Differentiated Use of Small Business Credit Scoring by Relationship Lenders and Transactional Lenders: Evidence from Firm-Bank Matched Data in Japan*

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Abstract

This paper examines the ex-post performance of small and medium enterprises (SMEs) that obtained small business credit scoring (SBCS) loans. Using a unique Japanese firm-bank matched dataset, we identify whether an SME has obtained SBCS loans, and if so, from which bank: a relationship lender or a transactional lender. We find that the ex-post probability of default after the SBCS loans were provided significantly increased for SMEs that obtained SBCS loans from a transactional lender. We also find that the lending attitude of relationship lenders in the midst of the recent global financial crisis was more severe if a transactional lender had extended an SBCS loan to a firm. These findings suggest that SBCS loans by a transactional lender are detrimental to a relationship lender's incentive to monitor SMEs and maintain relationships. In contrast, we do not find such detrimental effects for SBCS loans extended by a relationship lender.

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1. Introduction

Loans to small businesses have traditionally been based on intimate relationships between borrower firms and lenders, because many of these firms are much more informationally opaque than large firms and thus lenders primarily rely on "soft" information gathered through long-lasting transaction relationships with small businesses. However, advances in information technology over the past decades have considerably transformed the landscape of small business lending, and a number of transaction-based lending technologies that rely on quantifiable and verifiable "hard" information have become available for small businesses. In particular, small business credit scoring (SBCS) has expanded rapidly in many countries and has attracted a fair amount of research interest.[1] It has been argued that SBCS is effective in increasing the availability of credit to small businesses and/or improving the accuracy of risk-based pricing of loans to them. However, the recent contraction in small business lending in the United States, where the use of SBCS is the most advance, has cast some doubts on the predictive power of SBCS.[2] The recent global financial crisis has also raised the question of whether SBCS loans are immune to abrupt adverse changes in financial markets. It may well be the case that SBCS loans are detrimental to firm-bank relationships, which in turn may have contributed to the difficulties small businesses faced in obtaining financing during and following the crisis.

Against this background, the present paper, focusing on Japan, examines how firms that received SBCS loans have weathered the financial crisis that erupted after the failure of Lehman Brothers in September 2008. The paper contributes to the literature on SBCS by examining how the use of SBCS differs depending on whether the provider of SBCS loans is a relationship lender or a transactional lender. The analysis relies on a unique firm-bank matched dataset. As we discuss in greater detail below, SBCS has been rising in popularity among Japanese banks since the early 2000s.

[1] See Berger and Frame (2007) for a survey.
[2] See, for instance, "When Business Credit Scores Get Murky," *Wall Street Journal*, March 18, 2010.

However, despite its growing relevance in small business loan markets, there is little empirical research on SBCS in Japan. We fill this gap by constructing a new dataset on SBCS in Japan. Our dataset is based mainly on three firm surveys conducted by the Research Institute of Economy, Trade, and Industry (RIETI) during 2008-2009. The virtue of these surveys is that we can identify SBCS loan user firms and non-user firms as well as a firm's primary bank, that is, the bank that has the largest amount of loans outstanding to the firm. Moreover, we can identify whether a primary bank (relationship lender) or a non-primary bank (transactional lender) has extended SBCS loans to a particular firm. Thus, we can make inferences on how a bank's strategy of implementing SBCS differs depending on whether the bank is a relationship lender or a transactional lender. This is an issue that has not been explored much in the literature on SBCS because, unlike our firm-bank matched data, most previous studies make use of bank survey data.[3]

Specifically, we empirically investigate how the ex-post performance of small and medium enterprises (SME) differs depending on whether they have obtained SBCS loans, and if so, whether those loans were from their primary bank or a non-primary bank. We also examine the relationship between a primary bank's lending attitude in the midst of financial crisis and a firm's usage of an SBCS loan.

Previous studies suggest that there are two potential benefits for a lender to adopt SBCS: cost-saving in the screening of loan applications, and the mitigation of informational opacity of prospective borrowers (Berger and Frame, 2007). Berger, Frame, and Miller (2005) provide evidence that the primary motive of "rules" banks that use SBCS to automatically make lending decisions is cost-saving, while "discretion" banks that utilize credit scores as one of several inputs in making credit decisions aim to reduce the opaqueness of potential borrowers. We develop this argument and

[3] Most studies are based on a survey of the largest U.S. banks conducted by the Federal Reserve Bank of Atlanta in January 1998. On the other hand, Berger, Cowan, and Frame (2011) recently used a survey of U.S. community banks conducted by the U.S. Small Business Administration.

hypothesize that transactional lenders (non-primary banks in our dataset) tend to use SBCS based on the cost-saving motive, whereas the motive of relationship lenders (primary banks) in adopting SBCS is to make more efficient lending decisions.

Utilizing the financial turmoil after the failure of Lehman Brothers as a natural experiment, we perform two exercises. First, we examine how the provision of SBCS loans, either by a primary bank or a non-primary bank, affects borrowing firms' performance during the crisis. Some studies suggest that SBCS loans may be associated with more type II errors than relationship loans. For instance, Agarwal and Hauswald (2008) and DeYoung, Glennon, and Nigro (2008) find that the use of SBCS loans and/or transactional loans is associated with a higher probability of default (PD). On the other hand, Berger, Cowan, and Frame (2011) find that credit scoring does not materially affect the quality of bank loan portfolios. We conjecture that whether SBCS is prone to type II errors depends on lenders' SBCS implementation strategy. If a lender uses SBCS for cost-saving, then it is likely that SBCS loans have a higher PD than non-SBCS loans, because a credit score alone is an imperfect indicator of borrower quality, since it is based on a limited set of quantifiable information. In contrast, if the lender uses SBCS discretionally in order to evaluate the creditworthiness of opaque small businesses more accurately, then it is likely that SBCS loans are not associated with a higher likelihood of default.

Second, we investigate whether the use of transactional loans such as SBCS loans is detrimental to firm-bank relationships. In particular, we examine whether the lending attitude of a primary bank worsens more in the midst of crisis if a firm obtained SBCS loans. We conjecture that the provision of SBCS loans is detrimental to a firm-bank relationship if it is provided by a non-primary bank, that is, a transactional lender. To our knowledge, there are no existing studies that investigate this issue.

Our main findings are as follows. First, we find that, on average, the ex-post PD of firms

that have obtained SBCS loans from non-primary banks is higher than that of non-SBCS loan user firms, conditional on the ex-ante PD and other covariates. The finding is consistent with our hypothesis that the main motive for a transactional lender in adopting SBCS is cost-saving. Our analysis on the treatment effect of SBCS suggests that less effective monitoring by the primary bank and non-primary banks, after a non-primary bank extended an SBCS loan, also played a role in the deterioration of firm performance.

In contrast, we find that the ex-post PD of firms that have obtained an SBCS loan from their primary bank becomes smaller than that of non-SBCS loan user firms. This is also consistent with our hypothesis that a relationship lender uses SBCS as one of many inputs for making a more precise credit decision.

Finally, we find that the lending attitude of a firm's primary bank worsened during the financial crisis if the firm had obtained an SBCS loan from a non-primary bank. We do not find such a detrimental effect of SBCS loans on primary banks' lending attitude when the SBCS loans were provided by the primary bank.

Overall, our findings suggest that the main motive of extending SBCS loans for a transactional lender is to expand the customer base via the cost-saving effect generated by SBCS. The cost associated with this strategy of implementing SBCS is that these loans are more prone to type II errors. For a relationship lender, the virtue of SBCS is that it improves the accuracy of lending decisions in that the credit score represents one of many inputs. From borrowers' viewpoint, SBCS loans from transactional lenders appear to be beneficial in that – at least in normal times – they increase the availability of credit. However, such loans may also have their drawbacks in that the use of SBCS loans from transactional lenders may be detrimental to the close ties a borrower has with its relationship lender, which may be particularly valuable during times of crisis.

Our findings are consistent with the use of SBCS by "rules" banks vs. "discretion" banks

in the manner suggested by Berger, Frame, and Miller (2005), but the focus of this paper is on the different motives underlying the use of SBCS by relationship and transactional lenders. Understanding this point is quite important, yet it has not been explored much in the literature. This is due to the data limitations previous empirical studies faced, namely that they were not able to distinguish whether a bank that extends SBCS loans is a relationship lender or not. It should also be noted that our firm-bank matched dataset presents us with the opportunity to provide sharper inferences on the use of SBCS loans than previous studies that are mostly based on bank-level datasets.

The remainder of the paper is organized as follows. Section 2 briefly describes the development of the SBCS loan market in Japan. Section 3 then develops our empirical hypotheses on how the use of SBCS loans affects the ex-post performance of borrower firms and the lending attitude of their relationship lenders. Next, Section 4 describes the data and variables used in the paper and explains our empirical models, while Section 5 presents the results of our empirical analysis. Section 6 summarizes the paper's findings.

2. The Development of Small Business Credit Scoring in Japan

Credit scoring is a quantitative method to evaluate the credit risk (PD) of loan applications. Using both qualitative and quantitative data and statistical techniques, credit scoring produces a "score" for a loan applicant that forms the basis of credit decisions such as whether or not to provide a loan and the loan contract terms. Following Berger and Udell (2006), we define SBCS loans as loans where the primary lending decision is based on numerical credit scores. Note that this definition does not rule out the use of other information (for instance, soft information that is primarily used in relationship lending) as a secondary source.[4]

[4] Whether SBCS is a substitute or complement to other lending technologies is one of the key issues in the literature (Berger, Frame, and Miller, 2005) that will be discussed below. Uchida, Udell, and

In the United States, credit scoring has been used for underwriting consumer credit for some time, but it was not used for small business credit until the mid-1990s because of the heterogeneity of small businesses. The development of credit scoring models for small business loans in the 1990s was motivated by the casual observation that repayments of small business loans depended less on the business itself than on the credit history of the business owner (Mester, 1997; Allen, Delong, and Saunders, 2004). Since then, many U.S. banks have been using the consumer credit score of small business owners to evaluate small business loan applications (Cowan and Cowan, 2006). Consistent with the use of the consumer credit score of business owners, SBCS is typically used for loans under $100,000, an amount that is fairly small for business loans.

SBCS has been rising in popularity among Japanese banks as well since the early 2000s. Although there is no official aggregate data on the volume of SBCS loans in Japan, the outstanding amount of SBCS loans for the three largest banks was 5 trillion yen (about 50 billion dollars) at the end of 2005, about 5 percent of their entire loans outstanding to small businesses.[5] SBCS has also spread among regional banks and cooperative financial institutions, and they originated more than 8 trillion yen of SBCS loans in total during FY2003 – FY2006.[6] The expansion of SBCS among regional banks and cooperative financial institutions is partly due to regulatory pressure from the Financial Services Agency (FSA) to provide small business loans that do not require small business borrowers to pledge real estate collateral.[7]

In comparison with the United States, one distinguishing feature of SBCS models used in

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Yamori (2008) investigate the relationship among different lending technologies in Japan. However, they do not include SBCS in their analysis.

[5] *Nikkei Newspaper*, September 20, 2006.

[6] Financial Services Agency (FSA), "Progress Report on the Action Program Concerning Enhancement of Relationship Banking Functions," July 12, 2007.

[7] In March 2003, the FSA released the "Action Program Concerning Enhancement of Relationship Banking Functions." The action program urged regional banks and cooperative financial institutions to "utilize methods such as the credit scoring model […] from the perspective of promoting lending activities, placing emphasis on cash flow from business operations and avoiding an excessive reliance on collateral and personal guarantees" (p.4, authors' translation).

Japan is their reliance on business credit scores. In Japan, many scoring models use only firms' attributes such as financial ratios and do not take into account most, or any, of the business owners' personal attributes, because banks do not have sufficient access to databases on the personal credit histories of business owners. For this reason, some banks exclude proprietorships as eligible applicants for SBCS loans (Ono, 2006). Ono (2006) also reports that the maximum amount of SBCS loans made by each regional bank ranges from 5 million yen to 50 million yen, and the median is 30 million yen (approximately $300,000). The median amount is slightly larger than that of SBCS loans in the United States (typically under $100,000) where most banks rely on consumer credit scores.

However, growth in the SBCS loan market has stagnated since the mid-2000s, in part because the default rates of SBCS loans have been higher than expected.[8] Worried by the fact that some banks were accumulating non-performing loans, the FSA has ceased to promote the use of SBCS in its Action Program since 2007.

3. Empirical Hypotheses

To examine how the use of SBCS affects the performance of loans to small businesses and their ties with relationship lenders during the financial crisis, we put forward empirical hypotheses that are based on the existing theoretical and empirical literature.

3.1. Strategies of Implementing SBCS

There may be several reasons for lenders to adopt SBCS, and the strategies of implementing SBCS (and the associated effects on loan contract terms and ex-post loan

[8] A typical example is the failure of Shin Ginko Tokyo. The bank was established in 2004 at the initiative of the Tokyo metropolitan government to promote small business loans without collateral. SBCS loans were the main product of Shin Ginko Tokyo and by the end of 2007 the bank had lost nearly 80 percent of its capital because of the extremely high default rate on its SBCS loans. See Hasumi and Hirata (2010) for details.

performance) may differ across banks. Previous studies suggest that there are two potential benefits for lenders of adopting SBCS: (i) cost-saving in screening loan applications, which would help to expand small business lending, and (ii) the mitigation of the opacity problem, which would contribute to more efficient lending decisions and/or setting contract terms more accurately (Mester, 1997; Berger and Frame, 2007). Berger and Frame (2007) argue that cost-saving is likely to be the key motive for "rules" banks that use scores to automatically approve or reject loan applications, as this greatly reduces the human resource expenses associated with loan processing. In contrast, banks that use scores as a supplementary factor in making credit decisions are termed as "discretion" banks. For discretion banks, the key incentive for adopting SBCS is to improve the precision of their information about the creditworthiness of prospective borrowers and make correct lending decisions.

Consistent with the cost-saving motive, most previous empirical studies find that the adoption of SBCS by a bank is associated with an increase in the provision of small business loans (Frame, Srinivasan, and Woosley, 2001; Frame, Padhi, and Woosley, 2004; Berger, Frame, and Miller, 2005; Agarwal and Hauswald, 2008; Berger, Cowan, and Frame, 2011). Explicitly distinguishing "rules" banks and "discretion" banks, Berger, Frame, and Miller (2005) report that the availability of small business credit increases for "rules" banks after the adoption of SBCS, but observe no significant increase for "discretion" banks. They also find a substantially larger increase in average loan premiums for "discretion" banks than for "rules" banks. This suggests that the main reason for adopting SBCS for "discretion" banks is to set loan contract terms more accurately with respect to the credit risk of a borrower firm.[9]

[9] Note that the effects of SBCS on the volume and price of loans may not only depend on the strategy of implementing SBCS (rules/discretion) but also on the type of bank. The sample of Berger, Frame, and Miller (2005) consists of large banking organizations in the United States. Using a sample of U.S. community banks, Berger, Cowan, and Frame (2011) find that the increase in credit availability is limited to banks that use consumer credit scores "discretionally."

3.2. The Effect of SBCS on Borrower Performance

Regarding the effect of SBCS on a bank's risk taking and loan performance, DeYoung, Glennon, and Nigro (2008), constructing a simple partial equilibrium model, point out three potential effects. First, SBCS may make the loan production process more efficient and reduce associated costs. As a result, the bank will be more willing to extend loans to marginally riskier borrowers (risk-taking effect), because, with increased efficiency, the bank has greater capacity to absorb losses. This effect would increase the ex-post default rate, all else equal. Second, if used in isolation, SBCS may be informationally inferior to traditional relationship lending, as credit scores are an imperfect indicator of the creditworthiness of prospective borrowers that are based on a limited set of quantifiable information. This effect of SBCS makes both type I errors (rejecting good loans) and type II errors (approving loans that will default) more frequent and will result in a higher default rate.[10] This being the case, lenders will use SBCS only if the cost-saving effect of credit scoring outweighs the deterioration in expected loan performance. In contrast, and finally, by combining the hard information obtained from the credit scoring model and the soft information gathered through an existing firm-bank relationship and the traditional loan screening process, SBCS may improve the lender's information set and result in a smaller default rate. The first and second effects correspond to the cost-saving motive underlying the adoption of SBCS by "rules" banks, while the third effect is likely to be found for "discretion" banks that use SBCS to reduce the borrower opacity problem.

Turning to empirics, using U.S. commercial loans data, DeYoung, Glennon, and Nigro (2008) report that the default rate for SBCS loans is higher than that for non-scoring loans. This result is consistent with either the risk-taking effect or the increase in type II errors associated with SBCS loans, or both. Agarwal and Hauswald (2008) also find that the credit delinquency of online scoring loans is higher than that of relationship-based in-person loans. Because Agarwal and

[10] For the sake of brevity, we will only refer to type II errors hereafter.

Hauswald (2008) estimate the likelihood of credit delinquency of scoring loans conditional on public credit scores and the bank's internal credit scores (ex-ante riskiness), their empirical result suggests that SBCS loans are more prone to type II errors. On the other hand, Berger, Cowan, and Frame (2011) report the use of SBCS does not materially affect the non-performing loan ratio of U.S. community banks. Regarding the ex-ante riskiness of borrowers, Berger, Frame, and Miller (2005) find that the average risk rating of loans issued by "rules" banks is higher (i.e., such loans are riskier) than that by non-scoring banks, while the average risk rating of loans issued by "discretion" banks is lower than that by non-scoring banks. These empirical results suggest that the risk-taking effect of SBCS is limited to "rules" banks.

The main aim of this paper is to empirically investigate the different use of SBCS by relationship lenders and transactional lenders. We posit that relationship lenders and transactional lenders have different motives for adopting SBCS and examine whether the ex-post performance of SBCS-loan user firms in the midst of the recent financial crisis depends on the provider of SBCS loans (a relationship lender or a transactional lender).

On extending an SBCS loan to a prospective borrower, a transactional lender does not have sufficient access to soft information on the borrower. Thus, the likely motive for employing SBCS for a transactional lender is cost-saving. The potential accompanying cost is the exacerbation of the borrower opacity problem, which may result in more frequent type II errors. Note that a deterioration in the performance of loans after the adoption of SBCS may also occur as a by-product of more ex-ante risk-taking if SBCS is useful for a transactional lender in reducing loan origination costs.

In contrast, using the credit score as a complement to the soft information that has been accumulated, a relationship lender may be able to evaluate the creditworthiness of small businesses more accurately. If that is the case, the default rate of SBCS loans provided by a relationship lender

should be smaller than that of non-scoring loans.

In summary, we put forward the following hypothesis:

Hypothesis 1 (The effect of SBCS on borrower performance)

The average ex-post performance of SBCS loan user firms deteriorates more than that of non-scoring loan user firms if SBCS loans are extended by a transactional lender that implements SBCS for the cost-saving motive.

In contrast, the average ex-post performance of SBCS loan user firms improves more than that of non-scoring loan user firms if SBCS loans are provided by a relationship lender that adopts SBCS in order to evaluate the creditworthiness of prospective borrowers more accurately.

Note that cost-saving may be the main motive also for a relationship lender, if it is relatively costly for the lender to reproduce (update) soft information. In this case, SBCS loans by a relationship lender are qualitatively the same as those by a transactional lender, and we would expect the average performance of SBCS-loan borrowers to deteriorate more than that of non-scoring loan borrowers.

In order to examine the above hypothesis, we make the following identifying assumption for our empirical analysis. We regard a primary bank as a relationship lender and a non-primary bank as a transactional lender. A primary bank is the bank who accounts for the largest amount of a firm's loans outstanding and who is thus likely to be the firm's "main bank." Non-primary banks, that is, banks other than the primary bank, are assumed to be transactional lenders.[11]

[11] Apart from the status of "main bank" or "Hausbank," the literature on relationship lending uses several other proxies such as the duration of a firm-bank relationship, the scope of a firm-bank relationship, and so on, to define a relationship lender. Our assumption that the primary bank is a relationship lender is also consistent with these alternative definitions, as the RIETI survey that we employ for our empirical analysis shows the intimacy of relationships measured by these proxies is, on average, stronger for primary banks (Uesugi et al., 2009).

3.3. The Effect of SBCS on Firm-Bank Relationships

To our knowledge, there are no existing studies that investigate whether the use of transactional lending such as SBCS has a detrimental effect on a firm-bank relationship. The studies most closely related to ours are those by Agarwal and Hauswald (2008, 2010), which examine how the intimacy of the firm-bank relationship (and the degree of informational asymmetry) affects the switch from relationship loans to transactional loans. For example, using loan applications data within a large U.S. financial institution, Agarwal and Hauswald (2010) find evidence that a borrower located further away is more likely to switch its lender.

The effect of SBCS on a firm-bank relationship is particularly important at a time of financial turmoil when an intimate firm-bank relationship is most valuable in obtaining external funds. We hypothesize that the effect of SBCS on a firm-bank relationship also depends on whether the bank that extends an SBCS loan is a relationship lender or a transactional lender. If a small business borrower obtains SBCS loans from a transactional lender, this may hurt the firm's relationship with the relationship lender and make the relationship lender's lending attitude more stringent during the crisis period. This ripple effect may be especially relevant in countries where many small businesses have multiple lending relationships, such as Japan as well as Italy, Portugal, and Spain (Degryse, Kim, and Ongena, 2009). On the other hand, SBCS loans obtained from a relationship lender may not be detrimental to the firm-bank tie. That is, if a relationship lender uses the numerical credit score as one of many inputs in making a credit decision, then it is likely that the relationship lender also reproduces soft information on the borrowing firm, and hence the lending attitude of the relationship lender during the crisis period is not adversely affected by the use of SBCS.

In summary, we put forward the following hypothesis:

Hypothesis 2 (The effect of SBCS on the lending attitude of a relationship lender)

The lending attitude of a relationship lender to firms that obtain SBCS loans from transactional lenders is more stringent than to firms that do not obtain SBCS loans, particularly during a period of crisis.

In contrast, the lending attitude of a relationship lender to SBCS loan user firms is not adversely affected if the SBCS loan is provided by the same relationship lender.

Note again that the lending attitude of a relationship lender that extends SBCS loans may also become more stringent than that of a non-scoring relationship lender if the lender uses SBCS as a substitute for relationship lending. Under this scenario, the relationship lender loses, at least partially, soft information that is needed to evaluate the creditworthiness of the firm in times of distress, and effectively becomes a transactional lender.

4. Data, Variables, and Empirical Approach

4.1. Data

The two main sources of our dataset are the "Survey on Transactions between Enterprises and Financial Institutions under the Financial Crisis" conducted in February 2009 and the "Survey on Transactions between Enterprises and Financial Institutions" conducted in February 2008, both by the Research Institute of Economy, Trade, and Industry (RIETI). Based on a sample drawn from the Financial Information Database of Tokyo Shoko Research (TSR), a commercial credit research firm that compiles information on more than 1.2 million firms, the 2008 survey questionnaire was sent to 17,018 firms, of which 6,059 responded. The 2009 survey questionnaire was sent to 5,979 firms out of the 6,059 respondents for the 2008 survey. The number of respondent firms for the 2009 survey is

4,103.

These RIETI surveys ask a variety of questions on corporate financing, including, in the 2009 survey, whether firms have obtained SBCS loans or not and, if they have, from which financial institutions (for the sake of convenience, we call them "banks" hereafter). Banks are categorized as "primary bank," "second primary bank," and "other bank." The primary bank is defined as the bank with the largest amount of loans outstanding to the firm, while the second primary bank is the bank with the second-largest amount of loans outstanding to the firm. Firms are asked to identify their primary and second-primary banks both in the 2008 and the 2009 survey. In addition, we tried to identify other SBCS banks by sending follow-up questionnaires to firms that used SBCS loans (RIETI, "Survey on Small Business Credit Scoring," November 2009).[12] Thus for each firm, we are able to identify its primary and second primary banks, and whether these banks have extended an SBCS loan. As for the other banks, we are able to identify them only if they have extended an SBCS loan to the firm. In our analysis below, we assume that a primary bank is a relationship lender and a non-primary bank (a second primary or other bank) a transactional lender.

In addition to the information on the usage of SBCS loans, we collect information on firm characteristics, bank characteristics, and firm-bank relationship variables in order to test our hypotheses. Firm variables are taken from the RIETI surveys as well as from the TSR Financial Information Database, which contains the financial statements of firms surveyed. Firms whose latest financial statements are prior to March 2006 are excluded from our sample. In addition, because the focus of the paper is on *small business* credit scoring, we exclude firms whose annual gross sales exceed 5 billion yen.

Data for bank financial variables come from several sources: data for most variables are from the Nikkei Financial Quest Database. We then try to supplement missing data from the website

[12] The questionnaire was sent to 418 firms that responded to the 2009 survey and answered they had obtained SBCS loans. The number of respondent firms to the follow-up survey is 284.

of the Financial Services Agency (FSA),[13] which contains information on regional banks and cooperative financial institutions, from "Kinyu Map," which is published annually by Kinyu Journal Company, from the Shinkin Bank and Credit Cooperatives (Shinyo Kumiai) database supplied by Keio University, and from banks' annual reports. Because we are primarily concerned with private banks' usage of SBCS, we drop observations from our dataset if a firm has transactions with government-sponsored financial institutions or finance companies (non-banks).

Information for firm-bank relationship variables is taken from the 2008 RIETI survey. The 2008 survey asks several questions on the relationship between a firm and its primary bank, including the duration of the relationship, the frequency of meeting, the physical distance between the firm and the bank branch, and the amount of loans outstanding. In order to maintain consistency with regard to the identity of firms' primary bank between 2008 (the year for which firm-bank relationship variables are constructed) and 2009 (the year for which the use of SBCS loans is identified), we drop observations of firms whose primary bank changed between 2008 and 2009.

Matching the data on the usage of SBCS with firm characteristics, primary bank characteristics, and firm-primary bank relationship variables, we have a maximum of 819 observations for the empirical analysis. The number of observations differs depending on which dependent variable we use and on the estimation strategy that we employ to test our hypotheses below. The reduction in the number of observations from the original RIETI surveys (4,103 firms) is due to missing data as well as the exclusion of some firms and financial institutions for the reasons explained above.

4.2. Variables

A list of variables and their definitions is provided in Table 1, while Table 2 presents summary

[13] http://www.fsa.go.jp/policy/chusho/shihyou.html

statistics for all sample firms, for firms that have obtained SBCS loans, and for firms that have not obtained any SBCS loans. Finally, Table 3 presents summary statistics for firms that have obtained SBCS loans from a primary bank, a non-primary bank, and both primary and non-primary banks.

The most relevant variable for our empirical analysis is the dummy variable indicating whether a firm had SBCS loans outstanding as of February 2009. We construct two dummy variables: whether a firm obtained SBCS loans from a primary bank (*SC_DUM_PR*) and from a non-primary bank (*SC_DUM_NPR*). In the RIETI surveys, SBCS loans are defined as "loans that are quickly processed (loan approval/denial is usually decided within a few days) and are easy to apply for, that, in general, do not require collateral and/or third-person guarantees, and that are often referred to as 'business loans' and/or 'quick loans'" (authors' translation). The last part reflects the casual observation that, in Japan, many banks have specific names for their SBCS loan products, so that firms can judge whether they are applying for an SBCS loan. Furthermore, in order to avoid any misclassification, the answer "do not know" is allowed in the survey questionnaire. Roughly 20 percent of survey respondent firms select this choice, and these observations are dropped from our dataset. Table 2 indicates that 12.6 percent of firms (103 out of 819 firms) in our dataset have obtained SBCS loans. Specifically, Table 3 indicates that the ratio of firms that have obtained an SBCS loan from their primary bank is 7.6 percent (62/819), while that of firms that have obtained an SBCS loan from a non-primary bank (or banks) is 7.3 percent (60/819). 2.3 percent of sample firms (19/819) obtained SBCS loans from both their primary and a non-primary bank.

4.2.1. Variable for Testing Hypothesis 1: Ex-post performance of Borrowing Firms

Hypothesis 1 states that the ex-post performance of an SBCS loan user firm is expected to deteriorate more than that of a non-scoring loan user firm if the SBCS loan is provided by a transactional lender that adopts SBCS for the cost-saving motive. In contrast, we expect that the

ex-post performance of a firm will not be adversely affected by the usage of an SBCS loan if the loan is extended by a relationship lender that adopts the scoring model for mitigating the borrower opacity problem.

As a proxy for the ex-post performance, we employ the borrower firm's probability of default in year 2009 (*F_PD*), that is, the PD of a firm estimated based on its financial statement after the SBCS (or non-SBCS) loan was extended.[14] As a proxy for the observable riskiness of a firm, we employ the annualized probability of default within 3 years calculated using the scoring model of Moody's RiskCalc.[15] Table 2 shows that, on average, *F_PD* is higher for SBCS loan user firms than for non-user firms. In addition, Table 3 shows that, among the former, the mean value of *F_PD* is higher for firms that obtained SBCS loans from a non-primary bank (2.8 percent) than for firms that obtained SBCS loans from their primary bank (1.7 percent). This preliminary observation is consistent with Hypothesis 1.

4.2.2. Variable for Testing Hypothesis 2: Lending Attitude of Primary Banks

Hypothesis 2 implies that a relationship lender's (primary bank's) lending attitude to a firm during the recent global financial crisis was adversely affected by the firm's prior usage of SBCS loans extended by a transactional lender (non-primary bank). In contrast, SBCS loans are not detrimental to a firm-bank relationship if loans are provided by the relationship lender itself.

The RIETI survey questionnaire asks respondent firms whether the lending attitude of their

[14] Ideally, we would like to use actual default events as a proxy for the ex-post performance of borrowing firms. However, because our ex-post data span only a one-year period, the number of defaulted firms in our sample is very limited (9 out of 826 firms) and thus it is difficult to examine Hypothesis 1 empirically by using actual default events.

[15] RiskCalc v3.2 Japan is created using pooled data on 201,000 SMEs for the period 1992 to 2005. Released in 2009 by Moody's KMV, it is one of the most widely used "third-generation" credit scoring models for evaluating the creditworthiness of unlisted companies in Japan. RiskCalc employs probit regressions whose independent variables are inventory to net sales, trade receivables to net sales, EBITDA to interest expense, net sales growth, total liabilities less cash to total assets, retained earnings to total liabilities, cash to total assets, gross profit to total assets, previous year income to previous year net sales, and real net sales.

primary bank has (1) improved, (2) remained unchanged, or (3) worsened after the failure of Lehman Brothers in September 2008. We use this index variable, *R_ATTITUDE*, to examine whether the role of a relationship lender as the provider of liquidity insurance in times of difficulty becomes less effective if the firm obtained an SBCS loan from a transactional lender, presumably because the firm-primary bank relationship became less intimate. Tables 2 and 3 show that the mean value of *R_ATTITUDE* is 2.27 for firms that have obtained SBCS loans from non-primary banks, 2.11 for firms that have obtained SBCS loans from primary banks, and 2.02 for firms that have not obtained SBCS loans. As a higher value represents a worsening lending attitude, these summary statistics are also consistent with Hypothesis 2.

4.2.3. Other Control Variables

To control for other covariates that may affect the ex-post performance of a borrowing firm and the lending attitude of its primary bank, we include the following variables.

First, regarding firm characteristics, we include a firm's probability of default before SBCS loans are extended (*PD*), because the ex-post probability of default (*F_PD*) is likely to be positively correlated with the ex-ante *PD*. Consistent with this conjecture, Table 2 shows that the average probability of default before the SBCS loan is extended is higher for firms that obtained SBCS loans than for firms that did not obtain SBCS loans. Meanwhile, Table 3 shows that the mean value of *PD* for firms that have obtained an SBCS loan from a non-primary bank (2.0 percent) is lower than that for firms that have obtained an SBCS loan from their primary bank (2.4 percent). This is in sharp contrast with the previous observations on *F_PD*, namely, that the mean value of *F_PD* is higher for firms having obtained an SBCS loan from a non-primary bank (2.8 percent) than from their primary bank (1.7 percent).

In addition to *PD*, we also include the logarithm of annual gross sales (*LN_SALES*) as a

proxy for firm size and the logarithm of firm age (*LN_FIRMAGE*). Further, we control for the share of equity holdings by a business representative (*OWNERS_HOLD*), as such holdings carry the risk of a commingling of a firm's business assets and a representative's personal assets.

Second, to control for the characteristics of a firm's primary bank, we use the logarithm of the bank's asset size (*BK_LN_ASSETS*) and the bank's share of bank branches within the prefecture of the borrowing firm (*BK_SHARE*). The primary bank's asset size may be an important determinant of the firm-bank relationship, since studies on relationship lending generally find that small banks have a comparative advantage in relationship lending (Berger and Black, 2011; Berger et al., 2005; Uchida, Udell, and Watanabe, 2008). The market share of the bank is included as a covariate to control for the degree of competition in a local loan market. In addition, we use the Herfindahl Index in each prefecture (*HERFINDAHL*). *HERFINDAHL* is calculated based on the share of banks' branches within the prefecture in which a borrowing firm is located. *BK_SHARE* and *HERFINDAHL* may also be important for firm-bank relationships, although the existing empirical literature is ambiguous on whether market concentration (competition) is conducive or detrimental to relationship lending (Elsas, 2005; Degryse and Ongena, 2007, Presbitero and Zazzaro, 2011).

Finally, we use a set of variables to measure the strength of the relationship between a firm and its primary bank, as this is likely to affect the bank's lending attitude in the midst of a crisis. Specifically, we use the logarithm of the duration of the firm-bank relationship (*R_LN_DURATION*), an index variable representing the frequency of meeting (*R_FREQ*), and an index variable for the physical distance between a firm and the primary bank's branch (*R_DISTANCE*). We also construct a variable that measures the percentage share of the primary bank in a firm's loans outstanding (*R_PRIME_SHARE*). Table 2 shows that, on average, the intimacy of relationships measured by these proxies is stronger for firms that have not obtained SBCS loans than for firms that have obtained SBCS loans.

4.3. Empirical Approach

4.3.1. Baseline Estimations

To examine our hypotheses, we begin with estimating the following linear-regression models:

$$F\_PD_i = \beta_0 + \beta_1 \cdot SC\_DUM\_PR_i + \beta_2 \cdot SC\_DUM\_NPR_i + \mathbf{X}_i'\boldsymbol{\beta} + \varepsilon_i \quad (1)$$

$$R\_ATTITUDE_{ij} = \gamma_0 + \gamma_1 \cdot SC\_DUM\_PR_i + \gamma_2 \cdot SC\_DUM\_NPR_i + \mathbf{X}_i'\boldsymbol{\gamma} + u_i \quad (2)$$

where vector $\mathbf{X}_i$ contains the set of covariates for firm *i* described in the previous Subsection 4.2.3.

The dependent variable F_PD_i represents the expected default probability of firm *i* as of year 2009, that is, after the SBCS loan is extended. $R\_ATTITUDE_{ij}$ is an index variable representing the lending attitude of firm *i*'s primary bank *j* as of February 2009. The two dummy variables for SBCS loans indicate whether a firm has SBCS loans outstanding from either its primary bank (*SC_DUM_PR*) or a non-primary bank (*SC_DUM_NPR*) as of February 2009. Because most SBCS loans were provided to our sample firms before February 2009,[16] F_PD_i and $R\_ATTITUDE_{ij}$ measure the probability of default and the lending attitude of a firm's primary bank after the firm has obtained SBCS loans. Regarding the other covariates $\mathbf{X}_i$, firm variables are taken from the 2009 RIETI survey and firms' most recent financial statement, dates for which range from March 2006 to December 2008. For bank variables, *BK_LN_ASSETS* is as of the end of March 2008. *BK_SHARE* and *HERFINDAHL* are calculated using the "Nihon-Kinyu-Meikan 2008" published by Kinyu Journal Company and the data are as of October 2007 and the Keio/Kyoto Joint Global COE Program's Shinkin and Shinso data. Finally, firm-primary bank relationship variables are constructed from the 2008 RIETI survey, i.e., they are for one year prior to the 2009 survey. In essence, we examine how SBCS loans extended by either a primary bank or a non-primary bank affect a user

[16] For a limited number of firms (221 firms), we can identify the date at which an SBCS loan was provided. Only 3 firms out of the 221 answered that they obtained an SBCS loan in February 2009.

firm's ex-post performance and the lending attitude of the firm's primary bank, conditional on the firm's and its primary bank's ex-ante characteristics.

4.3.2. Treatment Effects Estimations

Whether a firm obtains an SBCS loan – be it from its primary bank or a non-primary bank – is not a random event. Hence, even if we find that scoring dummy variables have a significant effect on firms' ex-post performance and their primary bank's lending attitude, there may be several possible causal interpretations. For instance, suppose we obtain a significantly positive coefficient for *SC_DUM_NPR* in equation (1): SBCS loans extended by a firm's non-primary bank are associated with an increase in the future probability of default *F_PD*, conditional on ex-ante characteristics of the firm (such as its ex-ante riskiness) and of the primary bank. One possible explanation for the result would be that SBCS loans by non-primary banks are more prone to type II errors when such banks are screening loan applications. However, an alternative possible explanation is that a firm's performance deteriorated as a result of less intensive monitoring by a non-primary bank that provided an SBCS loan as well as by the primary bank. In a similar vein, the tightening of a primary bank's lending attitude during the financial crisis may be associated with the provision of an SBCS loan by a non-primary bank, either because the firm-primary bank relationship became less intimate after the firm obtained an SBCS loan from a non-primary bank, or because a firm that obtained an SBCS loan from a non-primary bank had a less intimate relationship with the primary bank in the first place.

In order to make sharper inferences on the mechanisms underlying the empirical results obtained from linear regression models (1) and (2), we need to distinguish the selection effect (selection bias) and the treatment effect of SBCS loans. To do so, we employ propensity score matching. The procedure is as follows:

(i) We implement the following probit estimations that model the probability of a firm obtaining an SBCS loan from a primary or non-primary bank:

$$\Pr(SC\_DUM\_PR_i = 1) = f(\mathbf{X}_i'\boldsymbol{\delta}) \quad (3)$$

$$\Pr(SC\_DUM\_NPR_i = 1) = g(\mathbf{X}_i'\boldsymbol{\delta}) \quad (4)$$

where vector $\mathbf{X}_i$ contains the same covariates as in equations (1) and (2). Borrower firms that obtain an SBCS loan (*SC_DUM_PR*=1, *SC_DUM_NPR*=1) are labeled treatment observations. Based on the estimation results, we then attach a propensity score to each observation. The propensity score is defined as $e_{PR}(\mathbf{X}_i) \equiv \Pr(SC\_DUM\_PR_i = 1 \mid \mathbf{X}_i)$ for equation (3) and as $e_{NPR}(\mathbf{X}_i) \equiv \Pr(SC\_DUM\_NPR_i = 1 \mid \mathbf{X}_i)$ for equation (4).

(ii) Next, for each treatment observation, we identify matched observations from non-treatment observations. We define non-treatment observations as firms that do not obtain an SBCS loan from *any* bank. That is, in matching observations, firms that obtained an SBCS loan from a non-primary bank are excluded from non-treatment observations in estimating equation (3). Similarly, firms that obtained an SBCS loan from their primary bank are excluded from the sample in estimating equation (4). The matched observations are observations that have the "closest" propensity score to a particular treatment observation and are labeled control observations. There are several matching algorithms to find the "closest" control observations. As a baseline for our analysis, we employ kernel matching.

(iii) Finally, we compare the change in the probability of default and in the lending attitude of the primary bank, *F_PD* and *R_ATTITUDE*, of the treatment group and the control group after the eruption of the financial crisis.[17]

[17] To be precise, *F_PD* measures the level of the probability of default after the crisis. However, because we control for the probability of default before the crisis by including it as one of the covariates in the first-stage probit estimation, we are effectively looking at the change in the probability of default.

One of the benefits of employing propensity score matching estimation is that we can match treatment and control observations using the scalar propensity score. The propensity score, which is the conditional probability of being treated given the value of observed characteristics, is a very useful variable in dealing with a highly dimensional vector of covariates. Rosenbaum and Rubin (1983) showed that treatment observations (in our case firms that obtained SBCS loans) and control observations (firms that obtained non-SBCS loans) with the same propensity score value have the same distribution of the full vector of covariates. It is thus sufficient to match firms in terms of the propensity score in order to obtain the same probability distribution of covariates for treatment and control observations.

In propensity score matching, an assumption known as unconfoundedness has to be satisfied so that the differences in *F_PD* and *R_ATTITUDE* between the treated observations and the control observations with the same propensity scores are attributable to the treatment effect of SBCS loans (Rosenbaum and Rubin, 1983). For instance, regarding *F_PD*,

$$(F\_PD^T, F\_PD^C) \perp SC\_DUM\_PR \mid e_{PR}(\mathbf{X}_i) \quad \text{and}$$

$$(F\_PD^T, F\_PD^C) \perp SC\_DUM\_NPR \mid e_{NPR}(\mathbf{X}_i)$$

need to hold (superscripts *T* and *C* stand for the treatment group and the control group, respectively). Although there is no direct test for unconfoundedness, this assumption means that it is necessary to control for all relevant variables $\mathbf{X}_i$ that influence the selection of treatment observations and their ex-post probability of default (outcome variable). We believe our data is rich enough to include all the necessary covariates. Furthermore, by including the ex-ante probability of default as one of the covariates in the first-stage probit estimation, we are effectively looking at the change in the probability of default.[18] This is analogous to using the difference-in-difference estimator that allows

[18] Regarding *R_ATTITUDE*, the variable indicates the *change* in lending attitude of a primary bank after September 2008. The original RIETI survey also asks about the *level* of its lending attitude (either "good," "usual," or "bad").

for the existence of differences in time-invariant unobservable characteristics between the treatment and the control group.

In addition to unconfoundedness, the following balancing condition of the covariates given the propensity score must be satisfied (Becker and Ichino, 2002):

$$SC\_DUM\_PR_i \perp \mathbf{X}_i \mid e_{PR}(\mathbf{X}_i) \quad \text{and} \quad SC\_DUM\_NPR_i \perp \mathbf{X}_i \mid e_{NPR}(\mathbf{X}_i) .$$

In other words, for a given propensity score, treatment observations are randomly chosen and, therefore, the treatment sample and the control sample are on average identical. In order to verify the balancing condition, we implement t-tests for equality of means for each covariate between treated and controls. If there are no statistically significant differences between the two groups, then we can proceed to estimate the treatment effect in the second step with some confidence.

5. Results

5. 1. Baseline Estimations

Table 4 presents the ordinary least square regression results of equations (1) and (2). Regarding the effect of SBCS on ex-post borrower performance, the coefficient on *S_DUM_NPR* in the *F_PD* regression is significantly positive, indicating that the probability of default during the financial crisis increased by as much as 0.82 percentage points for borrowers that obtained an SBCS loan from a non-primary bank. This result is consistent with the first part of Hypothesis 1 which states that the provision of SBCS loans by transactional lenders is associated with a deterioration in borrower ex-post performance, because the transactional lender adopts SBCS for the cost-saving motive and thus is more prone to committing type II errors. In contrast, the coefficient on *S_DUM_PR* is significantly negative and indicates that the probability of default is 0.46 percentage points lower if borrowers obtained an SBCS loan from their primary bank. The result is consistent with the second part of Hypothesis 1, which states that the average ex-post performance of SBCS

loan user firms improves in comparison with non-scoring loan user firms, since primary banks adopt SBCS in order to evaluate the creditworthiness of prospective borrowers more accurately.[19]

Turning to other covariates, the coefficient on *PD* is positive and significant, indicating that an observably riskier borrower ex-ante is likely to be riskier ex-post as well. The coefficient on *R_DISTANCE* is also positive, although only statistically significant at the 10 percent level. The positive coefficient is consistent with the finding in previous empirical studies (Agarwal and Hauswald, 2010; DeYoung, Glennon, and Nigro, 2008) that a borrower that is located farther away from a lender is more likely to default. The coefficient on *R_FREQ* is also weakly positive, suggesting that the average performance of borrowers deteriorates more if their primary bank monitors them more frequently. Although this result seems somewhat paradoxical, a possible explanation is that firms that turn out to be observably riskier ex-post are likely to be informationally opaque ex-ante, and hence primary banks consult with such firms more often.

Regarding the lending attitude of primary banks during the financial crisis, the coefficient on *S_DUM_NPR* in the *R_ATTITUDE* regression is significantly positive, indicating that firms that obtained an SBCS loan from a non-primary bank prior to the crisis were more likely to experience a tightening in the lending attitude of their primary bank during the crisis. In contrast, the coefficient on *S_DUM_PR* is statistically insignificant; that is, SBCS loans provided by the primary bank did not have any positive or negative effects on its lending behavior during the crisis period. Taken together, these results are consistent with Hypothesis 2 which states that an SBCS loan by a transactional lender has an adverse effect on the ties between a firm and its relationship lender, while an SBCS loan by a relationship lender does not have such a harmful effect. From a borrower's

[19] As noted in footnote 14, we do not use actual default events as a proxy for ex-post firm performance because of the limited number of defaulting firms (9 out of 826 firms). However, the following default rates are consistent with the estimation results using *F_PD*: 0.7 percent (5/722) for non-SBCS loan user firms, 1.6 percent (1/63) for firms that obtained an SBCS loan from their primary bank, and 5.0 percent (3/60) for firms that obtained an SBCS loan from a non-primary bank.

perspective, the results suggest that there is a certain cost associated with switching from a relationship lender to a transactional lender via SBCS loans. Although SBCS loans from transactional lenders seem to be beneficial in increasing the availability of credit during normal times, they may be detrimental to a firm's ties with its relationship lender, which may be particularly valuable during times of financing difficulty.

The coefficient on *PD* is again positive and significant, indicating that the lending attitude of primary banks is worse for ex-ante riskier firms. Although significant at only 10 percent, the negative coefficients on the relationship variables (*R_PRIMESHARE*, *R_LN_DURATION*, *R_FREQ*) suggest that having established a closer relationship with the primary bank has a positive effect on the bank's lending attitude in times of crisis.

Finally, we examine (i) whether the effect of SBCS on the ex-post probability of default differs depending on a firm's ex-ante riskiness (ex-ante probability of default), and (ii) whether the detrimental effect of obtaining an SBCS loan from a non-primary bank on the lending attitude of the primary bank is attenuated if a firm has established a solid relationship with the primary bank. To do so, we re-estimate specifications (1) and (2) adding (i) interaction terms between the scoring dummy variables (*SC_DUM_PR* and *SC_DUM_NPR*) and *PD* in the *F_PD* regression, and (ii) interaction terms between the scoring dummy variables and the firm-primary bank relationship variables in the *R_ATTITUDE* regression. The results are presented in Table 5.

In the *F_PD* regression, the coefficient on *SC_DUM_PR * PD* is negative and significant, indicating that the improvement in *F_PD* for firms that obtained an SBCS loan from their primary bank is larger for observably riskier firms. In contrast, although statistically significant only at the 10 percent level, the coefficient on *SC_DUM_NPR * PD* is positive, indicating that the deterioration in *F_PD* for firms that obtained an SBCS loan from a non-primary bank is larger for observably riskier firms. That is, a non-primary bank is more prone to type II errors (extending loans that will

deteriorate) when it extends SBCS loans to observably riskier firms, presumably because non-primary banks adopt SBCS based on the cost-saving motive. On the other hand, SBCS loans by primary banks are immune to such errors, since they use scoring in order to evaluate the creditworthiness of borrowers more accurately.

In the *R_ATTITUDE* regression, the coefficient on *SC_DUM_NPR * R_FREQ* is negative and weakly significant. This suggests that if a firm meets frequently with its primary bank, the detrimental effect of obtaining an SBCS loan from a non-primary bank on the primary bank's lending attitude is attenuated. Interestingly, the coefficient on *SC_DUM_PR * R_FREQ* is also negative. A possible interpretation is that, for primary banks, screening and monitoring based on a scoring model and on-site inspection by a loan officer mutually reinforce each other in helping the bank to make more accurate credit decisions and thus contribute to an improvement in its lending attitude.[20]

5. 2. Treatment Effects Estimations

The empirical results in the previous section generally support Hypotheses 1 and 2 posited in Section 3. As noted above, however, simple linear regression models allow several causal interpretations. The positive correlation between the extension of SBCS loans by non-primary banks and an increased ex-post probability of default may be due to either slackness in ex-ante screening by the banks (ex-ante selection effect) reflecting the fact that they are likely to have adopted SBCS for the cost-saving motive, or slackness in interim monitoring after the SBCS loan has been extended (ex-post treatment effect). Similarly, the tightening in the lending attitude of primary banks toward firms that obtained SBCS loans from non-primary banks may occur as a result of a weakening in the

[20] In addition, the coefficient on *SC_DUM_NPR * PD* is positive and strongly significant. Firms obtaining an SBCS loan from a non-primary bank experience a worsening in *R_ATTITUDE*, if they are observably riskier firms.

firm-primary bank relationship after the scoring loan was provided (treatment effect). Alternatively, the tightening could simply reflect the fact that firms that obtained an SBCS loan from a non-primary bank did not have a close tie with the primary bank in the first place (selection effect).

To investigate whether the results obtained in Table 4 are due to the selection effect or the treatment effect, we implement propensity score matching estimation. To begin with, Table 6 shows the results of the probit estimations for the determinants of whether a firm obtains an SBCS loan from a primary (*S_DUM_PR*) or non-primary bank (*S_DUM_NPR*). Starting by looking at *LN_SALES* and *LN_FIRMAGE*, we find that the coefficients are negative, indicating that smaller and younger firms are more likely to obtain SBCS loans, either from a primary bank or a non-primary bank. This result is in line with the findings of previous studies such as Frame, Srinivasan, and Woosley (2001) and Cowan and Cowan (2006). Next, the positive coefficient on *PD* implies that SBCS loans are more likely to be extended to observably riskier firms. This is consistent with the point made by De Young, Glennon, and Nigro (2008) mentioned above that the adoption of SBCS may lead banks to take a more aggressive risk-taking stance. Turning to the firm-primary bank relationship variables, the positive coefficient on *R_DISTANCE* in the primary bank estimation indicates that the primary bank is more likely to extend an SBCS loan to a firm that is located farther away from the bank's branch. One possible explanation for this result is that primary banks use SBCS in order to complement soft information on borrower firms that are farther away and on which soft information thus may be less precise. The negative coefficient on *R_PRIMESHARE* in the non-primary bank estimation suggests that a firm is more likely to obtain an SBCS loan from a non-primary bank when it has a less intimate relationship with its primary bank as measured in terms of the primary bank's share in the firm's loans outstanding.

Based on the propensity scores obtained from the probit regression models above, we next

estimate the treatment effect for SBCS loans using kernel matching estimators.[21] We match each treated observation with the non-treated observations, each of which has its own weight that is proportional to the "closeness" to the treated observation, where "closeness" here is measured by the propensity scores.

The estimation results for the treatment effect are reported in Table 7. For each variable, there is an unmatched estimator and an average treatment effect on the treated (ATT) estimator, both of which are shown in the column labeled "Difference." For example, regarding the treatment effect of SBCS loans by a primary bank, in the "Unmatched" row for the variable *F_PD*, there are two values, one for the treatment group (firms that obtained an SBCS loan from a primary bank) and the other for the non-treated group (firms that did not obtain an SBCS loan). The former value (1.715) indicates that SBCS loan user firms' average probability of default after the crisis was 1.7 percent, whereas the latter (1.483) indicates that it was 1.5 percent for non-user firms. The difference between these two figures, 0.2 percentage points, is the unmatched estimate of the treatment effect as shown in the column labeled "Difference." In contrast to the result obtained in Table 4, the unmatched estimate of the treatment effect suggests that the ex-post probability of default for firms that obtained an SBCS loan from a primary bank is higher than that of firms without an SBCS loan, although the difference between the two is statistically insignificant. We should note, however, that the unmatched estimate of the treatment effect may well be driven by selection bias since ex-ante differences in terms of firm and bank characteristics between SBCS loan users and non-users possibly affect the difference in *F_PD*. By contrast, the ATT estimator takes into account the sample selection and gives us the treatment effect of SBCS. In the "ATT" rows, the value for the non-treated group in the "Unmatched" row is replaced by the value for the control group, in which the

[21] We also estimate the treatment effects for SBCS loans using different matching algorithms: 5-nearest matching and radius matching. The estimation results (not reported) in most cases are qualitatively the same as those of the kernel matching estimation and can be obtained from the authors upon request.

counterfactual firms are non-SBCS loan users with similar ex-ante characteristics as SBCS users. The difference between the value of “Treated” and “Controls” is -0.3 percentage points but is statistically insignificant. This suggests that the improvement in the ex-post performance of SBCS loan borrowers from primary banks that we found in the previous subsection (Table 4) is driven by the selection effect, that is, a reduction in type II errors due to effective screening. Table 7 further indicates that the treatment effect on *R_ATTITUDE* is also insignificant for firms that obtained SBCS loans from a primary bank.

Turning to the treatment effects of SBCS loans by non-primary banks, Table 7 shows that the treatment effects on both *F_PD* and *R_ATTITUDE* are positive and significant. The treatment effect on *F_PD* suggests that the ex-post performance of SBCS loan user firms deteriorated because the primary bank exerted less effective monitoring after these firms had obtained an SBCS loan from a non-primary bank. It may also be the case that the interim monitoring by a non-primary bank that had provided an SBCS loan was weak. The treatment effect on *R_ATTITUDE* indicates that the lending attitude of firms’ primary banks tightened after the provision of an SBCS loan by a non-primary bank.

6. Conclusion

This paper empirically examined the ex-post performance of SMEs that obtained SBCS loans, using a unique firm-bank matched dataset for Japan. The paper also examined whether firm-bank relationships were affected during the recent financial turmoil by the provision of SBCS loans by other banks. Moreover, our rich dataset allowed us to investigate whether (and how) the impact of SBCS loans differed depending on whether they were extended by a relationship or a transactional lender. The findings of the paper can be summarized as follows.

First, we find that a firm’s ex-post probability of default increased if the firm had obtained

an SBCS loan from a non-primary bank (transactional lender). The finding is consistent with the hypothesis that a transactional lender that adopts SBCS for the cost-saving motive is more prone to type II errors. Our analysis on the treatment effect of SBCS suggests that weakening monitoring activity by banks after SBCS loans were provided also played a role.

In contrast, we find that SBCS loans extended by a primary bank (relationship lender) were associated with a decrease in the ex-post default probability of user firms. The finding is consistent with the hypothesis that a relationship lender uses SBCS in order to augment the information set in assessing the creditworthiness of informationally opaque borrowers.

Third, we find that the lending attitude of a firm's primary bank in the midst of the recent financial crisis was adversely affected by the use of an SBCS loan if the loan was extended by non-primary banks. In contrast, we do not find such a detrimental effect for an SBCS loan provided by primary banks. These findings are also consistent with our hypothesis that a transactional lender and a relationship lender have different motives in adopting SBCS.

As far as we know, this is the first empirical analysis on the different use of SBCS by relationship and transactional lenders. Our analysis suggests that SBCS loans by a relationship lender are complementary to relationship-based loans and the lender uses the numerical credit score as one of many inputs in making a credit decision. In contrast, SBCS loans by transactional lenders seem to be genuinely transaction-based in that these lenders adopt SBCS for the cost-saving motive.

There are various possible extensions to our analyses. One would be to widen the time window for observing borrowers' ex-post performance. Currently, we only have a one-year window for analysis due to data limitations. As more data become available over time, we may be able to extend the window to several years and incorporate additional ex-post performance variables, including actual default rates. A second extension would be to examine more closely how banks determine their strategy of implementing SBCS. In this paper, we did not pay attention to the

composition of relationship-based SBCS loans and transaction-based SBCS loans within a bank. However, it may well be the case that at one bank, SBCS loans are mostly relationship-based, while at another bank, they are mostly transaction-oriented. Exploring the determinants of banks' SBCS strategies further represents an interesting topic for future research. Finally, the paper did not analyze the loan contract terms of SBCS loans, such as loan interest rates and collateral. However, our analysis on the different impact of SBCS loans by relationship lenders and by transactional lenders suggests that the loan contract terms of SBCS loans may also differ depending on the lender. Tackling this issue may reinforce the paper's findings and further expand our understanding of the nature of SBCS loans.

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Table 1: Definitions of Variables

Dependent variables	
F_ PD	Ex-post probability of default: annualized default rate within 3 years estimated using Moody's RiskCalc, based on the financial statement of the firm in year 2009.
R_ATTITUDE	Index variable indicating the change in lending attitude of a primary bank after September 2008: 1: better, 2: unchanged, 3: worse.
Use of small business credit scoring (SBCS) loans	
SC_DUM_PR	1 if a firm has SBCS loans outstanding from a primary bank, 0 otherwise.
SC_DUM_NPR	1 if a firm has SBCS loans outstanding from a non-primary bank, 0 otherwise.
Firm characteristics	
LN_SALES	Log of gross annual sales.
LN_FIRMAGE	Log of firm age.
PD	Ex-ante probability of default: annualized default rate within 3 years estimated using Moody's RiskCalc, based on the financial statement of the firm during March 2006 to December 2008.
OWNERS_HOLD	Share of equity holdings by business representatives.
INDUSTRY	Borrower industry dummy variable: 1: construction, 2: manufacturing, 3: wholesale and retail, 0: other.
REGION	Borrower dummy variable for region of headquarters: 1: Tokyo metropolitan area, 2: Chukyo metropolitan area, 3: Kinki metropolitan area, 0: other.
Bank characteristics	
BK_LN_ASSETS	Log of asset size.
BK_SHARE	Share of branches within the prefecture of a borrowing firm.
HERFINDAHL	Herfindahl index computed based on the shares of bank branches within the prefecture of a borrower firm, as of October 2007.
Firm-primary bank relationship	
R_LN_DURATION	Log of the number of years a borrower firm has been transacting with its primary bank.
R_FREQ	Index variable indicating the frequency of meeting between a borrower firm and its primary bank: 1: less than annually, 2: annually, 3: semi-annually, 4: once every 2-3 months, 5: monthly, 6: weekly, 7: daily, 0: no direct meeting.
R_DISTANCE	Index variable indicating the physical distance between a borrower firm and its primary bank's branch: 1: less than 500m, 2: 500-1,000m, 3: 1-10km, 4: 10-30km, 5: 30-50km, 6: 50km and more.
R_PRIMESHARE	Share of loans obtained from the primary bank to a firm's total loans.

Note: The dependent variables, *F_PD* and *R_ATTITUDE*, measure the ex-post performance of borrowing firms and the change in the lending attitude of their primary bank after the global financial crisis erupted. The independent variable *SC_DUM_PR/SC_DUM_NPR* indicates whether a firm has SBCS loans outstanding from a primary/non-primary bank as of February 2009. Firm variables are taken from the 2009 RIETI survey and firms' most recent financial statement, ranging from March 2006 to December 2008. *BK_LN_ASSETS* is as of the end of March 2008, while *BK_SHARE* and *HERFINDAHL* are calculated from "Nihon-Kinyu-Meikan 2008" (data as of October 2007). Relationship variables are constructed from the 2008 RIETI survey conducted in February 2008.

Table 2: Summary Statistics - SBCS Loan User Firms and Non-user Firms

This table presents summary statistics of variables used in the OLS estimations (Tables 4 and 5). Definitions of variables are provided in Table 1.

	All firms						Firms with SBCS loans			Firms without SBCS loans		
	N	Mean	SD	Min	Median	Max	N	Mean	SD	N	Mean	SD
Dependent variables												
F_PD	581	1.577	1.699	0.130	1.010	10.510	58	2.422	2.254	523	1.483	1.602
R_ATTITUDE	819	2.042	0.429	1.000	2.000	3.000	103	2.175	0.532	716	2.022	0.409
SBCS dummies												
SC_DUM_PR	819	0.076	0.265	0.000	0.000	1.000	103	0.602	0.492	716	0.000	0.000
SC_DUM_NPR	819	0.073	0.261	0.000	0.000	1.000	103	0.583	0.496	716	0.000	0.000
Firm characteristics												
LN_SALES	819	13.589	1.051	10.104	13.631	15.419	103	13.041	0.994	716	13.668	1.036
LN_FIRMAGE	819	3.505	0.525	1.099	3.638	4.663	103	3.295	0.527	716	3.535	0.519
PD	819	1.542	1.738	0.130	0.920	10.890	103	2.349	2.177	716	1.426	1.634
OWNERS_HOLD	819	0.642	0.350	0.000	0.720	1.000	103	0.719	0.287	716	0.631	0.357
INDUSTRY_1	819	0.286	0.452	0.000	0.000	1.000	103	0.350	0.479	716	0.277	0.448
INDUSTRY_2	819	0.245	0.431	0.000	0.000	1.000	103	0.146	0.354	716	0.260	0.439
INDUSTRY_3	819	0.286	0.452	0.000	0.000	1.000	103	0.311	0.465	716	0.282	0.450
REGION_1	819	0.179	0.384	0.000	0.000	1.000	103	0.272	0.447	716	0.166	0.373
REGION_2	819	0.095	0.294	0.000	0.000	1.000	103	0.058	0.235	716	0.101	0.301
REGION_3	819	0.127	0.333	0.000	0.000	1.000	103	0.107	0.310	716	0.130	0.336
Primary bank characteristics												
BK_LN_ASSETS	819	15.252	1.701	10.672	15.117	18.755	103	15.086	1.597	716	15.276	1.716
BK_SHARE	819	0.149	0.121	0.000	0.112	0.462	103	0.158	0.130	716	0.148	0.120
HERFINDAHL	819	0.115	0.067	0.037	0.103	0.292	103	0.122	0.070	716	0.113	0.067
Borrower-primary bank relationship												
R_LN_DURATION	819	3.087	0.824	0.000	3.401	4.605	103	2.891	0.824	716	3.115	0.821
R_FREQ	819	5.172	1.185	0.000	5.000	7.000	103	5.155	1.211	716	5.175	1.182
R_DISTANCE	819	2.683	0.898	1.000	3.000	6.000	103	2.728	0.782	716	2.676	0.914
R_PRIMESHARE	819	0.612	0.250	0.000	0.600	1.000	103	0.584	0.230	716	0.616	0.252

Table 3: Summary Statistics - Breakdown of SBCS Loan User Firms

This table presents the means and standard deviations of variables used in the OLS estimations (Tables 4 and 5) for firms that have obtained SBCS loans. Definitions of variables are provided in Table 1.

	SBCS loans from primary banks (*S_DUM_PR* =1)			SBCS loans from non-primary banks (*S_DUM_NPR* =1)			SBCS loans from both primary and non-primary banks (*S_DUM_PR* =1 & *S_DUM_NPR* =1)		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Dependent variables									
F_PD	35	1.715	1.290	33	2.846	2.749	10	1.348	1.523
R_ATTITUDE	62	2.113	0.483	60	2.267	0.548	19	2.263	0.452
SBCS dummies									
SC_DUM_PR	62	1.000	0.000	60	0.317	0.469	19	1.000	0.000
SC_DUM_NPR	62	0.306	0.465	60	1.000	0.000	19	1.000	0.000
Firm characteristics									
LN_SALES	62	13.059	0.986	60	13.059	0.958	19	13.158	0.831
LN_FIRMAGE	62	3.304	0.550	60	3.265	0.530	19	3.230	0.609
PD	62	2.391	2.354	60	2.031	1.818	19	1.479	1.519
OWNERS_HOLD	62	0.733	0.283	60	0.690	0.290	19	0.676	0.285
INDUSTRY_1	62	0.371	0.487	60	0.317	0.469	19	0.316	0.478
INDUSTRY_2	62	0.194	0.398	60	0.083	0.279	19	0.105	0.315
INDUSTRY_3	62	0.306	0.465	60	0.317	0.469	19	0.316	0.478
REGION_1	62	0.226	0.422	60	0.317	0.469	19	0.263	0.452
REGION_2	62	0.081	0.275	60	0.033	0.181	19	0.053	0.229
REGION_3	62	0.081	0.275	60	0.150	0.360	19	0.158	0.375
Primary bank characteristics									
BK_LN_ASSETS	62	15.036	1.568	60	15.214	1.649	19	15.326	1.676
BK_SHARE	62	0.178	0.137	60	0.139	0.126	19	0.163	0.153
HERFINDAHL	62	0.133	0.069	60	0.117	0.073	19	0.140	0.078
Borrower-primary bank relationship									
R_LN_DURATION	62	2.954	0.804	60	2.787	0.878	19	2.766	0.951
R_FREQ	62	5.226	1.122	60	5.133	1.228	19	5.316	0.946
R_DISTANCE	62	2.774	0.876	60	2.700	0.671	19	2.789	0.787
R_PRIMESHARE	62	0.630	0.228	60	0.515	0.200	19	0.515	0.165

Table 4: OLS Estimation Results for Ex-Post Performance of Firms and Lending Attitude of the Primary Bank

This table presents the OLS estimation results for *F_PD* (ex-post probability of default) and *R_ATTITUDE* (lending attitude of the primary bank). Definitions of the variables are provided in Table 1. ***, **, * indicate a significance level of 1, 5, and 10%, respectively.

	Dep. variable: *F_PD*				Dep. variable: *R_ATTITUDE*			
	Estimation method: OLS				Estimation method: OLS			
	Coef.	Std. Err.	t	P>t	Coef.	Std. Err.	t	P>t
SBCS dummies								
SC_DUM_PR	-0.459 **	0.223	-2.060	0.040	-0.028	0.057	-0.490	0.626
SC_DUM_NPR	0.816 ***	0.233	3.500	0.000	0.211 ***	0.059	3.610	0.000
Firm characteristics								
LN_SALES	-0.133 **	0.062	-2.150	0.032	0.018	0.017	1.030	0.305
LN_FIRMAGE	-0.004	0.128	-0.030	0.973	0.023	0.035	0.670	0.506
PD	0.719 ***	0.037	19.600	0.000	0.068 ***	0.009	7.460	0.000
OWNERS_HOLD	0.179	0.155	1.160	0.249	0.051	0.044	1.150	0.251
INDUSTRY_1	0.121	0.166	0.730	0.465	0.022	0.045	0.500	0.619
INDUSTRY_2	0.227	0.167	1.360	0.176	0.109 **	0.046	2.340	0.019
INDUSTRY_3	0.031	0.164	0.190	0.849	-0.009	0.044	-0.200	0.844
REGION_1	-0.102	0.180	-0.560	0.573	0.093 *	0.050	1.880	0.061
REGION_2	0.079	0.199	0.400	0.691	0.093 *	0.054	1.720	0.086
REGION_3	-0.050	0.173	-0.290	0.773	0.075	0.049	1.520	0.128
Primary bank characteristics								
BK_LN_ASSETS	-0.002	0.038	-0.060	0.955	-0.004	0.011	-0.350	0.723
BK_SHARE	0.929	0.605	1.540	0.125	-0.033	0.171	-0.190	0.846
HERFINDAHL	-2.257 *	1.209	-1.870	0.062	0.150	0.337	0.440	0.657
Borrower-primary bank relationship								
R_LN_DURATION	-0.076	0.084	-0.910	0.363	-0.037 *	0.022	-1.660	0.098
R_FREQ	0.079 *	0.045	1.770	0.078	-0.022 *	0.013	-1.690	0.091
R_DISTANCE	0.108 *	0.059	1.830	0.068	-0.004	0.017	-0.240	0.811
R_PRIMESHARE	0.060	0.212	0.280	0.778	-0.114 *	0.060	-1.910	0.056
Constant	1.840 *	0.990	1.860	0.064	1.857 ***	0.274	6.780	0.000
Number of observations	581				819			
Adj.-R^2	0.487				0.094			
Prob. > F	0.000				0.000			

Table 5: OLS Estimation Results for Ex-Post Performance of Firms and Lending Attitude of the Primary Banks with Interaction Terms

This table presents the OLS estimation results for *F_PD* (ex-post probability of default) and *R_ATTITUDE* (lending attitude of the primary bank) where each regression includes an interaction term of the SBCS loans dummy variables (*SC_DUM_PR*, *SC_DUM_NPR*) and the *F_PD* or firm-primary bank relationship variables (*R_LN_DURATION*, *R_FREQ*, *R_DISTANCE*, *R_PRIMESHARE*). Estimation results for other covariates are omitted. Definitions of the variables are provided in Table 1. ***, **, * indicate a significance level of 1, 5, and 10%, respectively.

[Primary Bank]

	Dep. variable: *F_PD*					Dep. variable: *R_ATTITUDE*				
	Estimation method: OLS					Estimation method: OLS				
	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
SBCS dummy and interaction terms										
SC_DUM_PR	0.117	-0.077	-0.094	-0.872	0.050	0.025	0.288	0.422	-0.180	0.108
PD	0.748 ***					0.071 ***				
R_LN_DURATION		-0.070					-0.031			
R_FREQ			0.084 *					-0.016		
R_DISTANCE				0.101 *					-0.008	
R_PRIMESHARE					0.050					-0.102 *
*SC_DUM_PR*PD*	-0.318 ***					-0.022				
*SC_DUM_PR*R_DURATION*		-0.129					-0.106			
*SC_DUM_PR*R_FREQ*			-0.072					-0.086 *		
*SC_DUM_PR*R_DISTANCE*				0.139					0.055	
*SC_DUM_PR*R_PRIMESHARE*					0.216					-0.214
Number of observations	581	581	581	581	581	819	819	819	819	819
Adj.-R^2	0.492	0.487	0.487	0.487	0.487	0.094	0.096	0.096	0.094	0.094
Prob. > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

[Non-primary Bank]

	Dep. variable: *F_PD*					Dep. variable: *R_ATTITUDE*				
	Estimation method: OLS					Estimation method: OLS				
	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
SBCS dummy and interaction terms										
SC_DUM_NPR	-0.429 *	0.592	-0.978	0.187	0.265	0.005	0.326 *	0.636 ***	-0.022	0.220
PD	0.699 ***					0.059 ***				
R_LN_DURATION		-0.080					-0.033			
R_FREQ			0.060					-0.015		
R_DISTANCE				0.101 *					-0.008	
R_PRIMESHARE					0.029					-0.113 *
*SC_DUM_NPR*PD*	0.218 *					0.098 ***				
*SC_DUM_NPR*R_DURATION*		0.078					-0.041			
*SC_DUM_NPR*R_FREQ*			0.344 *					-0.083 *		
*SC_DUM_NPR*R_DISTANCE*				0.229					0.087	
*SC_DUM_NPR*R_PRIMESHARE*					1.028					-0.017
Number of observations	581	581	581	581	581	819	819	819	819	819
Adj.-R^2	0.490	0.487	0.490	0.487	0.487	0.104	0.093	0.097	0.094	0.093
Prob. > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 6: Probit Estimation Results for the Determinants of SBCS loans

This table presents the probit estimation results for *S_DUM_PR* (SBCS loans from a primary bank) and *S_DUM_NPR* (SBCS loans from a non-primary bank). Definitions of the variables are provided in Table 1. ***, **, * indicate a significance level of 1, 5, and 10%, respectively.

	Dep. variable: *S_DUM_PR* Estimation method: Probit				Dep. variable: *S_DUM_NPR* Estimation method: Probit			
	Coef.	Std. Err.	z	P>z	Coef.	Std. Err.	z	P>z
Firm characteristics								
LN_SALES	-0.219 ***	0.084	-2.610	0.009	-0.311 ***	0.089	-3.480	0.001
LN_FIRMAGE	-0.292 *	0.166	-1.760	0.078	-0.292 *	0.167	-1.750	0.081
PD	0.091 **	0.037	2.490	0.013	0.082 **	0.040	2.030	0.043
OWNERS_HOLD	0.265	0.229	1.160	0.246	0.066	0.239	0.280	0.782
INDUSTRY_1	0.228	0.226	1.010	0.313	-0.159	0.208	-0.760	0.446
INDUSTRY_2	0.235	0.247	0.950	0.342	-0.520 *	0.269	-1.930	0.053
INDUSTRY_3	0.308	0.230	1.340	0.180	-0.051	0.204	-0.250	0.803
REGION_1	0.707 ***	0.241	2.940	0.003	0.781 ***	0.240	3.260	0.001
REGION_2	0.122	0.280	0.440	0.663	-0.064	0.367	-0.170	0.862
REGION_3	0.103	0.260	0.400	0.693	0.573 **	0.243	2.350	0.019
Primary bank characteristics								
BK_LN_ASSETS	0.013	0.056	0.240	0.812	0.020	0.054	0.370	0.708
BK_SHARE	0.917	0.840	1.090	0.275	-0.483	0.861	-0.560	0.575
HERFINDAHL	2.354	1.678	1.400	0.161	2.597	1.691	1.540	0.125
Borrower-primary bank relationship								
R_LN_DURATION	-0.018	0.115	-0.160	0.873	-0.027	0.110	-0.240	0.807
R_FREQ	0.091	0.066	1.380	0.167	0.100	0.067	1.490	0.136
R_DISTANCE	0.137 *	0.083	1.660	0.098	0.106	0.089	1.190	0.235
R_PRIMESHARE	-0.209	0.291	-0.720	0.473	-1.112 ***	0.312	-3.560	0.000
Constant	0.510	1.366	0.370	0.709	2.810 **	1.378	2.040	0.041
Number of observations	785				782			
Log likelihood	-193.8				-177.6			
Pseudo R^2	0.1162				0.1612			

Table 7: Treatment Effect Estimations for Ex-Post Performance of Firms and Lending Attitude of the Primary Bank

This table presents the estimation results for the treatment effects for *F_PD* (ex-post probability of default) and *R_ATTITUDE* (lending attitude of the primary bank) of SBCS loan users. Definitions of the variables are provided in Table 1. ***, **, * indicate a significance level of 1, 5, and 10%, respectively.

[Primary Bank]

Variable		Treated	Controls	Difference		S.E.	T-stat.
F_PD	Unmatched	1.715	1.483	0.232		0.277	0.84
	ATT	1.715	1.981	-0.266		0.236	-1.13
R_ATTITUDE	Unmatched	2.113	2.022	0.091	*	0.055	1.65
	ATT	2.113	2.077	0.036		0.065	0.56

[Non-primary Bank]

Variable		Treated	Controls	Difference		S.E.	T-stat.
F_PD	Unmatched	2.846	1.483	1.363	***	0.303	4.50
	ATT	2.846	1.801	1.045	**	0.490	2.13
R_ATTITUDE	Unmatched	2.267	2.022	0.244	***	0.057	4.31
	ATT	2.267	2.055	0.211	***	0.075	2.83