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Abstract

The question of whether more competition among banks increases relationship banking, which is predicted to improve credit availability for informationally opaque firms in theory, is a controversial issue in the banking literature. By using firm-level survey data in Japan, this paper provides evidence for the negative correlation between lending competition and the provision of relationship banking. This paper raises the question whether fierce interbank competition is always beneficial for small firms.

Key words: relationship banking, lending competition.
JEL classification code: G21; L11; L14; D82.

1   Introduction

The existing theories provide us with mixed conclusions about the impact of lending competition to relationship banking. In a number of theoretical studies that model relationship banking as the acquisition of borrower-specific information by banks, it is shown that the increase in the number of competing banks in a local lending market leads to a reduction in information acquisition by these banks. This is because the additional market share that can be captured by the information advantage over rival banks decreases, and, therefore, it is more difficult to recoup the investment cost for information acquisition when the number of rivals increases (Petersen and Rajan 1995; Hauswald and Marquez 2006). On the other hand, several studies that model relationship banking as a provision of borrower-specific consulting or monitoring services to improve the probability of success of their borrowers' projects show the possibility that a bank is more likely to provide such consulting or monitoring services as the number of competing banks increases in order to fend off the competitive pressure from outside banks (Boot and Thakor 2000; Dinç 2000; Yafeh and Yosha 2001; Marquez and Dell'Ariccia 2004).

Some researchers resort to empirical studies in order to answer the question of whether or not lending competition promotes relationship banking.   For example, Elsas (2005) and Degryse and Ongena (2007) find that the probability for a firm to maintain a long-term and broad-based relationship with a bank is U-shaped against the concentration measure in local lending markets in Germany and in Belgium, respectively.   However, Petersen and Rajan (1995) and Montreal-Garriga (2005) find evidence for the negative correlation between lending competition and relationship banking in the U.S.

Most of the empirical studies focus on the informational aspect of relationship banking by measuring its existence by the length of the relationship or by the breadth of the relationship including whether a firm purchases a particular type of bank product that generates an information advantage for the providing banks, such as checking account services. Although these measures of relationship banking are reasonable under the limited feasibility of data, we have to admit that these measures are indirect for measuring the information advantage over rival banks.   The present empirical study uses a more direct measure constructed from the firm-level information about whether a firm receives firm-specific consulting services from its main bank. By using this measure, we find that such consulting services are *more* likely to be provided in *less* competitive lending markets.

2 Data

Our unique dataset is constructed from the firm-level microdata collected from *the Survey of the Financial Environment of Enterprises* in October 2002 by the Japanese Small and Medium Enterprise Agency.   The survey targeted 15,000 non-agricultural private companies in Japan.   The targets were randomly sampled by industry, size class of capital, and number of employees from those registered with Tokyo Shoko Research, Ltd., one of the largest private credit reporting companies in Japan.   The response rate of the question that we used for our relationship measure was 59.4% (8,229 companies). Most of the sample companies were small or medium-sized enterprises that are not publicly traded.   The survey sought information from firms concerning the details of financing activities and financial environments, including the duration and scope of the relationship with a main bank.   The response from each firm was matched with its

financial statement when available.   It is also possible to match each observation with the economic conditions in the prefecture where the responding firm was located.   In our study, each of 47 prefectures is assumed to comprise a unit of a local lending market, according to the finding that the Japanese lending market is geographically segmented by prefecture (Ishikawa and Tsutsui 2006).

The survey contained a multiple-choice question about what services other than commercial loans firms received from their main banks.   Such additional services included advice about financial and management matters.   We interpret this advising service as a proxy for the customer-specific consulting service that is modeled in Boot *et al*. (2000) and others.   After sorting observations by prefecture, we calculate the ratio of firms that receive such consulting services from their main banks in each prefecture.   This serves as a measure of the likelihood of the existence of relationship banking in each local lending market.   We call this variable the *Ratio of Advised Firms*.

We used two measures of the intensity of lending competition in each prefecture: (1) The number of lending institutions that have at least one regular branch in each prefecture, *Number of Banks*; and (2) the Herfindahl index of the number of regular branches in each prefecture, *Herfindahl Index of Branches*.   We collect the number of branches of each financial institution in each prefecture as of March 2002[1] from the *Nihon Kin'yu Meikan* (the directory of Japanese financial institutions), published by Nihon Kin'yu Tsushin Sha.

To control for average firm characteristics in each prefecture that are predicted to have some impact on relationship banking in the literature, we included *Average Number of Employees*, the *Average Years of a Relationship with a Main Bank*, and the

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[1] We used the number as of April 2002 for Mizuho Financial Group, which merged in April 2002.

Average Age of a Firm in each prefecture into the explanatory variables in our regression analysis.

The descriptive statistics of these variables are listed in Table 1. Table 2 shows the correlation matrix among these variables. The correlation between the *Ratio of Advised Firms* and the concentration measures suggests that lending competition has a negative impact on relationship banking. The negative correlation between the lending-market concentration and the average firm size appears to reflect the fact that both firm size and the number of competing banks are larger in a metropolitan area. This point prompts suspicion that lending competition measures could work as proxies for firm size. However, the correlation between the average size of firms and the *Ratio of Advised Firms* is much smaller than that between the concentration measures and the *Ratio of Advised Firms*. Although this result suggests that the degree of lending competition is a more significant determinant of the likelihood of relationship banking, we provide formal regression analyses in the next section.

3   Regression Analysis

3.1   Baseline regression

Table 3 is the list of estimated coefficients when the *Ratio of Advised Firms* in each prefecture is regressed on various sets of explanatory variables. Since the dependent variable is a probability, we applied weighted least squares estimation with the weight equal to $\left(\hat{p}_i(1-\hat{p}_i)/n_i\right)^{1/2}$ ($\hat{p}_i$ is the estimated dependent variable in prefecture *i*, n_i is the number of observations in prefecture *i*), so as to adjust the heteroskedasticity inherent in a linear probability model. The coefficients of the *Herfindahl Index of Branches* are positive in all specifications and statistically significant in many of the

specifications even after controlling for average firm characteristics. The coefficients of the *Number of Banks* are negative in all specifications but statistically significant only in Specification (2), in which the average number of employees in each prefecture is controlled. The squared measures of these concentration measures do not have any significant coefficient (Specification (6)).

3.2 Differences between large and small firms

In constructing the variable, *Ratio of Advised Firms*, we used all observations, including larger firms with even over 10,000 employees. These larger firms are more likely to be listed on a stock market and comply with the strict information disclosure requirement and the internal governance requirement imposed by the regulator. Furthermore, many of these firms operate nationwide rather than locally. Therefore, these firms are not expected to receive advice from their main banks, and, if any, the probability for these firms to receive advice from banks is expected to be independent of local lending competition. Thus, the negative correlation between local lending competition and the likelihood of relationship banking is expected to be observed more clearly among smaller firms, such as those with fewer than 300 employees.[2]

To address this point, we split the data set into two groups by firm size, (1) fewer than 300 employees (7,521 firms) and (2) 300 or more employees (708 firms), and then recalculated the *Ratio of Advised Firms* in each prefecture. The estimated coefficients with each of these split dataset are listed in Table 4 for small firms and Table 5 for large firms. As expected, the regressions with the dataset constructed only from small firms show a negative correlation between local lending competition and relationship banking (Table 4), while the regressions with the dataset constructed only from larger firms do

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[2] The Small and Medium-sized Enterprise Act in Japan defines small and medium-sized manufacturers as those with fewer than 300 employees or with capital of less than 300 million JPY.

not show such a tendency (Table 5).

4 Conclusion

Thus, we found that local lending competition has a negative impact on banks' incentive to provide relationship banking, which entails customer-specific consulting services. This result is robust even after controlling for firm characteristics, and the negative impacts are more clearly observed in the sample that consists only of small firms that are dependent on a local lending market. This result raises the question whether fierce lending competition is always beneficial for borrowing firms and the social welfare.

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Table 1.　Data Description

(1) Definition

Variables	Definition
Ratio of advised firms	Ratio of firms receiving consulting service from a main bank in each prefecture.
Herfindahl index of branches	Herfindahl index of each prefecture calculated from the number of branches.
Number of banks	Number of banks that has at least a regular branch in each prefecture.
Average number of employees	Average number of employees of firms in each prefecture calculated from the obervations in the survey.
Average years of a relationship with a main bank	Average years of lending relationship with a main bank in each prefecture calculated from the observations in the survey.
Average age of a firm	Average firm age in each prefecture calculated from the observations

(2) Descriptive Statistics

Variables	# of obs.	Mean	S.D.	Min	Median	Max
Ratio of advised firms	47	0.144	0.066	0.000	0.133	0.370
Herfindahl index of branches	47	0.169	0.069	0.040	0.167	0.297
Number of banks	47	29.1	23.6	5	23	146
Average number of employees	47	101.28	72.716	39.108	83.157	452.82
Average years of a relationship with a main bank	47	27.4	3.2	19.4	27.3	33.2
Average age of a firm	47	30.4	2.8	20.7	30.6	36.0

Table 2.   Correlation Coefficients among Variables

Variables	1	2	3	5	6
1 Ratio of advised firms	1				
2 Herfindahl index of branches	0.281	1			
3 Number of banks (log)	-0.234	-0.870	1		
5 Average number of employees	-0.050	-0.614	0.732	1	
6 Average years of a relationship with a main bank	0.095	0.254	-0.233	-0.185	1
7 Average age of a firm	-0.088	-0.345	0.414	0.430	0.610

Table 3. Baseline Regression

Dependent Variable: Ratio of Advised Firms. Weighted least square estimation. *, **, *** indicate statistical significance at 10%, 5%, and 1%, respectively (two tailed test). The content of each parenthesis is the standard error of each estimated coefficient. The Herfindahl index and the number of banks are the difference from sample mean in the specification (6).

(1) Herfindahl Index of Branches

Variables	(1)	(2)	(3)	(4)	(5)	(6)
Herfindahl index of branches	0.1275	0.2667 **	0.1003	0.2215 **	0.2616	0.2566
	(0.0815)	(0.1161)	(0.0887)	(0.1019)	(0.1569)	(0.1649)
(Herfindahl index of branches)^2						-0.4437
						(1.7616)
Average number of employees		0.0001			0.0001	0.0001
		(0.0001)			(0.0001)	(0.0001)
Average years of a relationship with a main bank			0.0019		0.0009	0.0006
			(0.0024)		(0.0040)	(0.0042)
Average age of a firm				0.0034	0.0014	0.0021
				(0.0023)	(0.0044)	(0.0047)
Constant	0.1234 ***	0.0929	0.0773	0.0055	0.0301	0.0612
	(0.0102)	(0.0210)	(0.0604)	(0.0791)	(0.0835)	(0.0792)
Adjusted R^2	0.0305	0.0666	0.0212	0.0568	0.0378	0.0117
Number of observations	47	47	47	47	47	47

(2) Number of Banks

Variables	(1)	(2)	(3)	(4)	(5)	(6)
Number of banks (log)	-0.0070	-0.0365 **	-0.0043	-0.0157	-0.0365 *	-0.0391 **
	(0.0068)	(0.0142)	(0.0074)	(0.0094)	(0.0184)	(0.0186)
(Number of banks (log))^2						0.0129
						(0.0134)
Average number of employees		0.0002 **			0.0001 *	0.0001
		(0.0001)			(0.0001)	(0.0001)
Average years of a relationship with a main bank			0.0024		0.0006	0.0006
			(0.0024)		(0.0039)	(0.0039)
Average age of a firm				0.0034	0.0015	0.0013
				(0.0025)	(0.0042)	(0.0042)
Constant	0.1643	0.2452 ***	0.0907	0.0908	0.1857 **	0.0780
	(0.0269)	(0.0431)	(0.0798)	(0.0611)	(0.0909)	(0.0764)
Adjusted R^2	0.0013	0.1324	-0.0002	0.0319	0.0646	0.0634
Number of observations	47	47	47	47	47	47

Table 4. Regression with Small Firms (with fewer than 300 employees)

Dependent Variable: Ratio of Advised Firms. Weighted least square estimation. *, **, *** indicate statistical significance at 10%, 5%, and 1%, respectively (two tailed test). The content of each parenthesis is the standard error of each estimated coefficient. The Herfindahl index and the number of banks are the difference from sample mean in the specification (6).

(1) Herfindahl Index of Branches

Variables	(1)	(2)	(3)	(4)	(5)	(6)
Herfindahl index of branches	0.1827 **	0.3056 ***	0.1582	0.2084 **	0.2704 *	0.2552
	(0.0822)	(0.1023)	(0.0944)	(0.0884)	(0.1477)	(0.1570)
(Herfindahl index of branches)^2						-0.6917
						(1.5590)
Average number of employees		0.0011 *			0.0011 *	0.0013 *
		(0.0006)			(0.0006)	(0.0007)
Average years of a relationship with a main bank			0.0012		0.0015	0.0010
			(0.0023)		(0.0040)	(0.0042)
Average age of a firm				0.0021	-0.0003	0.0007
				(0.0026)	(0.0046)	(0.0049)
Constant	0.1116 ***	0.0419	0.0823	0.0451	0.0173	0.0447
	(0.0105)	(0.0368)	(0.0558)	(0.0816)	(0.0832)	(0.0785)
Adjusted R^2	0.0789	0.1313	0.0638	0.0719	0.0973	0.0756
Number of observations	47	47	47	47	47	47

(2) Number of Banks

Variables	(1)	(2)	(3)	(4)	(5)	(6)
Number of banks (log)	-0.0123 *	-0.0306 ***	-0.0095	-0.0142 *	-0.0266 *	-0.0390 **
	(0.0070)	(0.0102)	(0.0081)	(0.0076)	(0.0147)	(0.0172)
(Number of banks (log))^2						0.0129
						(0.0098)
Average number of employees		0.0016 **			0.0015 **	0.0010
		(0.0007)			(0.0007)	(0.0008)
Average years of a relationship with a main bank			0.0017		0.0017	0.0012
			(0.0024)		(0.0040)	(0.0040)
Average age of a firm				0.0018	-0.0009	-0.0002
				(0.0027)	(0.0045)	(0.0045)
Constant	0.1788 ***	0.1701 ***	0.1250	0.1316 *	0.1397 *	0.0671
	(0.0273)	(0.0268)	(0.0824)	(0.0743)	(0.0812)	(0.0767)
Adjusted R^2	0.0441	0.1324	0.0323	0.0319	0.0971	0.1133
Number of observations	47	47	47	47	47	47

Table 5. Regression with Large Firms (with more than 300 employees)

Dependent Variable: Ratio of Advised Firms. Weighted least square estimation. *, **, *** indicate statistical significance at 10%, 5%, and 1%, respectively (two tailed test). The content of each parenthesis is the standard error of each estimated coefficient. The Herfindahl index and the number of banks are the difference from sample mean in the specification (6).

(1) Herfindahl Index of Branches

Variables	(1)	(2)	(3)	(4)	(5)	(6)
Herfindahl index of branches	0.0485	-0.0234	-0.0403	-0.0716	-0.2499	-0.3997
	(0.2577)	(0.4180)	(0.2584)	(0.2508)	(0.4474)	(0.6632)
(Herfindahl index of branches)^2						-1.4728
						(7.1713)
Average number of employees		-3.3E-06			-2.8E-05	-2.8E-05
		(4.3E-05)			(4.9E-05)	(5.8E-05)
Average years of a relationship with a main bank			-0.0018		-0.0028	-0.0031
			(0.0027)		(0.0025)	(0.0027)
Average age of a firm				-0.0021	0.0012	0.0027
				(0.0031)	(0.0049)	(0.0051)
Constant	0.1856	0.1953	0.2576 **	0.2973 *	0.2926	0.1931
	(0.0225)	(0.0843)	(0.0993)	(0.1527)	(0.2637)	(0.2421)
Adjusted R^2	-0.0247	-0.0525	-0.0405	-0.0376	-0.0654	-0.0863
Number of observations	41	41	39	41	39	38

(2) Number of Banks

Variables	(1)	(2)	(3)	(4)	(5)	(5)
Number of banks (log)	-0.0037	-0.0012	-0.0001	-0.0096	0.0046	0.0302
	(0.0178)	(0.0402)	(0.0188)	(0.0202)	(0.0409)	(0.0674)
(Number of banks (log))^2						-0.0187
						(0.0301)
Average number of employees		-6.9E-07			-1.3E-05	-7.8E-06
		(6.0E-05)			(5.9E-05)	(6.2E-05)
Average years of a relationship with a main bank			-0.0019		-0.0027	-0.0028
			(0.0027)		(0.0026)	(0.0027)
Average age of a firm				0.0029	0.0021	0.0028
				(0.0049)	(0.0051)	(0.0052)
Constant	0.2051	0.1949 *	0.2576	0.0940	0.1852	0.1697
	(0.0785)	(0.1082)	(0.1404)	(0.2173)	(0.2417)	(0.2490)
Adjusted R^2	-0.0245	-0.0524	-0.0408	-0.0427	-0.0778	-0.1032
Number of observations	41	41	39	40	39	38