo\ Dummy_i$. In general, banks have access to rich information in case of borrowers within the home region, i.e., creditworthiness can be assessed based on various information in addition to basic financial information, which may be one reason of lower possibility of rated "normal" for non-cross-border loans. The reason for $Tokyo\ Dummy_i$ showing no statistic significance may be that loans to Tokyo located borrowers are mostly finance and real estate industries (Figure 14), thus predominately explained by industry dummy variables.[8]

Figure 14: Distribution of regional banks' borrower classifications by industry (left panel) and industry distribution by location of borrowers (right panel)



[8] When no controls for industry types are made, a positive correlation between loans to Tokyo and the probability of "normal" are observed.

On the other hand, among the cross-terms, $With\ major\ Dummy_i * Local\ city\ Dummy_i$ and $With\ major\ Dummy_i * Neighbor\ Dummy_i$ have shown negative significance. The reason for this could be that this paper defines a cross-border loan on a prefecture basis, while some regional banks have their business base beyond the prefecture where their head offices are located.

For $With\ major\ Dummy_i * Other\ Dummy_i$ term, positive correlation is observed. It suggests that in the case of loans to borrowers who locate far away from the home prefecture of banks, the access to the information on borrowers could be limited to some extent and thus the fact that major bank(s) is/are also the creditor(s) may have become a key element when judging their borrower classifications.

In interpreting the estimation formula in this section, various caveats should be taken into consideration. First, the estimation formula developed in this paper does not consider qualitative information such as the prospects for business continuity and profitability based on the type of industry, as well as the status of support from financial institutions. Second, each bank has its own business base in a different area which cannot be easily classified by prefecture basis.

V. Conclusion

This paper analyzes the borrower classifications (internal ratings) of shared borrowers using loan-by-loan level data collected by the Common Data Platform. The results of the analysis suggest that prefecture-wise cross-border loans and loans to major banks' borrowers are more likely to be rated as "normal" even if the effects of the financial conditions of the borrowers are excluded.

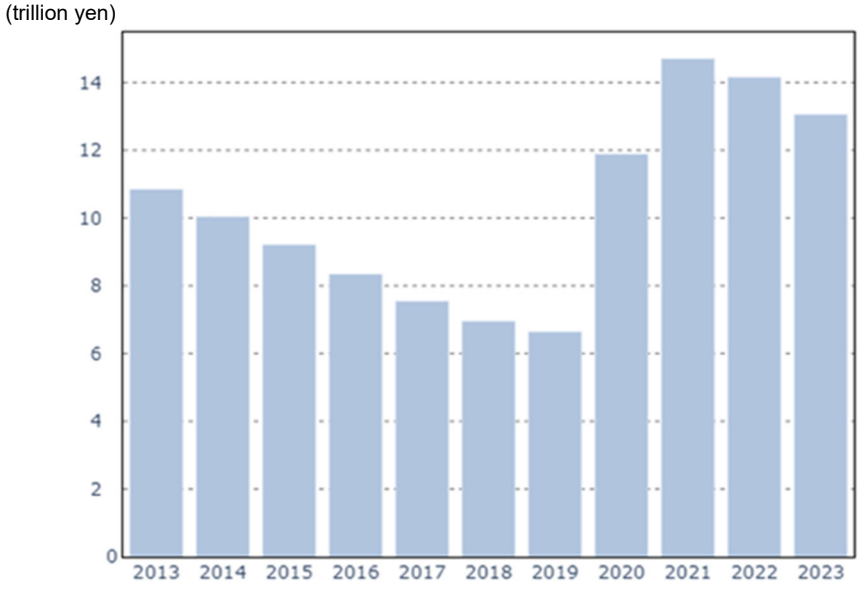
Although the results of this analysis contribute to a deeper understanding of the credit risk management practices of banking industry as a whole, it is also necessary to take various factors into account in understanding the lending discipline of each bank. For example, the use of Credit Guarantee System, which has not been covered in this analysis due to data limitation, could be considered for shared borrowers and also all other borrowers to have a comprehensive picture of lending practices (see the BOX below). The FSA will continue to deepen its understanding of the credit risk management practice by further enhancing its data analysis capabilities.

BOX: Utilization of Credit Guarantee System

The Credit Guarantee System, where Credit Guarantee Corporations provide guarantees to small and medium-sized enterprises (SMEs) when they take out loans from financial institutions, is one of key elements that influence the riskiness of loans and the credit decision of financial institutions. Since the Common Data Platform is at the gradual operation phase, detailed analysis around the status of guarantees is limited at present, however, it is desirable to take this factor into account in the future. In this box, basic profiles of credit guaranteed loans are presented.[9][10]

Figure 15 shows the historical trend in guaranteed loans of regional banks I. The ratio of guaranteed loans rose sharply during the COVID-19 crisis but declined gradually in other periods.[11]

Figure 15: Trend in outstanding guaranteed loans of regional banks I over time



Guaranteed ratio varies from around 0% to 40% depending on industry. “Food and Beverage” and “Construction” industries, which consist of small companies in general, have relatively high guaranteed ratios, while "Real Estate," "Finance," "Electricity & Gas," and "Goods & Leasing"

[9] In the verification using logistic regression in this paper, control variables for whether a loan is guaranteed is not introduced due to data limitations. However, as shown in this box, the status of guarantees differs depending on the industry and region, so it is likely that the status of guarantees is controlled to a certain extent by the industry dummies and financial institution dummies.
[10] Figures 16-19 uses the granular loan data from the Common Data Platform but limited to Regional Bank I due to data limitation.
[11] Quoted from SME Agency, "Guarantees by financial institutions" (https://www.chusho.meti.go.jp/kinyu/shikinguri/hosho/jisseki.html) From the data definition, it should be noted that the data before fiscal 2019 is the balance as of the end of March, while the data after fiscal 2020 is the average of the balance at the end of each month.

have low guaranteed ratios (Figure 16)[12].

Enterprises with smaller sales make greater use of guaranteed loans (Figure 17), which is consistent with the purpose of the Credit Guarantee System to facilitate financing regional banks I for SMEs, and that the guaranteed ratio has been on a declining trend from September 2023 to December 2024 (Figure 17).

The guaranteed ratio by bank size shows that the ratio is lower at regional banks I with large total loans outstanding, which may reflect that fact that the proportion of large borrowers increases as bank size increases (Figure 18).

The guaranteed ratio by region of borrower location indicates that the guaranteed ratio declines for cross-border loans compared to within-the-home loans in all regions, but the extent of the decline varies by region (Figure 19).

As described above, the use of credit guarantee varies depending on the attributes of creditors and borrowers. Further analysis around credit guaranteed loans while improving the accuracy of loan data would enrich the analysis presented in this paper.

Figure 16: Guaranteed ratio by type of industry

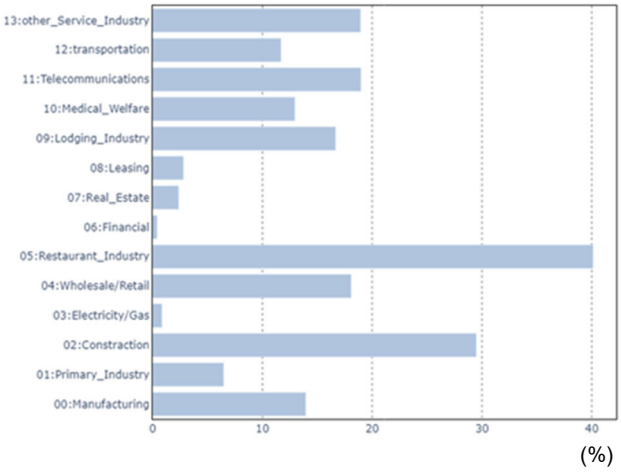
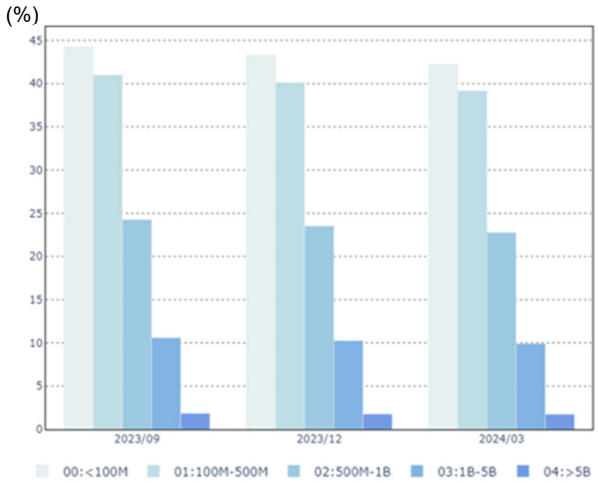


Figure 17: Guaranteed ratio by firm size



[12] It should be noted that "Agriculture & Forest business (excluding raw material production and raw material production services)," "Fishery business," and "Finance & Insurance business (excluding some finance & insurance businesses)" are excluded from the scope of the Credit Guarantee Program. In Figures 17-19, only industries subject to the credit guarantee program (manufacturing / construction / wholesale & retail / food & beverage / accommodation / medical & welfare / information & communications / transportation / other services) are included in the aggregation.

Figure 18: Guaranteed ratio by bank size

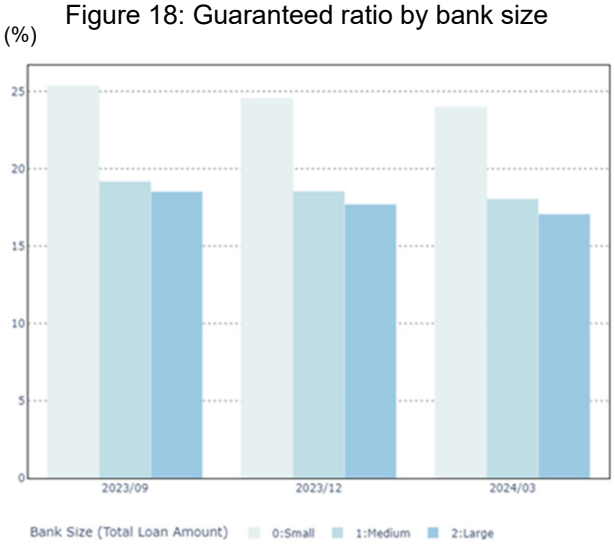


Figure 19: Guaranteed ratio by borrower location