SME financing and the choice of lending technology in Italy: complementarity or substitutability?

Francesca Bartoli[*], Giovanni Ferri[**], Pierluigi Murro[***], Zeno Rotondi[****]

Abstract

This paper investigates SME financing in Italy. The literature distinguishes between two main different lending technologies (LTs) for SMEs: transactional and relationship LTs. We find that banks lend to SMEs by using both LTs together, independently of the size and proximity of borrowers. Moreover, we show that when soft information is taken into account in transactional (relationship) lending it increases (decreases) the probability of firms being credit rationed. These results support the view that LTs can be complementary, but reject the hypothesis that substitutability among LTs is somehow possible for outsiders by means of hardening of soft information.

Keywords: Lending technologies, bank-firm relationship, soft information, hard information, small business finance
JEL Classifications: G21, G30, O16

1. Introduction

Among academics and policymakers there is a clear perception that small and medium-sized enterprises (SMEs) lack adequate financing and need to receive special assistance (see, e.g., Vos et al., 2007). Banks lend to SMEs by means of a variety of technologies. Berger and Udell (2006) define a lending technology as a unique combination of primary information source, screening and underwriting policies/procedures, loan contract structure, and monitoring strategies/mechanisms. As different banks use different lending technologies, for any borrowing enterprise choosing the bank amounts to selecting the lending technology it will be facing. Accordingly, this choice is a key component for the strategy of any enterprise, even more so for SMEs that usually rely on one or just a few bank rapports. Among the various lending technologies used to finance SMEs, the literature has thus far focused mostly on two classes: transaction-based lending technologies and relationship lending technologies. These two classes can be primarily distinguished by means of the type of information a bank uses in granting and monitoring the loan. Transaction-based lending technologies are typically based (primarily) on hard quantitative information (e.g. those derived from the borrowers' balance sheets and/or the collateral guarantees they offer), while instead relationship lending assigns a key role to soft information (difficult to codify qualitative information obtained via personal interaction/acquaintance). Because of this, the academic literature views the transaction lending technology as more desirable for relatively informationally transparent firms,

[*] UniCredit Group, Head of Family & SME Analysis, Territorial Research and Strategies; e-mail: francesca.bartoli@unicredit.eu; [**] Full professor of Economics, University of Bari; e-mail: g.ferri@dse.uniba.it; [***] Luiss University; e-mail: pmurro@luiss.it; [****] UniCredit Group, Head of Territorial Research & Strategies; e-mail: zeno.rotondi@unicredit.eu; (Corresponding author). The views put forward in the paper belong exclusively to the authors and do not involve in any way the institutions of affiliation. Pierluigi Murro gratefully acknowledges financial support from UniCredit and University of Bologna, Research Grant on Retail Banking and Finance.

while judging the relationship lending technology to be more appropriate for comparatively opaque firms (suffering more intense asymmetries of information).

The aim of this paper is to shed new light on the characteristics of lending technologies that Italian banks use to finance SMEs. A recent strand of literature suggests that relationship lending is not the only way in which banks can extend financing to SMEs and that banks are increasingly engaging in SME financing via different transactional technologies that facilitate arm's-length lending (see, e.g., Berger and Udell, 2006; de la Torre et al., 2010). For these reasons, in the first part of the empirical analysis we study the specific features and the diffusion of lending technologies that appear to be more widespread vis-à-vis SMEs. In particular, we check whether there is complementarity among lending technologies. To address these issues, we use a novel component of survey micro-data allowing us to learn the lending technology used by the firm's main bank. The data refer to the end of 2006 and come from the Tenth Survey of Italian Manufacturing Firms (SIMF) run by UniCredit Group. The results seem to indicate that a sort of complementarity is present. In fact, the firms obtain bank loans through different technologies. Such complementarity makes it difficult to identify the determinants of using a lending technology as an alternative to the others.

The second part of the analysis addresses the role of soft information in the Italian banking market. Petersen (2004) conjectures that transactional lenders might be able to "harden" soft information to boost their local competitive behavior and allow them to compete more aggressively outside core markets. In contrast with predictions in the literature,[1] Uchida et al. (2012) suggest that loan officers at large banks appear to be capable of producing as much soft information as they do at small banks.

We investigate the impact of soft information on the probability that a firm is credit-rationed, depending on the lending technology employed by the firm's main bank. The results show that soft information lowers (raises) the probability of rationing if the firm's main bank uses relationship (transactional) lending technologies. The implications of these findings are twofold. First, the way soft information becomes embodied in the lending decision might still differ between relational vs. transactional technologies. Second, substitutability among LTs for outsiders by means of hardening of soft information might be rather unfeasible.

The paper is structured as follows. Section 2 briefly discusses the literature on lending technologies. Section 3 presents the dataset, as well as the methodology we use to construct the variables employed. Sections 4 presents the empirical evidence on lending technologies and the role of soft information. Section 5 concludes.

2. Related literature

There is growing literature on the lending technologies that banks use to finance SMEs. The empirical research tried to test the results derived from the theoretical models. In particular, several papers have analyzed – in various countries – the impact "relationship lending" has on the financing of SMEs. For the US, Cole (1998) finds that a lender is less

[1] A large strand of the literature suggests that more hierarchical banks (such as large and foreign banks) are relatively less capable of processing and quantifying soft information and transmitting it through the channels of large/complex organizations (Berger at al., 2001; Stein, 2002).

likely to grant credit to a firm if the customer relationship has lasted for one year or less, or if the firm deals with other financial counterparts. On data for Italy, Angelini et al. (1998) find that the intensity of "relationship banking" reduces the probability that borrowing firms will be rationed, even though the lending rates charged by the banks tend to increase as the bank-firm relationship lengthens. For Belgian enterprises, Degryse and Van Cayseele (2000) detect the impact relationship banking along two different dimensions: borrowing rates increase as the bank-firm relationship lengthens, while borrowing rates decrease when the scope of the bank-firm relationship – defined as the purchase of additional information intensive services (other than the loan) – increases.

Recently, both the theoretical and the empirical strands of the literature analyze also the transaction-based lending technologies. Often, the literature has used the transaction lending label for any type of loan based on information that is easily verifiable by outsiders. Instead now some authors underline that transaction lending is not a single homogeneous lending technology but should be separated into a number of distinct transaction technologies used by financial institutions. Berger and Udell (2006) suggest that transactions technologies include financial statement lending, small business credit scoring, asset-based lending, factoring, fixed-asset lending, and leasing. The authors briefly define and describe each of the lending technologies, highlight its distinguishing features, and show how the technology addresses the opacity problem. Each technology is distinguished by a unique combination of the primary source of information, screening and underwriting policies/procedures, structure of the loan contracts, and monitoring strategies and mechanisms.

Also the empirical literature tries to explain the characteristics of each technology. A number of studies focuses on each individual technology in isolation. For example, Berger and Frame (2007) study credit scoring and Udell (2004) asset-based lending. However, most of these studies focus on one lending technology only disregarding the other technologies. Differently from these studies, Uchida et al. (2006), utilizing survey micro-data on Japanese SMEs, tested the importance of the various lending technologies proposed by Berger and Udell (2006). The authors find there is complementarity among lending technologies. This result suggests that the bank, though possibly preferring one of them, might be using also (some of) the other lending technologies in unison. de la Torre et al. (2010) find that SMEs are a strategic sector for most banks, including large and foreign banks, not just small and niche banks. Furthermore, they suggest that relationship lending is not the only way in which banks can extend financing to these firms. Banks are increasingly applying to SME financing different transactional technologies.

Although the literature generally distinguishes the lending technologies on the basis of the type of information which is exchanged between the firm and the bank, only few papers try to study in detail what is meant by hard and soft information. According to Petersen (2004) hard information is quantitative, easy to store and transmit in impersonal ways, and its content is independent of the collection process. Instead, soft information is qualitative, often communicated in text, and so not easy to store. Also, soft information contents depend on the collector of the information. This is why soft information is gathered personally and the decision maker is the same person as the information collector. That's why, according to Stein (2002), smaller less hierarchical banks are better able to use soft information in their decisions.

The distinction among lending technologies derives from the idea that there are two types of production functions using distinct inputs: hard and soft information. However, the nature of information is not exogenously fixed. In fact, the lenders practices recently show us that it may be possible to change the nature of information. For example, Frame et al. (2001) find that credit scoring is associated with an increase in the portfolio share of U.S. small-business loans, reducing information costs between borrowers and lenders. Moreover, Berger et al. (2005) show results consistent with the hypothesis that the use of credit scoring increases SME credit availability (in particular for relatively risky credits).
Albareto et al. (2008), reporting the results of an Italian survey conducted by the Bank of Italy in 2007, illustrate that medium and large banks do use soft information (like qualitative information on the firm's governance) in their credit scoring models. Finally, another example of a change in the nature of information is group lending, such as Mutual Guarantee Institutions (MGIs). Columba et al. (2010) and Bartoli et al. (2012) suggest that banks, especially large ones, appreciate this kind of lending technology in order to lend to SMEs. They find that MGIs, through peer monitoring and joint responsibility, help banks to mitigate SMEs' asymmetric information problems.

3. Data and empirical model

3.1 Methodology

We model the complementarity among lending technologies as:

$$y_i = \alpha_1 z_i + x_i \delta_{11} + u_i \,. \qquad (1)$$

where y_i is the lending technology used to finance firm i, z_i is the vector of control variables, x_i accounts for the presence of relationship lending and u_i is the vector of heteroskedastic-robust standard errors.
As shown in Table 4, lending technologies are highly correlated with each other, revealing a simultaneity in their choice. It is then possible that the results are affected by endogeneity problems. To account for endogeneity in estimating the interaction between transactional lending and relationship lending technologies, we use an instrumental variable (IV) approach. We define a vector of instrumental variables that are correlated with the explanatory variable x_i, but are uncorrelated with the error term u_i. The effect of these instruments on x_i is captured by the parameters in the following equation:

$$x_i = \alpha_2 z_i + w_i \delta_{21} + v_i, \qquad (2)$$

where z_i is the vector of control variables and x_i is the endogenous variable in (1), w_i is the vector of instruments and v_i is the stochastic error term. We estimate the model in (1)-(2) with the two-stage least squares (2SLS) technique.
To ensure the validity of the chosen instruments we must perform diagnostic checks. First of all, to be a good instrument, an excluded exogenous variable must be sufficiently correlated with the included endogenous regressor and orthogonal to the error term. The assumption of correlation is tested with an F-test of the excluded instruments that corresponds to Shea's (1997) "partial R-squared" measure of instrument relevance, taking intercorrelations among instruments into account. In turn, the assumption of

orthogonality to the error term is tested using the Hansen-Sargan overidentification test. Tests of overidentifying restrictions actually check also whether the equation is misspecified, meaning that one or more of the excluded exogenous variables should be included in the structural equation. Hence, a rejection of the Hansen-Sargan overidentification test can be interpreted as either having invalid instruments and/or incorrect model specification. We finally report a test of endogeneity for the instrumented variable, in order to check whether the variable presumed to be endogenous in the OLS model could instead be treated as exogenous. If the null hypothesis of exogeneity cannot be rejected, then the OLS estimator is more efficient, and should be used instead.[2]

3.2 Data

Our main data source is the Tenth Survey on Italian Manufacturing Firms (SIMF), run by the UniCredit banking group in 2007. Every three years this survey gathers data on a sample of Italian manufacturing firms having more than 10 employees. The 2007 wave consists of 5,137 enterprises. All the firms with more than 500 employees are included, while those having a number of employees in the range 11 to 500 are sampled according to a stratified selection procedure based on their size, sector, and geographic localization. The main strength of this database is the very detailed information it collects on individual firms. In particular, the 2007 wave features information regarding the firm's: a) ownership structure; b) number and skill degree of employees; c) attitude to invest in R&D and whether it has made innovations; d) extent of internationalization and exports; e) quality of the financial management and relationships with the banking system. This information refers to the three years previous to the survey year, in our case 2004-2006.

The firms in the sample cover approximately 9% of the reference universe in terms of employees and about 10% in terms of value added. Tanks to its stratification, the sample is highly representative of the economic structure of Italian manufacturing. Table 2 presents some descriptive statistics. At the mean, the surveyed firms have been in business for 22 years; beyond 60% of them have fewer than 50 employees (below 4% of the firms have more than 500 employees); 70% of them are localized in the North. Only 1% are listed in the Stock Exchange, while 37% have their profit/loss and financial statements certified by external auditors. As to sector specialization, almost half of the enterprises belong to traditional sectors, according to the Pavitt classification, while only 5% have their business in the high tech sectors.

Moving on their financial set up, the average length of the relationship with the main bank is 17 years; 49% of the firms have a national bank as their main banking counterpart, 10% entrust a larger-sized cooperative bank, 7% feature a savings bank as their main bank, 5% entrust a smaller-sized cooperative mutual bank, while 28% of the firms have another type of bank as their main bank. Finally, there is extensive multiple banking: on average firms have five banks and the share of loans obtained from the main bank is 32% of the total banking loans received.

[2] Under the null hypothesis that the specified endogenous variable can actually be treated as exogenous, the test statistic is distributed as a chi-squared with a number of degrees of freedom equal to the number of variables tested. The endogeneity test is implemented like the C statistic, defined as the difference of two Hansen-Sargan statistics: one for the equation with the smaller set of instruments, where the suspect variable is treated as endogenous, and one for the equation with the larger set of instruments, where the suspect variable is treated as exogenous. Under conditional homoskedasticity, this endogeneity test statistic is numerically equal to the Hausman test statistic (see Hayashi, 2000).

Particularly relevant for our analysis, the 2007 wave of the survey features a peculiarity with respect to the previous waves. Specifically, an entirely new set of questions (partly inspired by an analogous detailed survey on SME financing run in Japan, see Uchida et al. 2012) are specifically tailored to investigate in depth the relationship between the firm and its main bank. In this paper we focus particularly on two questions where the firm is asked to state which of the characteristics – choosing from a given list – have been important in the firm's selection of its main bank, as well as stating which characteristics, in the firm's view, best describe the way its main bank grants credit. Unsurprisingly, given the fact that answering this section of the survey was relatively more time-consuming, only one third of the surveyed enterprises (exactly 1,541 firms) answered these questions. We cannot rule out self-selection. In other words, it is possible that the choice by a firm to answer this part of the questionnaire was not random.
For the analysis, we also use data from other sources (see the Appendix for details on the variables). We employ data made available by the Bank of Italy on the presence of banks in local markets. We use data provided by the Italian National Statistics Office (ISTAT) on civil suits and population per judicial district, as well as on the value added and population of provinces. Finally, we employ data on social capital by Guiso et al. (2004a).

3.3 Lending technology indices

Our first aim is to investigate the complementarity among lending technologies in Italy. We consider four indicators of lending technology similar to those in Uchida et al. (2006). The indices are constructed to represent to what extent the relevant loans have characteristics of different lending technologies. We capture these characteristics inspecting the answers to the question "*In your view, which criteria does your bank follow in granting loans to you?*". In answering this question the firm was required to give a weight (going, in descending order, from 1, very much, to 4, nil) to fifteen factors (see the Appendix). Most of these factors are related to one of the lending technologies. We then link the factors that we believe to be most closely associated with each lending technology based on the Berger and Udell (2006) classification scheme. For reason of comparability of our results with those in Uchida et al. (2006), we focus only on four lending technologies from this classification.[3]
First, *financial statement lending*, is a transactions technology based primarily on the strength of a borrower's financial statements. Berger and Udell (2006) hypothesize that banks underwrite commercial loans using the financial statement lending technology for firms with a strong financial condition based on an assessment of verified (i.e., audited) financial statements. From the list of fifteen criteria shown in the Appendix, we use the initial four. These factors (financial solidity, profitability, growth of sales and ability of the firm to repay its debt) represent qualities that are best assessed by an analysis of the firms' audited financial statements. From these four factors we created the financial statement lending index, *LT_FS*, by calculating the average of the four dummy variables which take a value of one if the firm answered 1 (very much) to the four relevant lending factors, respectively. The virtue of using an average index is that it can be directly

[3] As mentioned above, Berger and Udell (2006) list six *transaction-based lending* technologies: (i) financial statement lending, (ii) small business credit scoring, (iii) asset-based lending, (iv) factoring, (v) fixed-asset lending, and (vi) leasing, together with *relationship lending*.

compared with the other (averaged) indices, as we explain below, since all the indices are constructed from dummy variables and thus take a value in the [0,1] range.[4]

Next, we focus on fixed-asset lending. Fixed-asset lending technologies involve lending against assets that are long-lived and are not sold in the normal course of business (e.g., equipment, motor vehicles, or real estate). The factors that are related to fixed-asset lending are items 5, 6 and 8. Keeping the distinction in Uchida et al. (2006), we make a clear difference between *real estate lending* and *other fixed-asset lending*, and so we construct two indices. The first, *LT_RE*, is a dummy variable that takes the value one if the firm answered 1 (very much) to lending factor no. 5. Second, *LT_OF*, is an *average* of the two dummy variables which take a value of one if the firm answered 1 (very much) to lending factors no. 6 and 8, respectively.[5] Indeed, as a robustness check, we aggregate the three transactional lending technologies in a single index (we label it *LT_TRANS*).[6] We take the three transactional lending technologies as well as the aggregated index as the endogenous variable.

Finally, as the key explanatory variable, we consider the *relationship lending* technology. Under relationship lending, the financial institution relies primarily on soft information gathered through contact over time with the SME, its owner and the local community to address the opacity problem. We construct the *relationship lending* index, *LT_RL*, using the factors that seem most related to soft information accumulation by banks through close relationships. The index is an average of six dummy variables which take a value of one if the firm answered 1 (very much) to lending factors, no. 9, 10, 11, 13, 14 and 15, respectively.

These indices are not likely to be perfect proxies for the use of different lending technologies, since they are based on the borrowers' perception of the lending factors used by the bank in underwriting its loans, and thus may not be precisely capturing the banks' screening process. However, constructing these indices has some advantages. We manage to perceive the actual features of the bank (in the firm's view) at the time the firm is asked. No such information was available in the prior literature.

Comparing across the various lending technology indices, we first ascertain which one is more widespread. Then, bearing in mind the results in Uchida et al. (2006) referred to the Japanese market, we analyze the degree of complementarity among the various technologies, by looking at the correlation among the indices as well as via multivariate regressions of the indices.

Let us consider first the relative importance of each lending technology individually, by directly comparing the magnitude of the corresponding index together with the dummy variables constituting the index. Table 2 shows also the summary statistics of these variables. The lending factors related to financial statement technology are relatively more frequently emphasized, so the index of financial statement technology is the largest among the four indices. Thus shows this is the most frequently used lending technology,

[4] We also conducted preliminary analysis using the *first principal component* of the principal component analysis over the dummy variables. Because the results were qualitatively the same, and because we cannot easily compare these indices with each other, we only report results with the averaged indices.

[5] Note that the basic technology used in real estate lending and other fixed-asset lending is the same, and the distinction is solely based on the type of collateral.

[6] This index is an average of seven dummy variables which take a value of one if the firm answered 1 (very much) to lending factors, no. 1, 2, 3, 4, 5, 6 and 8, respectively. In Table 2 we report the partial correlation between *LT_TRANS* index and *LT_RL* index.

a result that is robust also for each bank type.[7] The relationship lending index is the second most important index, followed by the real estate lending index. The other fixed-asset lending is the least frequently used lending technology. However, the presence of a ranking in the use of lending technologies does not rule out the possibility of complementarity. In fact, it can be reasonably argued that different technologies require screening and monitoring processes that are similar in nature and in intensity, so that these may be used in tandem instead of being strictly distinct from each other.

3.4 Credit rationing and soft information

In the second part of the empirical analysis we address the role of soft information on the probability that a firm is credit-rationed, depending on the lending technology employed by the firm's main bank. To define our indicator of credit rationing, we use firms' answers to three questions of the survey. The questions are:

1. In 2006 would your firm have wished a larger amount of loans at the prevailing interest rate agreed with the bank?
2. In 2006, did the firm demand more credit than it actually obtained?
3. To obtain more credit, were you willing to pay a higher interest rate?

The variable of credit rationing is a dummy variable taking value one if the firm answers yes to the first question and to at least one of the other two, and zero otherwise.

In order to construct a proxy variable for the use of soft information we consider a methodology similar to that used in Scott (2004) and Uchida et al. (2006). We use the question of the Survey: "Which characteristics are key in selecting your main bank?". In answering this question the firm was required to give a value, with descending order of importance, from 1 to 4 to fourteen factors (see the Appendix for the details on this question). We focus on the following characteristics:

a. The bank knows you and your business.
b. Frequent contacts with the credit officer at the bank.

The variable Soft is a dummy variable that takes value one if the firm chose the highest value for both the above characteristics a and b, and zero otherwise.

3.5 Control variables

In this section, we discuss the other variables included in the regressions. We first classify banks into two types: large banks and local banks. The variable for large banks, is a dummy that takes value one if the main bank is a national bank or a foreign bank, whereas the variable for local banks, is a dummy taking value one if the main bank is smaller-sized mutual bank, larger-sized Volksbank type cooperative bank, a saving bank or "other type of bank".

[7] The level of *LT_FS* is 0.192 for the firms for which the main bank is either a national bank, 0.214 for those whose main bank is a foreign bank, 0.166 for those whose main bank is a larger-sized cooperative bank, 0.2 for those whose main bank is saving bank, and 0.23 for those whose main bank is smaller-sized cooperative mutual bank. The rankings among the four indices are the same even if we compare by bank type, except for national bank, where the relationship lending index is the lowest.

We use different variables to represent firm characteristics as controls: the age of the firm; the logarithm of the number of employees, as a proxy for size; a dummy variable that takes value one if the firm is a corporation; and the degree of financial leverage, given by the ratio of total loans to the sum of the total loans and the firm's assets. We control also for the firm's geographic localization, defining two dummies for whether a firm is located in the Center or in the South of Italy, and its sector based on a two-digit ATECO sectors.

Finally, we insert some variables describing the characteristics of the local economy: the average value of the Herfindhal-Hirschman index of concentration on bank loans in the province during 1991-2004 period; the average number of branches per thousands inhabitants in the province during 1991-2004 period in the province; the GDP pro capita in the province in 2004; the length of the first-degree trial by the courts located in the province in 2004; the provincial level of social capital as measured in Guiso et al. (2004a).

In addition to the control variables used in the fist part of the analysis, we consider: the length of the firm-main bank relationship; the share of the loans the firm receives from its main bank relative to firm's total loans; the permanence of the loan officer in the same branch, also with regards to the main bank; the presence of external certifications of firms' statements; the firm's profitability as measured by the average value of the firm's return on assets in the 2004-2006 period. Finally, we distinguish whether the firm has a five, four, three digit according to the ATECO classification and we add dummies for ATECO three and four digit.

3.6 Instruments

To implement our empirical model we need an appropriate set of instruments for the relationship lending index. The first instrumental variable is the number of branches per thousand inhabitants in the region in 1936. This variable describes the banking market in 1936, when a strict entry regulation that virtually froze Italy's banking structure for several decades was introduced: Guiso et al. (2004b) have used this instrument to account for endogeneity in the case of a local banking development indicator, taken as a regressor in a firm's growth equation. Since the use of the relationship lending technology is arguably related to banking development, we use the same instrument. Furthermore, following Herrera and Minetti (2007), we use the annual number of branches created by incumbent banks net of branch closed per thousand inhabitants in the province where the firm is headquartered, taking the average in 1991-2004.[8] Since the number of provinces rose from 95 to 107 over 1991-2006, we impute data on firms headquartered in new provinces referring to their original province. Until the liberalization process in the 1980s, the regulation directly constrained the opening of new branches in the local market, with variable tightness across provinces. Then, the number of branches created plausibly reflects the local tightness of regulation, as well as the banking concentration process. Finally, we construct a new instrument that considers the average permanence of branch managers in banks headquartered in the province in 1992. The idea is that lending technologies are influenced by banks' organizational models, and in particular by the

[8] For a detailed discussion on the justification of these instruments, see Herrera and Minetti (2007) and Minetti et al. (2011).

permanence of branch managers, which in turns affects banks' capability of gathering soft information.

4. Findings

4.1 Complementarity among lending technologies

To study the complementarities between lending technologies we run some multivariate regression models among the indices. In particular, we examine four different specifications, considering as dependent variable each component of transaction-based lending separately and an aggregate index.[9] Table 4 reports the results. The main explanatory variable is the bank's use of relationship lending. In all the four cases, the estimated coefficient for relationship lending is positive and significant at less than the 1% level. Specifically, taking into account the magnitude of the coefficients, relationship lending results more closely tied with financial statement lending (0.71) than with the two fixed-asset lending technologies (real estate and other fixed-asset, both with a coefficient of 0.59). If we consider the transaction-based lending technologies in aggregate, the value of the coefficient is 0.66.

To control for endogenity problems we re-estimate with 2SLS model using the generalized methods of moments (GMM). Results are reported in Table 5. The estimates confirm the complementarity between relationship lending and transaction-based lending considered in aggregate and in each single component. In particular, the estimated coefficient of relationship lending is positive and significant at less than the 5% confidence level with respect to transaction-based lending taken as aggregate and "other-fixed asset" lending; it is positive and significant at less than 10% confidence level with respect to "financial statement" lending and "real estate" lending.

Regarding the diagnostic tests, the *F*-test of excluded instruments confirms at 5% significance level that the instrumental variables considered are correlated with the endogenous regressor, even if the value of the *F*-statistic is relatively small.[10] Second, the result on the χ^2-statistic on the Hansen-Sargan overidentification states that the null of either having invalid instruments and/or incorrect model specification can be rejected. However, the test of endogeneity for the instrumented variable fails to reject the null that the Relationship lending variable could be treated as exogenous in the OLS estimation. Hence, the results of this test do not support the need for an IV approach.

To check that our findings are robust we split the sample by the type of main bank. Our aim is to investigate whether the contemporaneous use of transaction-based lending and relationship lending is a phenomenon that characterizes smaller-sized/territorial banks more than large banks, as suggested by the literature. For the sake of simplicity we consider only the complementarity between transaction-based lending technologies taken in aggregate and relationship lending. Results are reported in Table 6 (column 1-2). Also in this case the sign of the estimated coefficient is positive and significant at less than 1%

[9] This index is an average of seven dummy variables which take a value of one if the firm answered 1 (very much) to lending factors, no. 1, 2, 3, 4, 5, 6 and 8, respectively.

[10] In particular, the *F*-statistics is equal to 2.95 in all the four cases considered, which could signal that we have weak instruments problems. In fact, Stock, Wright and Yogo (2002) and Stock and Yogo (2003) suggest that an *F*-statistic should exceed 10 for inference based on the 2SLS estimator to be reliable where there is only one endogenous regressor.

level, either when the firm's main bank is a large bank, or when it is a local one. The estimated coefficients of relationship lending do not statistically differ from each other. In fact, the Wald test fails to reject the null hypothesis of the equality of the estimated coefficients. Hence, the importance of complementarity among lending technologies holds with the same magnitude for both bank types. A plausible rationale for these findings can be found in Albareto et al. (2008). Their empirical evidence supports a convergence in recent years of lending organizational structures between local and large banks in Italy.

The results are different when we split the sample according to firms' characteristics. In column 3-6 of Table 6 we report the results from running the regressions for transactional lending technology on sub-samples of observations. First, we distinguish between small and large firms, based on the number of employees (columns 3 and 4). The impact of relationship lending on transactional lending turns out to be significant only for firms with less than 30 employees, which is the median number of employees in our sample. The coefficient equals 1.145 and is significant at the 10% level. In larger firms the effect is positive, but lower and insignificant. One interpretation is that banks use both relationship and transactional lending technologies to reduce the problems of asymmetry of information. Instead, for firms with less problems of asymmetry, such as larger firms, the complementarity among technologies is less relevant.

4.2 The role of soft information

We have shown that there is pervasive complementarity among lending technologies. Now an interesting issue raised by our finding lies in studying how soft information enters in this picture. To that end, we investigate the impact of soft information on the probability that a firm is credit rationed, depending on the lending technology used by the firm's main bank. In order to perform this analysis we interact our proxy of soft information with the lending technology adopted by the firm's main bank.[11] If hardening of soft information were feasible, we would expect that the interactions between *Soft* and the lending technologies would have a statistically significant impact and bear the same sign on the probability of being credit rationed.

Regression results and marginal effects for the probability of rationing are reported in Table 7. As expected *Soft* has a negative and significant impact on credit rationing in all regressions. More interestingly, the interaction between *Soft* and the two LTs is indeed significant, but the sign differs.[12] In particular, the interaction lowers the probability of credit rationing in the cases of the relational lending technology, whereas it increases the probability in the case of the transactional lending technology. This finding suggests that, though there may be hardening of soft information, soft information is still more valuable in the case of relationship lending.

The results for the other variables are in line with theory predictions.

[11] As well as for the analysis in Table 6, in this regressions we consider only the aggregate index for the transaction-based lending technology.

[12] In order to tackle for potential problems of small sample bias we performed Montecarlo bootstrapping. Results showed to be stable with 100 replications.

5. Conclusions

In this paper we have investigated the firm-main bank relationship using a large sample of Italian manufacturing firms, featuring a large presence of small and medium-sized enterprises (SMEs). We start considering a recent strand of literature stressing that banks want to serve SMEs and find this segment profitable, especially as margins in other banking markets narrow due to intensified competition (de la Torre et al., 2010). This literature finds that, partly thanks to the enormous progress in information and communication technologies, even large and foreign banks (normally arm's-length lenders) may now be capable of lending to SMEs referring also to firm's soft information. This implies that – through technology – substitutability between relationship lending and transactional LTs may to some extent be possible for outsiders by means of hardening of soft information. Another possibility, not explored in the literature, could be that different lending technologies – once believed alternatives – can indeed be complementary. In this paper we tried to address these issues.

Our results show that the same firm may indeed receive credit via different lending technologies, hence supporting the hypothesis of complementarity among lending technologies. Furthermore, our results highlight that this form of complementarity is found not only at large banks but also at smaller-sized ones, while it is confirmed that the latter banks still rely more intensely on relationship lending. Finally, we find also that soft information lowers (raises) the probability of credit rationing if the firm's main bank uses relationship (transactional) lending technologies. Thus, it appears that the way soft information becomes embodied in the lending decision might still differ between relational and transactional banks/technologies.

Our findings suggest that complementarity among lending technologies – pursued in particular by increasing delegation and lowering turnover of branch manager – might be more effective in the loan decision process rather than new soft information communication techniques. A related empirical evidence, in the same direction of our conclusions, is provided by Mocetti et al. (2010), who examine the interaction between information technology and banking organization. In particular, they show that banks equipped with more ICT capital and resorting to credit scoring delegate credit decisions relatively more to local branch managers in small business lending activities.

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Appendix

Table 1. Variables definition and sources

Variable	Definition and source (in parentheses)
LT_FS	Index for *financial statement lending technology*. We use a question available in the Survey: "In your view, which criteria does your bank follow in granting loans to you?". In answering this question the firm was required to give a weight (going, in descending order, from 1, very much, to 4, nil) to fifteen factors. From the list of fifteen criteria shown in the Appendix, we use the initial four. For each of the four characteristics we constructed a dummy variable, which takes a value of one if the firm chose 1. LT_FS is the average of these four dummy variables. (Survey on Italian Manufacturing Firms)
LT_RE	Index for *real-estate lending technology*. We use a question available in the Survey: "In your view, which criteria does your bank follow in granting loans to you?". In answering this question the firm was required to give a weight (going, in descending order, from 1, very much, to 4, nil) to fifteen factors. LT_RE, is a dummy variable that take the value one if the firm answered 1 (very much) to lending factor no. 5. (Survey on Italian Manufacturing Firms)
LT_OF	Index for *other fixed-asset lending technology*. We use a question available in the Survey: "In your view, which criteria does your bank follow in granting loans to you?". In answering this question the firm was required to give a weight (going, in descending order, from 1, very much, to 4, nil) to fifteen factors. LT_OF, is an average of the two dummy variables which take a value of one if the firm answered 1 (very much) to lending factors no. 6 and 8, respectively. (Survey on Italian Manufacturing Firms)
LT_TRANS	Index for the *transactional lending technology*. To construct this index, we aggregate the three transactional lending technologies (LT_FS, LT_RE and LT_OF) in a single index. (Survey on Italian Manufacturing Firms)
CREDIT RATIONED	Dummy taking a value of one if the firm answers yes to the question "In 2006 would your firm have wished a larger amount of loans at the prevailing interest rate agreed with the bank?", and yes to at least one of the following two questions: "In 2006, did the firm demand more credit than it actually obtained?" or "To obtain more credit, were you willing to pay a higher interest rate?". (Survey on Italian Manufacturing Firms)
LT_RL	Index for *relationship lending technology*. We use a question available in the Survey: "In your view, which criteria does your bank follow in granting loans to you?". In answering this question the firm was required to give a weight (going, in descending order, from 1, very much, to 4, nil) to fifteen factors. LT_RL, is an average of six dummy variables which take a value of one if the firm answered 1 (very much) to lending factors, no. 9, 10, 11, 13, 14 and 15, respectively. (Survey on Italian Manufacturing Firms)
Audit	Dummy taking value one if firm has its statements externally certified; 0 otherwise. (Survey on Italian Manufacturing Firms)
Age	Log of the age of firm since foundation, in years. (Survey on Italian Manufacturing Firms)
ROA	Average value of the ratio of firm's EBIT to firm's total assets during 2004-2006 period. (Survey on Italian Manufacturing Firms)
Leverage	Ratio of firm's total loans to the sum of firm's total loans and firm's equity as of the end of December 2006. (Survey on Italian Manufacturing Firms)
Corporation	Dummy variable taking value one if firm is a join stock company; 0 otherwise. (Survey on Italian Manufacturing Firms)

Banks	Total number of firm's reference banks. (Survey on Italian Manufacturing Firms)
Large	Dummy variable taking value one if the main bank is either a national bank or a foreign bank; 0 otherwise. (Survey on Italian Manufacturing Firms)
Local	Dummy variable taking value one if the main bank is a smaller-sized cooperative mutual banks, a larger-sized Volksbank type cooperative banks, a saving bank or "other type of bank"; 0 otherwise. (Survey on Italian Manufacturing Firms)
Share	Share of the loans the firm receives from its main bank relative to firm's total loans. (Survey on Italian Manufacturing Firms)
Turnover Loan Officer	Dummy taking value one if the loan officer of the firm's main bank does not change during the 2001-2006 period. (Survey on Italian Manufacturing Firms)
Length	Log of the length of the firm-main bank relationship. (Survey on Italian Manufacturing Firms)
Soft	We use the following question of the Survey: "Which characteristics are key in selecting your main bank?". In answering this question the firm was required to give a value, with descending order of importance, from 1 to 4 to the two following characteristics (among others): "The bank knows you and your business" and "Frequent contacts with the credit officer at the bank". The variable Soft is a dummy that takes value one if the firm chose the highest value for both the above two characteristics. (Survey on Italian Manufacturing Firms)
Size	Log of the firm's number of employees as of the end of December 2006. (Survey on Italian Manufacturing Firms)
Center	Dummy variable taking value 1 if the bank branch where the credit relationship with the firm takes place is located in Central Italy; 0 otherwise. (Survey on Italian Manufacturing Firms)
South	Dummy variable taking value 1 if the bank branch where the credit relationship with the firm takes place is located in Southern Italy; 0 otherwise. (Survey on Italian Manufacturing Firms)
HHI	Average value of the Herfindhal Hirschman index of concentration on bank loans in the province during 1991-2004 period. (Statistical Bulletin of the Bank of Italy)
Branch	Average number of branches per thousands inhabitants in the province during 1991-2004 period. (Statistical Bulletin of the Bank of Italy)
GDP	Log of the value of the GDP in the province as of the end of December 2004. (ISTAT)
Judicial inefficency	Log of the length of the first-degree trial by the courts located in the province in 2004. (ISTAT)
Social Capital	Voter turnout at the province level for all the referenda before 1989. These include data referenda on the period between 1946 and 1987. For each province turnout data were averaged across time. (Guiso, Sapienza and Zingales, 2004a)
Branches (1936)	Branches per thousands inhabitants in the region in 1936. (Guiso, Sapienza and Zingales, 2004b)
New branches incumbents	Average of the annual number of branches created minus those closed by incumbent banks per inhabitants in the province in the 1991–2004 period. (Herrera and Minetti 2007)
Management stability	Average permanence of branch managers in banks headquartered in the province in 1992. For each bank, data were weighted for the number of branches relative to the total of branches in the province. (Statistical Bulletin of the Bank of Italy)

Table 2. Summary statistics

Variables	Median	Mean	Standard Deviation	1st percentile	99th percentile
Dependent Variables					
LT_FS	0	0.216	0.332	0	1
LT_RE	0	0.119	0.324	0	1
LT_OF	0	0.113	0.259	0	1
RATIONED	0	0.426	0.495	0	1
Control Variables					
LT_RL	0	0.145	0.283	0	1
Audit	0	0.376	0.485	0	1
Age	21	22.663	14.388	3	72
ROA	0.046	0.056	0.065	-0.100	0.270
Leverage	0.939	0.899	0.113	0.475	0.997
Corporation	0	0.331	0.471	0	1
Banks	4	4.973	3.959	1	20
Large	0	0.497	0.500	0	1
Local	1	0.503	0.500	0	1
Share	25	31.817	32.805	0	100
Turnover of loan officer	0	0.259	0.438	0	1
Length	2.708	2.595	0.782	0	3.912
Center	0	0.162	0.369	0	1
South	0	0.118	0.323	0	1
HHI	0.106	0.111	0.048	0.051	0.270
Branch	0.531	0.530	0.124	0.226	0.828
GDP	10.214	10.192	0.219	9.602	10.522
Judicial inefficency	5.846	5.893	0.276	5.403	6.633
Social Capital	0.86	0.845	0.055	0.64	0.91
Soft	0	0.097	0.296	0	1
Size	3.401	3.553	1.118	1.386	6.884
Instrumental Variables					
Branches (1936)	0.222	0.249	0.118	0.057	0.530
New branches incumbent (1991-2004)	0.020	0.021	0.009	0.005	0.037
Management stability (1992)	3.533	3.566	0.126	3.331	3.816

Table 3. **Correlation matrix**

	LT TRANS	LT_RL	RATIONED	Soft	Local	Banks	Length	ROA	Age	Size	Center	South	Leverage
LT_TRANS	1.0000												
LT_RL	0.7739	1.0000											
CREDIT RATIONED	-0.0088	0.0025	1.0000										
Soft	0.1755	0.1970	-0.1176	1.0000									
Local	-0.1907	-0.0924	0.0149	-0.1087	1.0000								
Banks	0.0137	0.0296	0.0371	0.0514	-0.0557	1.0000							
Length	-0.0250	0.0094	-0.1192	0.0096	0.0879	0.0768	1.0000						
ROA	-0.0165	-0.0176	-0.1348	-0.0407	0.0095	-0.0976	-0.0032	1.0000					
Age	-0.0062	0.0170	-0.0807	0.0836	-0.0284	0.1746	0.3334	-0.0454	1.0000				
Size	0.0378	0.0903	0.0188	0.0651	-0.0154	0.3946	0.1084	-0.0589	0.2255	1.0000			
Center	-0.0171	-0.0178	0.0639	-0.0029	-0.0352	0.0116	-0.0169	-0.0067	-0.0323	-0.0223	1.0000		
South	-0.0140	0.0014	-0.0140	-0.0185	-0.0554	-0.0482	-0.0572	-0.0844	-0.0930	-0.0241	-0.1613	1.000	
Leverage	0.0128	-0.0241	0.0950	-0.0328	-0.0042	-0.0770	-0.0801	0.0749	-0.1831	-0.2581	0.0141	-0.024	1.000

Table 4. The determinants of lending technologies

	(1)	(2)	(3)	(4)
Variables	LT_TRANS	LT_FS	LT_RE	LT_OF
LT_RL	0.663***	0.715***	0.593***	0.595***
	0.048	*0.056*	*0.084*	*0.068*
Branch	-0.062	-0.036	-0.159	-0.068
	0.080	*0.108*	*0.102*	*0.079*
Local	-0.063***	-0.081***	-0.045***	-0.036***
	0.012	*0.018*	*0.016*	*0.012*
Banks	0.000	-0.000	-0.002	0.002
	0.002	*0.003*	*0.002*	*0.003*
Corporation	0.029*	0.040*	0.026	0.007
	0.016	*0.023*	*0.021*	*0.015*
Leverage	0.060	0.093	0.047	0.000
	0.054	*0.078*	*0.080*	*0.060*
Size	-0.012**	-0.018**	-0.005	-0.002
	0.006	*0.008*	*0.009*	*0.005*
Age	-0.001	-0.001	-0.000	-0.000
	0.001	*0.001*	*0.000*	*0.000*
HHI	0.005	0.010	-0.026	0.009
	0.151	*0.233*	*0.166*	*0.146*
GDP	-0.020	0.028	-0.082	-0.085*
	0.050	*0.078*	*0.061*	*0.047*
Judicial inefficiency	-0.058	-0.005	-0.166***	-0.111**
	0.046	*0.066*	*0.057*	*0.043*
Social Capital	0.329	0.604*	0.094	-0.102
	0.219	*0.319*	*0.249*	*0.208*
Center	-0.003	-0.004	0.003	-0.004
	0.018	*0.028*	*0.024*	*0.016*
South	0.040	0.078	0.035	-0.032
	0.044	*0.069*	*0.061*	*0.035*
Constant	0.378	-0.635	1.848**	1.668***
	0.609	*0.884*	*0.773*	*0.620*
Observations	816	816	816	816
R-squared	0.381	0.272	0.230	0.340

The table reports regressions coefficients. The dependent variables are the three transactional lending technologies taken also in aggregate. For the definition of the explanatory variables see Table 1. The regressions are estimated by OLS. The regressions include sector dummies. Robust standard errors are reported below coefficients. (*): coefficient significant at 10% confidence level; (**): coefficient significant at 5% confidence level; (***): coefficient significant at less than 1% confidence level. The table also reports, as goodness-of-fit tests, the R-squared.

Table 5. The determinants of lending technologies (IV Regressions)

	(1)	(2)	(3)	(4)
Variables	LT_TRANS	LT_FS	LT_RE	LT_OF
LT_RL	0.765**	0.836*	0.633*	0.636**
	0.319	*0.457*	*0.384*	*0.302*
Branch	-0.055	-0.041	-0.125	-0.041
	0.079	*0.107*	*0.096*	*0.077*
Local	-0.058***	-0.078***	-0.041**	-0.033**
	0.015	*0.023*	*0.019*	*0.015*
Banks	-0.000	-0.001	-0.002	0.002
	0.003	*0.003*	*0.003*	*0.003*
Corporation	0.030*	0.042*	0.030	0.008
	0.016	*0.023*	*0.021*	*0.015*
Leverage	0.055	0.091	0.042	-0.017
	0.053	*0.077*	*0.081*	*0.058*
Size	-0.011**	-0.018**	-0.006	-0.003
	0.006	*0.008*	*0.008*	*0.005*
Age	-0.001	-0.001	-0.001	-0.000
	0.000	*0.001*	*0.000*	*0.000*
HHI	-0.038	-0.015	-0.084	-0.035
	0.149	*0.229*	*0.159*	*0.143*
GDP	-0.028	0.016	-0.079	-0.084*
	0.051	*0.079*	*0.061*	*0.050*
Judicial inefficiency	-0.063	-0.011	-0.159***	-0.100**
	0.045	*0.063*	*0.055*	*0.041*
Social Capital	0.334	0.611*	0.100	-0.070
	0.212	*0.314*	*0.231*	*0.196*
Center	-0.001	-0.005	0.004	-0.003
	0.020	*0.030*	*0.026*	*0.017*
South	0.046	0.078	0.050	-0.024
	0.044	*0.069*	*0.060*	*0.036*
Costant	0.476	-0.484	1.766**	1.578**
	0.610	*0.855*	*0.769*	*0.643*
Observations	816	816	816	816
R-squared	0.373	0.265	0.228	0.336
Test of excluded instruments, F-statistic	2.95**	2.95**	2.95**	2.95**
Endogeneity test of instrumented regressor , χ^2-statistic	0.097	0.068	0.008	0.026
Overidentification test, Hansen J-statistic	1.364***	0.229***	3.810***	2.204***

The table reports regressions coefficients. The dependent variables are the three transactional lending technologies taken also in aggregate. For the definition of the explanatory variables see Table 1. The regressions are estimated by 2SLS. The regressions include sector dummies. Robust standard errors are reported below coefficients. (*): coefficient significant at 10% confidence level; (**): coefficient significant at 5% confidence level; (***): coefficient significant at less than 1% confidence level. The table also reports, as goodness-of-fit tests, the R-squared. For the other diagnostic tests reported in the table see Section 4.1.

Table 6. Robustness checks

Variables	(1) LT_TRANS Local Banks	(2) LT_TRANS Large Banks	(3) LT_TRANS Small Firms	(4) LT_TRANS Large Firms
LT_RL	0.746**	1.152***	1.145*	0.719
	0.345	*0.431*	*0.587*	*0.555*
Branch	0.020	-0.206	-0.032	-0.056
	0.061	*0.161*	*0.087*	*0.093*
Banks	-0.000	-0.004	-0.002	0.000
	0.001	*0.005*	*0.004*	*0.002*
Corporation	0.022	0.039	-0.003	0.018
	0.014	*0.032*	*0.046*	*0.019*
Leverage	0.013	0.113	0.202**	0.054
	0.063	*0.110*	*0.091*	*0.053*
Size	-0.010*	-0.009	-0.049	-0.007
	0.005	*0.014*	*0.040*	*0.016*
Age	-0.001**	-0.000	0.000	-0.000
	0.000	*0.001*	*0.001*	*0.001*
HHI	0.191	-0.207	-0.052	-0.117
	0.188	*0.233*	*0.194*	*0.153*
GDP	-0.015	-0.054	-0.033	0.013
	0.051	*0.077*	*0.061*	*0.071*
Judicial inefficiency	-0.019	-0.073	-0.063	0.019
	0.038	*0.068*	*0.060*	*0.060*
Social Capital	0.248	0.395	0.338	-0.002
	0.238	*0.378*	*0.257*	*0.407*
Center	0.014	-0.036	-0.001	-0.017
	0.017	*0.038*	*0.039*	*0.022*
South	0.042	-0.009	0.048	-0.042
	0.051	*0.085*	*0.097*	*0.050*
Constant	0.074	0.783	0.403	-0.140
	0.570	*0.828*	*0.628*	*0.643*
Observations	411	405	527	740
R-squared	0.517	0.388	0.415	0.638
Test of excluded instruments, F-statistic	3.240	1.859	1.334	1.247

The table reports regressions coefficients. The dependent variable is the transactional lending technologies taken in aggregate. For the definition of the explanatory variables see Table 1. The regressions are estimated by 2SLS. The regressions include sector dummies. Robust standard errors are reported below coefficients. (*): coefficient significant at 10% confidence level; (**): coefficient significant at 5% confidence level; (***): coefficient significant at less than 1% confidence level. The table also reports, as goodness-of-fit tests, the R-squared. For the other diagnostic tests reported in the table see Section 4.1.

Table 7. The role of soft information in credit rationing

Variables	(1) CREDIT RATIONED Coefficients	(2) CREDIT RATIONED Marginal effects	(3) CREDIT RATIONED Coefficients	(4) CREDIT RATIONED Marginal effects	(5) CREDIT RATIONED Coefficients	(6) CREDIT RATIONED Marginal effects
Soft	-0.539*	-0.197**	-0.610*	-0.219**	-1.225**	-0.377***
	0.289	*0.096*	*0.318*	*0.101*	*0.554*	*0.114*
LT_RL			0.471	0.184	0.740	0.288
			0.491	*0.192*	*0.730*	*0.284*
LT_TRANS			-0.316	-0.124	-1.318	-0.513
			0.569	*0.222*	*0.817*	*0.318*
LT_TRANS × LT_RL					0.663	0.258
					1.399	*0.544*
Soft × LT_TRANS					4.534***	1.764***
					1.536	*0.594*
Soft × LT_RL					-2.835**	-1.103**
					1.334	*0.517*
Branch	-0.943	-0.369	-1.072	-0.419	-1.060	-0.412
	1.183	*0.463*	*1.236*	*0.483*	*1.251*	*0.487*
Banks	0.044	0.017	0.044*	0.017*	0.042	0.016
	0.027	*0.011*	*0.027*	*0.010*	*0.028*	*0.011*
Leverage	1.210	0.473	1.075	0.420	1.212	0.472
	1.126	*0.440*	*1.130*	*0.442*	*1.170*	*0.456*
Size	0.064	0.025	0.061	0.024	0.090	0.035
	0.106	*0.042*	*0.106*	*0.041*	*0.107*	*0.042*
Age	-0.004	-0.001	-0.004	-0.002	-0.006	-0.002
	0.008	*0.003*	*0.008*	*0.003*	*0.008*	*0.003*
ROA	-3.512**	-1.373**	-3.667**	-1.432**	-4.003**	-1.557**
	1.760	*0.687*	*1.799*	*0.701*	*1.812*	*0.702*
Turnover Loan Officer	-0.233	-0.089	-0.235	-0.090	-0.187	-0.072
	0.265	*0.099*	*0.267*	*0.100*	*0.271*	*0.102*
Length	-0.233	-0.091	-0.244	-0.095	-0.181	-0.070
	0.152	*0.060*	*0.151*	*0.059*	*0.151*	*0.059*
HHI	-2.335	-0.913	-2.404	-0.939	-2.318	-0.902
	2.523	*0.986*	*2.554*	*0.997*	*2.602*	*1.012*
GDP	1.479	0.578	1.545	0.604	1.360	0.529
	0.965	*0.378*	*0.971*	*0.380*	*0.972*	*0.379*
Center	0.452	0.178	0.470	0.186	0.445	0.176
	0.324	*0.127*	*0.326*	*0.127*	*0.327*	*0.128*
South	0.672	0.263	0.672	0.263	0.553	0.218
	0.621	*0.231*	*0.622*	*0.232*	*0.638*	*0.246*
Constant	-15.446		-15.897		-14.252	
	10.081		*10.108*		*10.160*	
Observations	184	184	184	184	184	184
Pseudo R-squared	0.138		0.142		0.175	

The table reports regressions coefficient and marginal effects. The dependent variable is the dummy of credit rationing. For the definition of the explanatory variables see Table 1. The regressions are estimated with Probit. The regressions include sector dummies. Robust standard errors are reported below coefficients. (*): coefficient significant at 10% confidence level; (**): coefficient significant at 5% confidence level; (***): coefficient significant at less than 1% confidence level. The table also reports the Pseudo R-squared as goodness-of-fit tests.

Survey questions

F1.15: *Which of these characteristics are key in selecting your main bank?*

1. The bank knows you and your business.
2. The bank knows a member of your Board of directors or the owners of the firm.
3. The bank knows your sector.
4. The bank knows your local economy.
5. The bank knows your relevant market.
6. Frequent contacts with the credit officer at the bank.
7. The bank takes quick decisions.
8. The bank offers a large variety of services.
9. The bank offers an extensive international network.
10. The bank offers efficient internet-based services.
11. The bank offers stable funding.
12. The bank offers funding and services at low cost.
13. The bank's criteria to grant credit are clear.
14. The bank is conveniently located.

F1.17: *In your view, which criteria does your bank follow in granting loans to you?*

1. Ability of the firm to repay its debt (e.g. years needed to repay its debt).
2. Financial solidity of the firm (capital/asset ratio).
3. Firm's profitability (current profits/sales ratio).
4. Firm's growth (growth of sales).
5. Ability of the firm to post (not personal) real estate collateral.
6. Ability of the firm to post tangible non-real estate collateral.
7. Support by a guarantee association (e.g. loan, export, R&D, etc.).
8. Personal guarantees by the firm's manager or owner.
9. Managerial ability on the part of those running the firm's business.
10. Strength of the firm in its market (number of customers, commercial network).
11. Intrinsic strength of the firm (e.g. ability to innovate).
12. Firm's external evaluation or its evaluation by third parties.
13. Length of the lending relationship with the firm.
14. Loans are granted when the bank is the firm's main bank.
15. Fiduciary bond between the firm and the credit officer at your bank.