



# MIZUHO RESEARCH PAPER

## 6

*The Current Status of  
Small Business Credit Scoring  
in Japan: based upon  
survey evidence on its use  
by Japanese banks*

**Arito Ono**  
**Senior Economist**

**Arito Ono** currently holds the position of senior economist at Mizuho Research Institute Ltd. (MHRI). Subsequent to joining the Fuji Research Institute Corporation in 1991, he obtained a Ph. D. in Economics from Brown University in 2001 and has engaged in extensive research in the field of banking and finance, international finance and political economy. His recent publications in English include the following: “On the Role of a Regional Lender of Last Resort,” *IDE-JETRO APEC Working Paper*, March 2004, “A Cure Worse than the Disease? Involving the Private Sector in Emerging Market Crises,” *Fuji Research Paper*, July 2002, “The Political Economy of Branching Restrictions: Menu Auction Approach,” Paper presented at the Annual Spring Meeting of the Japan Society of Monetary Economics, May 2001. His recent publications on banking and finance in Japanese are as follows: “On the Role of Collateral and Personal Guarantee in Small Business Lending: Evidence from the 1998 Survey of Small Business Finances,” *Mizuho Soken Ronshu (Mizuho Research Review)* (joint with Tamako Nishikawa), October 2004, “The Recent Development of Syndicated Loan Market in Japan and Its Implications to Small Business Financing,” National Life Finance Corporation Research Institute, *Chosa Kiho (Quarterly Bulletin)* (joint with Katsuyuki Hasegawa and Mariko Sawada), August 2003, “Did Relationship Banking in Japan Change During the Late 1990s? Evidence from Japan’s Bank Net Interest Margins,” *Mizuho Report*, February 2003.

(In 2002, the think tank division of the Fuji Research Institute Corporation was merged with the Dai-Ichi Kangyo Research Institute and the research division of the Industrial Bank of Japan to form MHRI.)

*E-mail: [arito.ono@mizuho-ri.co.jp](mailto:arito.ono@mizuho-ri.co.jp)*

*TEL: +81-3-3201-0231*

*FAX: +81-3-3282-6021*

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## Summary

1. In recent years, credit scoring has been rising in popularity among Japanese banks as a lending technique toward small and medium enterprises (SMEs). Credit scoring is a technique lenders use to determine whether or not to approve a loan application as well as the terms and conditions of a loan on the basis of a “credit score” of a prospective borrower. The credit score is computed by a quantitative model on the basis of various explanatory variables deemed closely linked to credit risk of a borrower (such as attributes and financial conditions of the owner and the firm).
2. This paper sheds light upon the current status of SME credit scoring in Japan on the basis of a questionnaire survey of Japanese banks. In particular, the paper will assess the three attributes of credit scoring which are deemed beneficial and indicate the pending tasks: (1) the reduction of credit screening costs, (2) the adjustment of lending interest rates commensurate with credit risks, and (3) the expansion of the “middle risk” market.
3. As far as the survey results show that operational costs for credit scoring are roughly half those of conventional loans, credit scoring technology may be commended for having achieved a certain level of success in cutting costs. However, a perusal of the screening items required by Japanese banks reveals that some banks set forth an extremely large number of variables. These banks, most likely, set forth a large number of “minimum standards.” Moreover, 89% of the banks require interviews with representatives in the screening process. However, an emphasis upon interviews and individual screening, which is common for relationship lending, is incompatible in many ways with credit scoring lending in which loans are managed as a portfolio. The future task will be to set clear policies on the use of relationship lending and credit scoring lending so as to maximize the efficacy of each of the lending techniques.
4. The average level of interest rates on credit scoring loans is

around 4.5%, which is approximately 2.5% higher than the average lending rate (1.94% as of March 31, 2004) of the banks providing responses to our survey. However, since the borrowers in most cases are limited to existing clients, credit scoring loans are not yet reaching the middle risk market. In order to gain a large slice of the middle risk market, it would be necessary to (1) construct a business strategy taking into consideration the trade-off between increasing the volume of loans and the improvement of credit spreads, and to (2) bring lending rates on conventional loans to more appropriate levels in terms of credit risks.

5. Despite the steady spread of credit scoring in Japan, a distortion is emerging in the product design and interest rate setting stance among some financial institutions. A clear positioning of credit scoring in small business lending, vis-à-vis other lending methods such as relationship banking, is extremely important.

\* This paper is based on joint research with Professor Yasuyoshi Masuda, Toyo University (Masuda and Ono, 2005). However, the author is solely responsible for the views and any remaining errors in this paper.

## **1. Introduction**

In recent years, credit scoring has been rising in popularity among Japanese banks as a lending technique toward small and medium enterprises (SMEs) (Note 1). Credit scoring is a technique lenders use to determine whether or not to approve a loan application as well as the terms and conditions of a loan on the basis of a “credit score” of a prospective borrower. The credit score is computed by a quantitative model on the basis of various explanatory variables deemed closely linked to credit risk of a borrower (such as attributes and financial conditions of the owner and the firm).

Credit scoring first developed as a lending technology in the

consumer credit markets in the United States of America. Wells Fargo Bank, a super regional bank of the US, adapted credit scoring for loans to small businesses in the early 1990s. Since then, credit scoring has developed into the main lending technique for small business loans among major US banks (Note 2).

In Japan, Tokyo Tomin Bank began to use credit scoring in 1998, setting off a rapid proliferation of the lending technique through its usage by major banks and other regional banks. In particular, ever since the Financial Services Agency (FSA) released the *Action Program Concerning Enhancement of Relationship Banking Functions* in March 2003, urging regional financial institutions to “utilize methods such as the credit scoring model (...) from the perspective of promoting lending activities placing emphasis upon cash flow from business operations and avoiding an excessive dependence upon collateral and guarantees,” credit scoring loans have basked in the limelight as a key financial product with the selling point that they require neither collateral nor guarantee (third party guarantee (Note 3)).

However, it is obvious from the foregoing definition that credit scoring is clearly different from “relationship banking” (Note 4) which is “a business model of lending by obtaining information including qualities of the management and future prospects of a debt company based on a long-term relationship” (FSA). More precisely, it should rather be categorized as a type of “transactions-based banking” which places emphasis upon the profitability of temporal and individual transactions on the basis of “hard” information such as financial statements. The use of credit scoring in SME lending would be beneficial in Japan for the three following reasons.

Firstly, it would reduce the cost of credit screening. Since SME lending usually involve small-lot loans, the burden of credit screening costs – being a fixed cost – is relatively larger for financial institutions. This is one of the reasons making it difficult for SMEs to obtain funds. Since the major part of the credit screening and monitoring processes are automated in the credit scoring system, the use of credit scoring could lead to the facilitation of SME

lending.

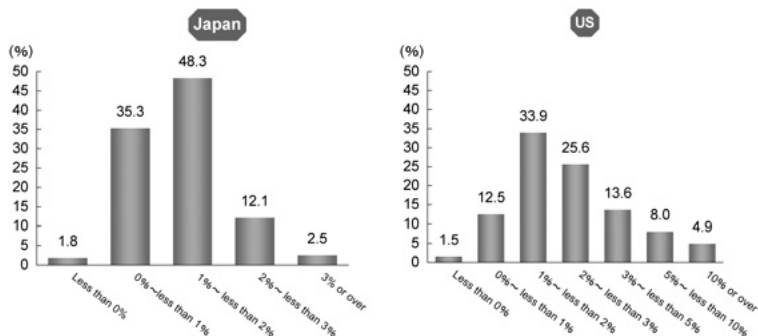
Secondly, credit scoring would bring lending interest rates to a more appropriate level. As shown in **Chart 1**, it is an oft-cited fact that lending interest rates among Japanese banks are mired at disproportionately low levels to credit risks, serving as one of the underlying reasons for the non-performing loan (NPL) problem in the 1990s. The establishment of lending interest rates commensurate with credit risks is a crucial issue for Japanese financial institutions. Nevertheless, it is a formidable task to raise normal lending rates from the perspective of continuity of past business practices. In this respect, a shift to credit scoring lending may serve as a turning point toward the normalization of lending interest rates toward SMEs.

Thirdly, there are high expectations toward the introduction of loans using credit scoring techniques given its potential to tap the “middle risk” market which have been excluded thus far from the scope of eligible borrowers from the perspective of banks (Note 5). At the same time, the average level of lending rates (after adjustment for credit risks) may rise through credit scoring lending toward this group of small business borrowers.

Keeping the foregoing premises in mind, this paper seeks to shed further light upon the current status of SME credit scoring in Japan on the basis of survey data obtained from a joint questionnaire survey of Japanese banks conducted by the author with Professor Yasuyoshi Masuda of Toyo University. This paper is structured as follows. Section 2 of the paper will set forth the characteristics of credit scoring. In Section 3, the paper elaborates upon the spread of credit scoring and specific schemes in Japan on the basis of the results of the aforementioned questionnaire survey and comparison with empirical data in the US. Lastly, Section 4 will discuss the pending issues which need to be addressed for credit scoring to take root in Japan.



**Chart 1: Lending spreads to SMEs – a comparison between Japan and the US**



Notes: 1. Based upon the number of loans.

2. Spread = lending interest rate minus base rate.

The base rate refers to the short-term prime rate in Japan. While the base rate differs from bank to bank in the US, 90% of the respondents cite the prime rate as the base rate.

Sources: National Life Finance Corporation Research Institute, FRB 1998 Survey of Small Business Finances.

## 2. The characteristics of credit scoring

According to Berger and Udell (2002), there are three forms of “transactions-based lending.”

The first is “financial statement lending.” This type of lending is best suited for firms with a high degree of transparency with certified audited financial statements. These types of loans require the prior provision of financial condition clauses (Note 6).

The second is “asset-based lending,” a form of lending which establishes credit lines on the basis of the collateral value of assets for firms which are slightly sub-par in terms of cash flow but nevertheless have collateral such as high quality accounts receivable and inventories.

The third form of lending is credit scoring lending, the subject of this paper. As mentioned above, credit scoring is a technique used for micro credits toward SMEs. Decisions on matters such as

whether or not to provide a loan and the terms and conditions of a loan are determined on the basis of a “credit score” calculated by a quantitative model on the basis of attributes linked closely to credit risks such as the characteristics of the owner and the financial conditions of the firm.

The striking characteristic of credit scoring lending, when compared with financial statement lending and asset-based lending, is that it recognizes loans as portfolio. In other words, while financial statement lending and asset-based lending judge credit risks with respect to each loan on a temporal basis, credit scoring determines creditworthiness on the basis of the average performance of the overall portfolio. This is illustrated symbolically by an episode involving Lawrence Lindsey, former Assistant to the president for economic policy and director of the National Economic Council under the previous administration of US President George W. Bush (Mester, 1997).

In this particular case, Mr. Lindsey, then a Governor of the Federal Reserve System, applied for and was denied the issuance of a Toys ‘R’ Us credit card on the grounds of his credit score. His application was denied on the basis that he had frequently made voluntary credit bureau inquiries. According to the credit scoring model, applicants with seven to eight such inquiries are categorized as a group who are three times as risky as the average applicant. Hence, the model arrived at the conclusion that it would be better not to issue a credit card to Mr. Lindsey. Unlike the ordinary applicant who makes voluntary credit bureau inquiries because of his concerns regarding the deterioration of his creditworthiness (or some other guilty conscience), Mr. Lindsey’s actions stem most likely from his curiosity as an expert in the field of finance. If such were the case, perhaps it would have been better to consider the high reading as an outlier and let the application pass. However, screening costs would surge if the circumstances surrounding each and all of such outliers had to be checked. Thus, credit scoring dismisses such outliers and evaluates creditworthiness on the basis of the average performance of the overall group.

### 3. The use of credit scoring by Japanese banks – survey evidence

Despite the rapid spread of credit scoring in Japan, there is virtually no information from which we can form a systematic and detailed picture of how Japanese banks are using credit scoring techniques. The only concrete information available is the FSA's twice-yearly report, the *Progress Report on the Action Program Concerning Enhancement of Relationship Banking Functions* which discloses the number of regional banking institutions adopting credit scoring technology, the number of actual loans and the amount of loans originated (**Chart 2**).

**Chart 2: Banking institutions adopting credit scoring technology**

Number of banks in each category	Regional financial institutions					Number of loans originated	Amount of loans originated (100 mil yen)
	Regional banks	Second tier regional banks	Shinkin banks	Credit cooperatives			
	602	65	50	306	181		
FY2002 (Note 2) (ratio)	117 ( 19% )	34 ( 52% )	26 ( 52% )	47 ( 15% )	10 ( 6% )	58,621	3,921
FY2003 (ratio)	188 ( 31% )	43 ( 66% )	36 ( 72% )	88 ( 29% )	21 ( 12% )	136,015	10,885
FY2004 (ratio)	269 ( 45% )	58 ( 89% )	43 ( 86% )	136 ( 44% )	32 ( 18% )	191,682	18,866

Notes: 1. The fiscal year starts from April and ends in March of the following year. The figures in parentheses represent the percentage of institutions engaging in credit scoring loans in the total number of institutions of the same business category.

2. For FY2002, the figures refer to the number of financial institutions engaging in credit scoring loans as of the end of September 2003.

Source: Financial Services Agency, *Progress Report on the Action Program Concerning Enhancement of Relationship Banking Functions*.

According to the FSA, 45% of regional banking institutions had started to use credit scoring technology by FY2004 (as of the end of

March 2005). The actual number of loans during FY2004 came to 192 thousand cases and the amount of loans originated stood at 1,886.6 billion yen (approximately US\$18.866 billion (Note 7)). The rate of credit scoring usage in terms of business categories was 89% among regional banks and 18% among credit cooperatives, revealing that the smaller the institution, the lower the rate of usage. These results are consistent with the nature of credit scoring technology which is well suited for large banks with a large number of loan applications and therefore compatible with the concept of managing loans as portfolio.

However, the FSA does not disclose the details regarding the status of credit scoring. Given these circumstances, the author and Professor Masuda of Toyo University conducted a *Questionnaire Survey on the Current Status of Credit Scoring Lending* in June–July 2004 on a survey group of 130 Japanese banks which are members of the Federation of Bankers Associations of Japan (Zenginkyo) and received responses from 37 institutions. The breakdown of the respondents is as follows: three megabanks (including long-term financial institutions), 14 regional banks, 16 second-tier regional banks which are members of the Second Association of Regional Banks (“second-tier regional banks,” these are generally smaller than traditional regional banks) and four other banks. Despite limitations such as the small number of samples and in particular the small number of responses from large banks, to the best of my knowledge, this is the first systematic research of credit scoring in Japan. The following section sets forth the characteristic aspects revealed by the survey, along with its comparison with US banks. This will provide some insight on the pending issues which must be addressed in order for credit scoring to take root in Japan.

### **(1) The spread of credit scoring technology**

At the time of the survey, we found 59.5% of all responding banks “currently using credit scoring technology” and 10.8% of all responding banks “scheduled to start using credit scoring technology in the near future.” These results are consistent with the

ratio of banks using credit scoring technology as of FY2003 in the FSA's survey mentioned before (66% of regional banks, 72% of second tier regional banks, **Chart 2**). Meanwhile, 24.3% responded that they are “interested, but do not have any scheduled plans on introduction.”

Looking closer at the 29 regional banks and second tier regional banks possessing similar business models, the average amount of outstanding loans of the 20 banks which are currently using credit scoring technology was 1,458.7 billion yen. In contrast, the average was 900.3 billion yen among the three banks scheduled to start credit scoring in the near future and 953.9 billion yen among the six banks with no plans for introduction. These figures also indicate that the larger the size of the bank, the more proactive they are in their efforts toward credit scoring technology (**Chart 3**).

**Chart 3: Characteristics of banks using credit scoring technology**

	Banks using CS	Banks scheduled to use CS	Banks not using CS
No. of banks	20	3	6
Outstanding balance of loans (100 mil yen)	14,587	9,003	9,539
Of which are loans to SMEs (100 mil yen)	7,600 (52.1%)	4,936 (54.8%)	4,915 (51.5%)
No. of branches	101	81	79
No. of employees (persons)	1,488	1,137	1,086
No. of employees per branch (persons)	13.9	13.5	12.7
Outstanding balance of SME loans per branch (100 mil yen)	68.7	57.5	51.3

Notes: 1. The figures are averages as of the end of March 2004.

2. Loans to SMEs = “outstanding balance of loans to SMEs (including loans to individuals and others)” minus “loans to individuals and others.”

Source: Nikkei NEEDS - Financial Quest database.

## (2) Motivations for lenders to use credit scoring technology

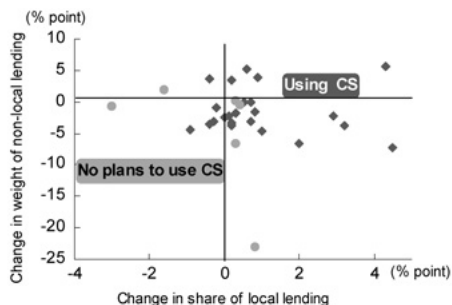
The respondents cited the following reasons for using (or being interested in) credit scoring technology: “prompt screening and implementation of loans” (93.9%), “upgrade efficiency (cost reduction) of existing loans” (75.8%), “marketing tool to gain new

borrowers” (48.5%), and “adjustment of lending conditions (such as lending interest rates) to appropriate levels” (39.4%) (respondents were allowed to cite multiple reasons). In the US, it is said that large banks started to use credit scoring as a marketing tool to tap the small business loan market traditionally dominated by community banks amid the abolishment of interstate branching regulations. In contrast, the motive behind Japanese banks’ use of credit scoring technology appears to lean more to the improvement of customer services through prompt and effective lending procedures to existing customers.

In **Chart 4**, we plotted the change in lending share of banking institutions in the local area (horizontal axis) and the change in weight of non-local lending in the overall portfolio (vertical axis) of both banks that use and banks that do not use credit scoring technology during the past five years (respondents were limited to regional and second tier regional banks). The results reveal that many of the banks using credit scoring technology are those banks which are gaining a greater local market share. This is consistent with the survey response that the main purpose of credit scoring is to raise the efficiency of existing loans.

Our query on operational costs (including labor costs) per loan revealed that the average operational cost of credit scoring loans is approximately half of conventional loans (average 50%, median 55%). This underscored the cost-cutting impact of credit scoring. However, a note of mention is necessary that there is a wide disparity among banks – some banks said that costs were approximately 90% of conventional loans.

**Chart 4: Lending behavior of regional banks (including second tier regional banks)**

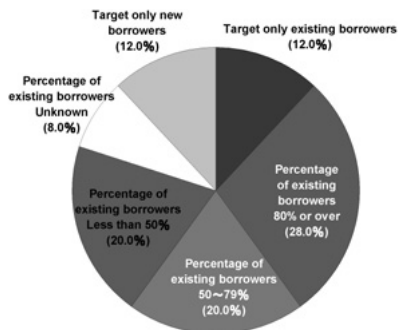


Notes: 1. "Share of local lending" refers to the change in lending share of the banking institution in the local area (prefecture where the head office is located) (1999-2004).  
 2. "Weight in non-local lending" refers to the change in ratio of non-local lending in the banking institution's total lending (1999-2004).  
 Source: Nikkei NEEDS - Financial Quest database.

**(3) Borrowers eligible for credit scoring loans**

Reflecting the foregoing motives, only 12% of the banks said that credit scoring loans are provided “only to new borrowers.” The percentage of banks providing credit scoring loans to “both existing and new borrowers” was 76% and “only existing borrowers” was 12%. Furthermore, as for the percentage of existing to new borrowers, 60% of the responding banks said that more than half are existing borrowers (Chart 5).

**Chart 5: Percentage of new and existing borrowers**



It should be noted that not all SME loans are subject to credit scoring. Our query regarding actual lending schemes revealed that there are caps on loans per company. We also found that 65% of the banks establish some sort of limit regarding the size of eligible companies. More specifically, we found a wide gap in lending limit per company ranging from 5 million yen to 50 million yen (the median/mode was 30 million yen = \$300 thousand). As for the size of eligible companies, many set caps in terms of sales, such as, “sales volume of 300 million yen to 1 billion yen.”

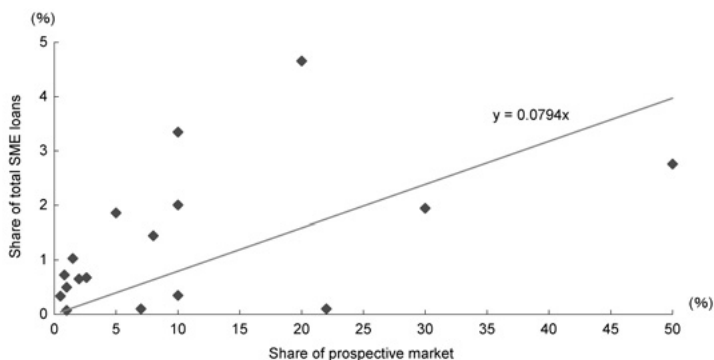
A comparison with US banks revealed a characteristic peculiar to Japan that some banks classify eligible borrowers in terms of the form of corporate organization. We found that 35% of the banks do not consider proprietorships as eligible. In contrast, proprietorships are not excluded from eligible borrowers of credit scoring loans in the US, given the emphasis upon personal information such as past credit records of the owner in the credit scoring model.

These differences between Japan and the US stem from the fact that small business credit scoring in the US developed and spread as an adaptation of consumer lending. Fair Isaac and Company (FICO), which first created a scoring model for consumer lending, later developed a scoring system for small business lending in 1995. This served to trigger the spread of credit scoring. The key to development of the model was the astute observation among lenders that “repayment of small business loans depended less on the business itself than on the credit history of the founder” which do not usually have credible financial statements (Allen, Delong, and Saunders, 2004). FICO studied and analyzed data on small business loans in response to requests by practitioners and found that variables such as the characteristics and credit history of the owner (e.g., age, number of dependents, number of years of experience in the business and past records on debt payment) produce a much more accurate forecast on credit risk than financial information on the business itself. In the case of Japanese banks, however, many of the scoring models are not based upon personal information due in part to the shortage of data on personal credit history.



What then is the percentage of credit scoring loans in total SME lending in Japan? The percentage of credit scoring loans in overall SME lending on a per-bank basis is still quite low: 0.1% to 4.7% (hereinafter expressed as “0.1–4.7%”) in terms of outstanding balance and 0.1–6.0% in terms of the number of cases. On the other hand, we found that the percentage of lending toward the prospective market for credit scoring loans ranged from 0.5–50%. Calculating backward, along with the percentage in overall SME lending, the market deemed as the prospective market for credit scoring would be approximately 10–30% of total lending toward SMEs (Note 8) (**Chart 6**). Again, it is necessary to take note of a wide disparity among banks.

**Chart 6: The percentage of credit scoring lending (in total SME lending and in the prospective market).**



Notes: 1. Value basis. No. of samples: 17.

2. The outstanding balance of credit scoring loans pertains to May–June 2004. The outstanding balance of SME loans is as of the end of March 2004.

#### (4) Credit scoring – the scheme

##### a. The scoring model

Our survey revealed that 23% of the banks rely solely on self-made “in-house models” and that 69% used some form of “external model” (including its joint use with an internal model).

Incidentally, we found that many of the banks adopting external models use the “Credit Risk Database (CRD) Model.”

Since it would be unrealistic for all banks to develop their own in-house models, many banks even in the US use scoring models provided by external vendors. There is also a tendency for usage to concentrate on certain external models such as FICO’s. However, an excessive dependence upon a single model for the risk assessment of small business lending is undesirable from the perspective of the soundness of a financial system. Given a bias in credit risk assessment among Japanese banks, a shift in environment may lead to the dysfunction of the entire Japanese banking system as intermediaries. A more desirable situation is the existence of a number of competitive credit risk assessment models providing banks with a wider choice of external models.

#### **b. Screening items, application forms and interviews**

The number of screening items in “score cards” (check lists) was 29 on average and 86 at the maximum. Compared to the FICO Model – the most popular scoring model in the US – which has 8–12 explanatory variables, there seems to be a relatively large number of items in Japanese models.

Furthermore, 77% of the banks said that they have certain “minimum criteria (admission criteria).” To be more exact, many of the banks set forth criteria such as “absence of excessive debt,” “passage of more than two years since establishment,” “not classified as borrowers requiring special attention,” and “absence of history as tax defaulters.” Moreover, 89% of the banks required “interviews with the representative.” This stems most likely from the popular belief among practitioners that “a proper assessment of SME credit risks is not possible only on the basis of objective quantitative information such as financial information.” However, an excessive dependence upon qualitative information through interviews is incompatible with the original purpose of credit scoring which is the prompt and efficient processing of loans. We will delve further into the significance of interviews in credit scoring in the following

section.

### **c. Collateral and guarantees**

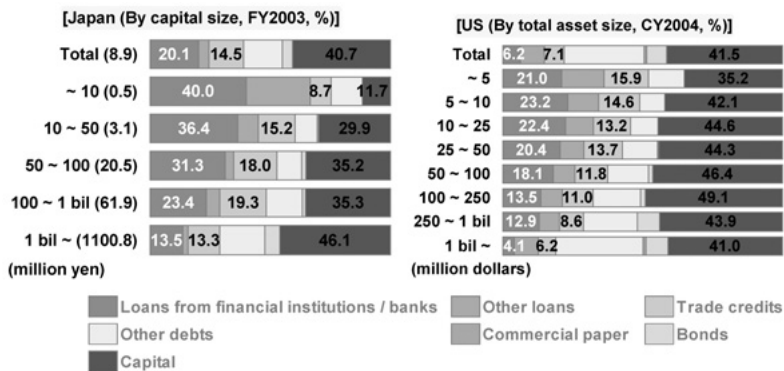
As mentioned in Section I. “Introduction,” credit scoring loans are often perceived in Japan as financial products that require neither collateral nor third-party guarantee. We actually found in our survey that 92% of the banks do not require collateral and that 96% of the banks do not require third-party guarantees. Meanwhile, 92% of the banks require a “personal guarantee by the representative.”

A note of mention is necessary that credit scoring is only a technique to facilitate the prompt and efficient processing of loans and that it does not in any way reduce credit risks. Admittedly, even in the US, it is said that a higher percentage of loans using credit scoring technology are uncollateralized in comparison to conventional loans. However, this stems from the following aspects of credit scoring. Firstly, credit scoring loans are, in all practical aspects, akin to personal credits to the owner. Secondly, short-term credit lines (the bulk of credit scoring loans) in conventional loans would usually be collateralized by movable assets, such as accounts receivable and inventories. However, given the high costs required in registering and managing moveable assets as collateral, it would run counter to the purpose of credit scoring, that is to raise the efficiency of lending procedures.

In Japan, by contrast, the object of assessment using scoring techniques is limited to corporate entities. Furthermore, Japan is characterized by a direct proportion of corporate size to capital-asset ratios – the smaller the company, the lower its capital-asset ratio (**Chart 7**). Generally speaking, the presence of “asymmetric information” between the lender and the borrower (a situation where borrowers have relevant information that lenders lack), where the lender cannot discriminate the terms and conditions (e.g. interest rates) in accordance to the debt payment capacity of borrowers, may lead to (1) “adverse selection” where potential borrowers who are the most risky are the ones who most actively seek out loans, and (2) “moral hazard” where the lender runs the risk that the borrower will

engage in risky businesses or that the borrower will place priority upon higher dividends or costs above debt payment after the loan is provided. In particular, companies with weak capital bases tend to cause adverse selection and create moral hazard because the losses from business failures are small. Hence, difficulties in financing may ensue since problems of adverse selection and moral hazard may lead to a hesitant lending stance among financial institutions. In Japan, lenders presumably use collateral and guarantees as a means to supplement capital in order to overcome the difficulties in financial mediation stemming from low capital–asset ratios. The significance of collateral and guarantees will be revisited in the following section.

**Chart 7: Financing structures of manufacturing firms**



Note: Japan's figures in parentheses are the average total assets (million yen).  
 Sources: Ministry of Finance, *Financial Statements Statistics of Corporations by Industry*.  
 US Department of Commerce, *Quarterly Financial Report*.

#### d. Lending interest rates, bank service fees

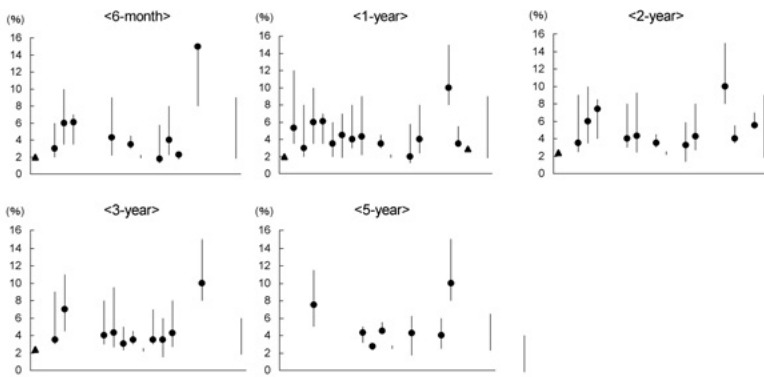
In most cases, interest rates on credit scoring loans are set within a range of 2–10% (**Chart 8**). Some of the respondents cited “psychological barriers” as a reason for the fact that interest rates above 10% are rare.

According to our survey, the mode values of lending rates (weighted by the number of credit scoring loans of each bank) are as

follows: 6-month (4.37%), 1-year (4.53%), 2-year (4.73%), 3-year (4.41%), and 5-year (5.49%). The extremely small interest rate differential of different maturities probably reflects the flat yield curve of market interest rates (government bond yields). The average level of interest rates on credit scoring loans is around 4.5%, which is approximately 2.5% higher than the average lending rate (1.94% as of March 31, 2004, calculated by the lending interest rate divided by outstanding balance of loans, including conventional loans) of the banks providing responses to our survey.

Responses regarding the interest rate differential with conventional loans (credit scoring lending rate minus conventional lending rate) revealed that interest rates on credit scoring loans (mode value) is generally higher than conventional loans. However, we also found scattered evidence of credit scoring lending rates falling below conventional lending rates, suggesting that interest rates are set at inordinately low levels amid a rush among banks to drive the quantitative spread of credit scoring.

**Chart 8: Lending rates of credit scoring loans (by maturity)**



Notes: 1. The vertical lines indicate the range of lending rates. The ● indicates the mode value and the ▲ indicates the lowest value.  
 2. The vertical lines are shown from the left hand side of the graph in accordance to the number of credit scoring loans (the banks with the most CS loans on the left).

Turning next to bank service fees, 69% of the responding banks charge service fees. Most banks charge flat-rate service fees around 10,000–50,000 yen (average 23,000 yen). While it seems irrational to require service fees for credit scoring loans that are meant to raise the efficiency of the screening process since Japanese banks do not normally charge service fees for conventional loans, banks appear to be shifting the costs for development of in-house scoring models and use of external models to the borrower as the recipient of benefits.

## **4. The “to do list” for credit scoring to take root in Japan**

In the final section, this paper will discuss the problems and issues that are likely to emerge in the course of credit scoring to take root in Japan. We shall look at these issues in accordance with each of the three significant reasons which make credit scoring a promising frontier as mentioned under Section I. “Introduction”: (1) reduction of screening costs based upon portfolio management, (2) tapping of new markets such as the middle risk market, and (3) adjustment of lending interest rates to appropriate levels.

### **(1) Reduction of screening costs based upon portfolio management**

As far as the survey results show that operational costs for credit scoring are roughly half those of conventional loans, the use of credit scoring technology may be commended for having achieved a certain level of success in cutting costs. However, a perusal of the screening items required by Japanese banks reveals that some banks set forth an extremely large number of variables. These banks, most likely, set forth a large number of “minimum standards.” Moreover, 89% of the banks require interviews with representatives in the

screening process.

As mentioned before, credit scoring is an antithetical lending technique to relationship banking. Efficiency is its intrinsic characteristic. Furthermore, unlike other types of transactions-based banking such as financial statement lending and asset-based lending, credit scoring is characterized by its portfolio management of loans on the basis of the law of large numbers. The upside of setting numerous “minimum standards” is that the average default rate would decline if those standards are correct. However, the downside is that it would narrow the range of loans falling within the purview of the scoring model and make it more difficult to manage portfolios from a statistical perspective. It is critically important to avoid setting unnecessary screening items and assess the balance between costs and benefits.

Japanese banks’ emphasis upon interviews and qualitative judgments on personal factors most likely stems from its judgment that such information would enable an accurate assessment of the borrowers’ credit risks and thus would be beneficial for the minimization of adverse selection. However, if such case-by-case screenings are indeed necessary, conventional lending practices based upon relationships should be followed instead of credit scoring. It is necessary to keep in mind that an excessive dependence upon interviews would undermine the merits of credit scoring, namely cost reduction through the facilitation of screening processes.

While highlighting the characteristics of credit scoring, lenders should be prepared to assess and use suitable lending techniques as necessary such as relationship lending which places emphasis upon interviews and case-by-case screenings. To do so, it would be necessary to clearly define the range of borrowers eligible for credit scoring loans. Screening procedures should be simplified for those borrowers deemed eligible and clarify the target market.

## **(2) Clarification and expansion of the prospective market**

Thus far, loans using credit scoring technology have been

growing steadily. Nevertheless, given the limited size of the prospective market, demand growth may run its course and start to falter very soon. In such an event, there are concerns that it might stymie the positive effect expected of credit scoring such as the reduction of screening costs and the adjustment of lending rates to appropriate levels.

Therefore, the impending task is to broaden the scope of loans in which credit scoring technology may be applied. As reiterated in the foregoing sections, our survey revealed a very high level of interest among Japanese banks regarding the expansion of new markets and clients. Looking forward, it would be necessary to consider widening the application of credit scoring to the middle risk market and proprietorships. In particular, the utilization of credit scoring technology in a bid to explore new clients would be extremely important for major banks and major regional banking institutions striving for growth as a super-regional banking institution.

However, the history of credit scoring in the US provides us with reasons to be concerned that the expansion of the prospective market might serve to stymie the improvement of the credit spread. For example, analysis by Berger, Frame and Miller (2005) on a survey conducted by the Federal Reserve Bank of Atlanta in January 1998 revealed a bipolarization of credit scoring in the US. In other words, banks using credit scoring technology mainly for the purpose of expanding their client base in the middle risk market, found that their credit spreads did not improve as much as expected despite the rise of their credit exposure to risky borrowers. In contrast, banks striving to upgrade their accuracy of risk identification and promote the concept of risk pricing found a significant improvement of lending spreads despite the decline of average risk volumes.

These results indicate that a simplistic approach to increasing the volume of credit scoring loans will not necessarily lead to the normalization of interest rates. In order to widen and gain a larger slice of the middle risk market, it would be necessary to construct a business strategy taking into consideration the trade-off between the surge of credit exposure and the improvement of credit spreads.



Given the weak capital bases of SMEs in Japan, efforts to increase lending to small companies (in particular proprietorships) whose businesses are inextricably linked to their owners, would require measures to avoid adverse selection. Although the requirement of interviews in the screening process of many banks would be one way to avoid adverse selection, it comes at the price of cost efficiency. In this respect, some US banks interviewed by the author deal with this problem by requiring higher scores for small business loans in comparison to conventional loans. Furthermore, the requirement of collateral/guarantee is also another possibility, as long as the evaluation/management of collateral does not impair the efficiency of the lending process in an excessive manner. This stems from the fact that low-risk borrowers have the incentive to provide collateral/guarantees and are less likely to lose collateral or be obliged to satisfy guarantees. (Bester, 1985)

### **(3) Improvement of credit spreads of conventional loans**

Lastly, it is necessary to adjust lending rates on conventional loans at appropriate levels for the proliferation, expansion and improvement of credit scoring loans.

According to the questionnaire survey, many banks are not asking existing clients to switch over from conventional to credit scoring loans despite clear definitions on clients eligible for credit scoring loans (45.8% of the banks are not asking clients to switch over from conventional to credit scoring loans whereas 37.5% are requesting clients to switch over). This is due most likely to the fact that interest rates on conventional loans do not properly reflect credit risks and that this is making it difficult to convince clients to switch over to credit scoring loans with higher interest rates. Similar factors are presumably in the background to the responses of 19.2% of the banks using credit scoring technology which cited “the difference in terms and conditions with conventional loans” as impediments toward the implementation of credit scoring loans (Note 9).

While it seems paradoxical, when considering the trade-off between the increase of loans and the improvement of spreads,

step-by-step efforts for proper risk pricing of conventional loans will lead not only to the improvement of banks' profitability but will also serve as the key to expansion of the credit scoring market.

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Credit scoring goes far beyond a mere lending scheme of banks and has the potential to reshape SME lending in Japan. However, it is not a "magic wand" capable of solving all problems at once, as exemplified by the trade-off between the rise of credit exposure and the improvement of credit spreads. For small business credit scoring to firmly take root, it is essential for banks to set forth clear policies on the strategic use of credit scoring in their management strategies.

\* \* \* \* \*

Notes:

1. Under Japan's Small and Medium Enterprise Basic Law, the term "small and medium enterprise (SME)" refers in general to enterprises with capital of not in excess of 300 million yen or 300 or fewer regular employees, and sole proprietorships with 300 or fewer employees. However, SMEs in the wholesale industry are defined as enterprises with capital not in excess of 100 million yen or 100 or fewer employees, SMEs in the retail industry are defined as enterprises with capital not in excess of 50 million yen or 50 or fewer employees, and SMEs in the service industry are defined as enterprises with capital not in excess of 50 million yen or 100 or fewer employees.
2. Currently the upper limit of loans using credit scoring is \$100 thousand –\$250 thousand in most cases. See, for instance, Frame, Srinivasan, and Woosley, (2001).
3. In Japan, SME borrowers are frequently required to provide third-party personal guarantees (such as relatives and directors other than the representative) in addition to guarantees by the representative.
4. Although there is no stylized definition of relationship banking, Boot (2000) defines relationship banking as the provision of financial services by a financial intermediary under a state of information asymmetry, where (1) borrower-specific – often proprietary – information can only be obtained through intensive screening or monitoring, and (2) information gathering takes place over time through multiple interactions with the borrower, often through the provision of multiple financial services.
5. As of 2003, lending interest rates to SMEs by banks are concentrated around a range of 2–4%. On the other hand, interest rates set by non-banks mostly fall within a range

- of 20–29.2% (29.2% is the legal usury limit). This bipolarization of interest rates is referred to as the “middle risk” gap.
6. Financial conditions which the borrower must maintain during the period of the loan in order to protect creditors, such as the maintenance of certain financial ratios.
  7. Calculated at an exchange rate of \$1 = 100 yen (the same exchange rate shall be applied for all dollar–denominated sums).
  8. Estimated around 7.9%, judging from the slope of the linear curve approximation in Chart 6. On the other hand, the average ratio of loans eligible for credit scoring technology in total SME loans among the banks is 29% (the average value of the slopes of each point in Chart 6).
  9. In our questionnaire survey of banks using credit scoring techniques, the respondents (plural responses allowed) cited the shortage of data as follows as impediments toward the implementation of credit scoring: “reliability of financial statements” (82.7%), “shortage of default data” (69.2%), “shortage of credit history data of clients” (51.9%). In contrast, banks which do not use credit scoring techniques had the tendency to cite the “shortage of know–how and personnel resources” (81.8%) as problems.

## Bibliography

- Allen, Linda, Gayle DeLong, and Anthony Saunders, “Issues in the credit risk modeling of retail markets,” *Journal of Banking and Finance*, 28(4), 727–752, 2004.
- Berger, Allen N., W. Scott Frame, and Nathan H. Miller, “Credit Scoring and the Availability of Price, and Risk of Small Business Credit,” *Journal of Money, Credit and Banking*, 37(2), 191–222, 2005.
- Berger, Allen N. and Gregory F. Udell, “Small Business Credit Availability and Relationship Lending: The Importance of Bank Organisational Structure,” *The Economic Journal*, 112, F32–F53, 2002.
- Bester, Helmut, “Screening vs. Rationing in Credit Markets with Imperfect Information,” *American Economic Review*, 75(4), 850–855, 1985.
- Board of Governors of the Federal Reserve System, *Report to the*

- Congress on the Availability of Credit to Small Businesses*,  
September 2002.
- Boot, Arnoud W. A., “Relationship Banking: What Do We Know?”  
*Journal of Financial Intermediation*, 9, 7–25, 2000.
- Frame, W. Scott, Aruna Srinivasan, and Lynn Woosley, “The Effect of  
Credit Scoring on Small–Business Lending,” *Journal of Money,  
Credit, and Banking*, 33(3), 813–825, 2001.
- Masuda, Yasuyoshi, and Arito Ono, “Credit Scoring no Genjo to  
Teichaku ni Mukete Kadai – Hougin Anketo Chosa to Beikoku  
deno Keiken wo Fumaete (The Current Status of Small Business  
Credit Scoring in Japan: based upon experience in the US and  
survey evidence on its use by Japanese banks),” *Mizuho Soken  
Ronshu (Mizuho Research Review)*, No. 1, 2005.
- Mester, Loretta J., “What’s the Point of Credit Scoring,” FRB of  
Philadelphia, *Business Review*, 3–16, September/October 1997.

**Mizuho Research Institute Ltd.**

*5-5, Otemachi 1-chome, Chiyoda-ku,  
Tokyo 100-0004, Japan*

*TEL: (03) 3201-0519*

*FAX: (03) 3240-8223*

*<http://www.mizuho-ri.co.jp/english/>*

