Loan Officer Authority and Small Business Lending.
Evidence from a Survey

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Abstract

A vast literature has emphasized that small banks are at a comparative advantage in small business lending. In this paper, we show that apart from size, which is negatively correlated with bank specialization in small business lending, organizational characteristics affect bank loan portfolio choices. By using a unique dataset based on a recent survey of Italian banks, we find that after having controlled for bank size, the branch loan officer's authority has a key role in explaining bank specialization in small business lending. In particular, banks which delegate more decision-making power to their branch managers are more willing to lend to small firms than other banks. We approximate loan officers' authority by controlling for several factors which shape their incentives: branch manager turnover, the amount of money up to which they are allowed to lend autonomously, their role in loan approval and in setting loan interest rates, the kind of information (*soft* versus *hard* information) used for screening and monitoring borrowers, and the structure of their compensation schemes.

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1. Introduction[1]

A large body of the literature has highlighted how large banks are less prone to lend to small firms (e.g. Berger *et al.*, 2005). An interpretation of the reluctance of large banks to lend to small firms is that these borrowers are opaque and can only be screened and monitored on the basis of *soft information*. According to Stein (2002), due to their high organizational complexity, large banks are at comparative disadvantage in screening and monitoring opaque firms with respect to smaller banks.

Most of the extant empirical literature, investigating bank specialization in small business lending, is based on the hypothesis that organizational complexity is directly related to bank size. However, Albareto *et al.* (2008), by exploiting a very unique dataset on the organizational characteristics of Italian banks recently surveyed by the Bank of Italy, showed that there is some heterogeneity in bank organization even within banks of similar size. As a result, we argue that even if size is an important driver affecting bank organizational design and then small business lending, other bank characteristics matter too.[2]

In this paper, we focus on the role of branch loan officers. We argue that, since soft information requires a repeated and close interaction between the lender and the borrower in order to be collected, branches, the hierarchical level which is the closest to borrowers, play a crucial role for small business lending. In particular, we test whether does exist a link between branch loan officer's authority and the propensity of banks to lend to opaque borrowers.

The main results of the paper are the following. Firstly, our analysis confirms that large banks are generally less prone to lend to small firms than other banks. This is in line with previous empirical contributions, supporting the view that small banks are better able to lend to opaque borrowers compared with larger intermediaries.

Secondly, we show that bank size is only part of the whole story since, even after having controlled for it, bank organizational features help to explain differences across banks in small business lending. In particular, our analysis suggests that loan officer authority is positively related to small business lending activity. Indeed, we find the more loan officers are involved in loan approval decisions and/or in setting loan pricing, the more the bank is specialized in small business lending.

[2] A comprehensive review on banking organizational issues is summarized in Cerqueiro, Degryse and Ongena (2007).

We also find that, banks which give greater importance to *soft information* in lending decisions are more willing to lend to small businesses, consistently with the view that small firms are opaque borrowers and that their creditworthiness assessment is largely based on proprietary information. Small business lending specialization is also negatively affected by branch managers' turnover. This result suggests that loan officers' efforts to gather *soft information* are less if they stay at a given branch for a shorter time.

Moreover, we also find that banks are less specialized in small business lending in the local market (province) where they are headquartered, while the size of the branch network in each local market enhances small business specialization. These results are consistent with the hypothesis that the operational proximity between lenders and borrowers increases the capability of branch managers to collect and verify soft information (Dell'Arriccia and Marquez, 2004), improving their ability to compete for internal resources and, as a consequence, the specialization of banks in lending to opaque borrowers too.

All in all, we contribute to the literature investigating the role of organization for bank lending specialization in two main ways. Firstly, by using a unique dataset including information about bank organizational features and lending technologies, we are able to go beyond the comparison between large and small banks. Secondly, we show that small business lending specialization is positively correlated with many bank organizational characteristics linked to a loan officer's authority.

The rest of the paper proceeds as follows. Section 2 presents the main theoretical motivations of the paper. Section 3 describes the data and the econometric methodology. Section 4 presents the empirical findings. Section 5 concludes.

2. Theoretical background and testable hypotheses

A wide strand of literature has emphasized that small firms are opaque and that banks have to gather soft information in order to screen and monitor them. Furthermore, this kind of information has some peculiar characteristics that give rise to agency problems within banks.

First, soft information is gathered trough repeated interactions between the lender and the borrower. Thus, time and proximity to the borrower are necessary to collect it. This also implies that it would be very costly for banks' headquarters to gather soft information directly. Think about the costs that banks would bear in case managers from headquarters had to repeatedly visit the firms they lend to.

An alternative and less expensive strategy is to delegate the collection of soft information to branch managers that are much closer to firms than their headquarters. However, this alternative raises agency costs due to the fact that soft information production is little verifiable: an asymmetric information problem then arises between headquarters and branches, where the latter are better

informed than the former, and this, according to Stein (2002), leads to a sub-optimal production of soft information.

Stein (2002) compares two extreme situations, hierarchies and stand-alone firms, showing that in a hierarchical setting, in which those who are in charge of gathering soft information have not the residual rights over the use of it, the production of soft information is lower compared to the case of stand-alone firms where the producer and the user of soft information coincides. The basic intuition for that result is that branch managers have to exert some costly effort in order to gather soft information but, at the same time, they can not be explicitly compensated for that since the effort is not verifiable by headquarters.

Headquarters may compensate branch managers indirectly for their effort only on the base of some indicators of branch lending. Indeed, branch managers' benefits are quite reasonably related to their lending activity, both because their compensation scheme might be explicitly based on some measure of the branch loan portfolio size and performance and because branch managers might obtain some private benefits by lending to local borrowers (e.g. they may pursue some "empire building" strategy or, more in general, they may gain in terms of their social status). However, branch managers have to exert efforts in gathering soft information <u>before</u> lending decisions are taken and, at the same time, they have not a full control over lending decisions. Indeed, headquarters, which can condition their decisions only on the base of the soft information branch managers are able to harden, may eventually overrule branch managers even in the case in which projects have a positive net present value. In that case, branch managers are not able to lend to the borrowers they would like to, and they do not obtain any benefit from the effort exerted in gathering soft information.

All in all, the paper by Stein supports the view that the organizational design of a bank matters for the incentives to produce soft information and then for small business lending. From an empirical perspective, what we observe among banks is that there exists a continuum of solutions between hierarchies and stand-alone firms: headquarters delegate to branch managers the collection of soft information and, at the same time, they also give to them some control over lending decisions. It is then reasonable to argue that the measure by which headquarters delegate lending decisions to branch managers depends on the trade-off between the benefits of enhancing soft information production efforts, which would need delegating more powers to branch managers, and the costs of leaving more room to local managers to pursue their own interests which may be conflicting with those of headquarters.

We argue that this trade-off depends on different factors that a bank may affect. The first one is the **lending technology** adopted which in some way constraints branch manager activity. For example, by relying more on credit scoring techniques, a bank is able to limit branch manager discretion in the overall lending process since the score is observed by headquarters. Another one is the branch manager

turn-over policy. The tenure at the same branch affects loan officers' expected pay-off from exerting efforts in the production of soft information. Indeed, the production of soft information takes time and the benefits of it may be reaped over a long period (e.g. benefits from knowing the character of an entrepreneur, which vary little over time). Finally, banks may affect branch managers' incentives by setting specific **compensation schemes.** Branch managers' pay-off may depend on different indicators (the size of the branch loan portfolio, the performance and the riskiness of the branch loan portfolio) and, obviously, the way banks set branch managers' compensation has a role also for the production of soft information. For example, one may argue that if banks put a lot of emphasis on the size of the loan portfolio, branch managers have little incentives to gather soft information from very small firms since it is reasonable that screening costs are, at least partially, fixed costs and that, since opacity may positively correlates with firm size, branch managers have to exert relatively more effort per unit of money lent with respect to larger firms.

Another important issue that arises when banks want to affect branch managers' incentives is how to choose the **exact perimeter of delegation**. For example, banks may delegate to branch managers the decision about granting a loan and/or about the loan characteristics (e.g. interest rates, collateral, type of loan, loan size, loan maturity). Furthermore, banks, apart from choosing which kind of powers they want to delegate, they may also set the limit up to which branch managers may use those powers (e.g., how much they can autonomously vary the loan interest rates with respect to certain given benchmarks?). It is reasonable to argue that the exact way banks define the content of delegation is not neutral with respect to branch managers' incentive to gather soft information. Indeed, every strategy that, by delegating more powers to them, allows to reduce the uncertainty that branch managers face in terms of the overall lending decisions would enhance their incentives to exert ex-ante efforts in gathering soft information.

To complicate even further the picture is the fact, following the paper by Aghion and Tirole (1997) which distinguishes between **"formal authority"** (the right to decide) and **"real authority"** (the effective control over decisions), one have to be aware that a given formal organizational setup may entail different degrees of real authority depending on some factors that are not necessarily observable (to the econometrician). On the other hand, following both Stein (2002) and Aghion and Tirole (1997), the incentives to gather soft information depends on the effective control that branch managers have over decisions, independently of their rights to decide. From the empirical perspectives, it is clear that the more we control for the organizational features of a bank, the less we run the risk of making errors when trying to assess branch managers' real authority.

Naturally, as for banks' headquarters, econometricians are not able to observe directly the production of soft information. As a consequence, we only may look at a proxy for it. In particular, we argue that, since small firms are highly opaque, there is a close relation within the incentives to gather

soft information and the relevance of small businesses lending for a given bank. Our testable hypothesis is then that the more branch managers are delegated control over lending decisions the more a bank is orientated towards small business lending.

In the following section we describe the set of information we have. It is a quite rich database that covers many aspects of bank organizations. This should reduce the risk of real authority measurement errors.

3. Data and methodology

3.1 Sources of data

In 2007 the Bank of Italy surveyed the lending practices in use by Italian banks at the end of 2006. More than 300 banks participated in the survey, accounting for 83 per cent of the overall Italian banking system's lending to firms. Leasing and factoring companies, branches of foreign banks, and consumer credit banks were not included in the survey since these intermediaries are highly specialized in specific segments of the credit market. The sample covers almost all Italian banks, except for the very smallest ones. The accuracy of the data collected is high. Firstly, preliminary interviews with some bankers allowed the questionnaire to be designed so as to avoid potential misunderstandings; secondly, ex-post interviews helped fill missing information and clarify erratic answers.

Banks participating in the survey were questioned about lending to small enterprises: the number of hierarchical layers involved in the decision to grant a loan, the kind of information required in order to make a lending decision (*soft* versus *hard* information), and information about branch branch managers, such as the amount of money up to which they are allowed to lend autonomously, the speed of their turnover, and their compensation schemes (see Albareto *et al.*, 2008).[3] In this paper we indifferently use with the same meaning the terms *loan officer* and *branch manager*, because at the end of 2006 the survey recorded the first decisional level on loan approvals, which was represented by the branch manager in most of the cases.

Initial evidence for bank organization suggests that branch manager power delegation and turnover generally increase with bank size (Table 1), but a certain variability in these organizational features persists within homogenous groups of banks sharing a similar governance scheme. Furthermore, the adoption of different lending techniques (e.g. soft information or rating systems) also shows mixed solutions across groups of banks (Table 2).

We then match the information obtained from the survey with bank Supervisory Reports allowing us to compute a measure of specialization in lending to small businesses at both sector (23

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[3] For a similar survey concerning US banks, see Udell (1989).

sectors) and geographical level (103 provinces) for each bank participating in the survey. We also use bank balance sheet data to compute control variables to take into account bank-level characteristics affecting portfolio composition. After a cleaning procedure to detect outliers, 239 banks remain.

Since the main obstacle of the econometric exercise is to proxy the local manager's real authority, because this is not directly observable, we adopt a pragmatic approach. In particular, it is reasonable to assume that both loan officers' decisional power and their efforts depend crucially on organizational design (in term of decentralization and control). Thus, we use a set of bank organizational controls to capture local managers' authority.

3.2 The research question and the econometric set-up

The main aim of the econometric analysis is to verify whether banks which delegate more real authority to their loan officers (that we approximate with various bank organizational features) are more oriented to small business lending, as suggested by Stein (2002).

Our baseline regression is a cross-section of the following type:

$$SHSE_{ijz} = f\left(Organization_i, SoftInformation_i, CreditScoring_i, BankMkt_{iz}, Bank_i, Sector_j, Geography_z\right)$$

The dependent variable (*SHSE*), which ranges between 0 and 1, is the outstanding amount of loans, granted by bank *i* to small businesses (with less than 20 employees) of sector *j* and headquartered in province *z*, as a share of the overall amount of lending to non-financial firms of sector *j* headquartered in province *z*, granted by bank *i*.

We have computed bank specialization in small business finance separately for each province/sector pair to which a bank lends. In this way we are able to disentangle loan demand factors – which vary at both sector and geographical level – and supply factors and in particular bank organizational characteristics – which vary at the bank level. To avoid eventual bias due to minimal amounts of lending, we drop all bank/sector/province observations accounting for less than 0.002 per cent of bank-level total loans.[4] Since the bank organizational characteristics are observed at the end of 2006, our measure of bank specialization in small business finance has been computed as the average of the four 2007 quarters. In this way we mitigate both endogeneity and seasonality problems. The

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[4] The value corresponds at the 10th percentile of the bank level total loan distribution. Alternative thresholds do not affect our main results.

econometric exercise is carried out by an OLS estimation and the results are checked with a tobit regression since our dependent variable is bounded between 0 and 1.

We investigate the impact of different organizational factors on bank specialization in small firm finance.

Organization$_i$ is our key set of variables, controlling for bank organization characteristics related to a <u>loan officer's real decision-making power</u> (see Table 3 for more details). In particular, we include in the estimation variables focusing on:

- the scope of the power delegated (i.e. the amount of finance up to which loan officers may autonomously lend, their discretion in setting interest rates or asking for collateral);[5]

- the turnover policy adopted by banks;[6]

- whether loan officers play a relevant role in the loan approval process or not;

- the kind of reward scheme: some bank headquarters may place a greater emphasis on branch profitability, while others may be more oriented to pursue a loan volume target or risk mitigation.

Bank lending specialization could also be affected by the type of lending technologies adopted (Berger and Udell, 1995 and 2002). In order to control for their impact we use two dummy variables. On the one hand, *SoftInformation$_i$* is a dummy that is equal to 1 if, according to the survey, bank *i* considers *soft* information as "crucial", "very important" or "important" in lending decisions. Since this kind of information is difficult to verify, if banks require branch managers to base their lending decisions on qualitative information or on personal knowledge, this implies that branch managers are largely autonomous. On the other hand, *CreditScoring$_i$* is a dummy that is equal to 1 if a bank has introduced a rating system mainly to monitor and control borrowers' creditworthiness.

Moreover, since our measure of specialization varies both at bank and market (province-sector) levels, we add control variables to equation (1) in order to tackle for omitted features in the estimates, potentially biasing our organizational variables, we are mainly interested in.

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[5] Our indicator varies at a bank level. Indeed, a certain variance across loan officers within the same bank might occur (for example, between junior and senior officers); following the survey request, banks reported the modal value. Nevertheless, by means of direct interviews, we asked several banks more detailed information on the variability of loan officer decisional power across different seniority levels or branch sizes and they confirm that the modal value is quite representative, since the variance is quite limited, or close to zero, in most cases. Once a loan exceeds the branch manager's decisional power, decision is made up at a higher level in the bank hierarchy. It is located outside the branch, either at a larger geographical entity of the organization (i.e., a regional coordinator) or inside the headquarters. Where it is located does not matter to our analysis, since we believe that the collection of soft information, requiring proximity, is fully efficient only at the branch level and that agency problems arises when any subject different from branch manager is empowered to decide.

[6] In some unreported regressions we have divided the level observed of a loan officer's delegation and turnover for bank *i* by the maximum computed over all the banks lending to small firms headquartered in province z, since we approximate the boundaries of local credit markets – the market relevant to small firms – with those of the 103 Italian provinces. In this way, following Degryse, Laeven and Ongena (2007) we aim to capture how bank *i's* organization differs from that of its competitors (other banks lending to firms in province z). Our main findings are robust to the employment of these average measures of delegation and turnover.

Firstly, in terms of bank-market characteristics, we insert in the model a more accurate measure of type of loans and technology/information required to be assessed. Indeed, lending technology is defined by both the very nature of the information considered (hard and/or soft) and the type of loan. Following the intuition of Berger-Udell (1995 and 2006), some loans, such as advances, can be mainly viewed as transactional lending, while lines of credit and long-term loans involve a more relationship-based assessment. We include a control variable measuring the composition of portfolio at a bank-province level, as the ratio of advances to total loans.

Secondly, with the aim to control for other bank-market relevant features, able to affect bank specialization in small business lending, we also take into account the bank headquarters' localization at a province level to respect to those of the firm.[7] To this aim we compute a dummy variable (*Bank_head*) that is equal to 1 if the <u>province</u>[8] where borrowers are headquartered is the same province where the lending bank *i* has its headquarters. We have adopted a discrete measure for this kind of distance since most of lending relationships are concentrated within the province where both the lender and the borrower are located. Given the prominent role of the branch manager to gather and use soft information – i.e. the more relevant asset to specialize in small business lending in a given market – , we include among our bank-market controls, the number of branches a bank has in the province where the borrowers are headquartered. In this way we aim at capturing possible informational spill-overs among branches of the same bank which are close each other.

Furthermore, following Berger, Rosen and Udell (2007), we also control for the relevance of large banks in each local credit market. In fact, they argue that examining the propensity of large or small banks to lend to SMEs could be misleading should not the market size structure be considered. Their intuition applies to our analysis: the dependent variable may be low for a large bank because such banks are able to expand their loans to large businesses (included in the denominator), in a more relevant way than smaller banks, constrained by regulatory limits or diversification issues. Therefore, we include in our estimation the local market size structure, measured as the share of the largest banks in that specific sector-province combination.

Finally, *Bank_i* is a vector of variables taking into account other bank-level characteristics, such as size, risk and cost efficiency, potentially correlated with portfolio composition, while *Sector_j* and *Geography_z* are respectively firm sector and province dummies, controlling for loan demand factors.

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[7] In the extant empirical literature (see, among others, Alessandrini *et al.,* 2005 and 2008; Hauswald and Marquez, 2006; Mistrulli and Casolaro, 2008; Jemenez *et al.*, 2008), this variable is used as a sort of functional distance between lender and borrower and a common interpretation is that the distance between borrowers and bank headquarters can affect the ability of branch loan officers to pass information along the hierarchy, which then lowers the ability of local managers to compete in the internal capital market. As we argue in previous section, we believe that once we control for branch manager authority, the pivotal hierarchical level to collect soft information, that distance is not relevant to enhance bank specialization in small business lending in the same province where a bank is headquartered, due to the prominent role of the CEO.

[8] Italy is divided into 103 provinces, 20 regions and 5 areas (North-West, North-East, Centre, South, Islands).

Particularly, these fixed effects should help us to control for firm characteristics, such as opacity, to the extent that firms belonging to the same sector share technology, competition milieu and, probably, financial structure, governance, and so on.

Descriptive statistics are reported in Table 3, which shows further information on the definition of variables employed in the econometric analysis.

4. Results

4.1 Basic regressions

Results are reported in Table 4. In the first model (model *a*) we have regressed our measure of bank specialization in small business finance over some bank and firm characteristics. In particular, after having controlled for loan demand factors, i.e. for the sector of activity and the province where the firm is headquartered (sector and province dummies), we find evidence supporting the view that **bank size** (*Size*) affects lending portfolio choices. In line with many other papers (e.g. Berger *et al.*, 2005), our results show that large banks are less prone than small banks to lend to small firms. In particular, moving from the 25th percentile of the bank size distribution to the 75th percentile, the share of lending to small firms decreases by about 11 percentage points. Going beyond bank size, we also find that market size structure is quite relevant for bank specialization towards small firms: similarly to the result shown by Berger-Rosen-Udell (2007), we find that the higher the share of large banks in the local market (*Large_banks*), the lower the share of loans to small enterprises; however, differently from US, bank size matters once again for small business lending.

In the first model, we also get that the number of branches a bank has in the province where the borrowers are headquartered (*Branches*) positively correlates with SME specialization. Therefore, as expected, other things being equal, banks are more prone to lend to opaque borrowers in local markets where their network of branches is larger. Our interpretation is that, since lending to small firms is mostly based on *soft information* and this information may be gathered only at a local level, a large branch network helps banks to collect *soft information,* thus making easier to screen and monitor opaque firms. Furthermore, the more the bank portfolio is oriented toward transactional lending technologies (*Lending_type*), such as advances, the lower the dependent variable is.

We also control for the bank headquarters' localization in the same province where borrowing firms are headquartered. In particular, *Bank_head* is a dummy which equals 1 if lenders and borrowers are headquartered in the same province and 0 otherwise. After having controlled for all relevant bank and market level characteristics, we find that bank specialization in small business lending is lower when the lender and the borrower are functionally close. Since soft information to finance small and opaque firms needs proximity and it is costly transmissible along hierarchy, this apparently surprising

result can be explained having in mind that in those provincial markets where the bank has its headquarters' localization, the General Managers or the CEO have more information and can overrule branch managers and reduce their incentives to collect soft information. Consequently, *ceteris paribus,* in that province where banks are headquartered they specialize more in lending to medium-sized and large firms than in other local markets.

The following equations add controls for **loan officer authority**. The main aim is to verify whether or not bank size fully captures all relevant organizational characteristics of banks affecting loan officer authority and then banks' lending choices. Briefly, we investigate whether, for any given bank size, additional controls for loan officer authority have some explanatory power for bank specialization in small business lending. If this is the case, that would imply that there is some heterogeneity in terms of organizational structure among banks of the same size and that bank size does not capture all the significant characteristics of bank organization.

As stated before, while we argue that loan officer authority does influence SME lending, we do not have a clear *a priori* about how it can be properly measured. We test different indicators.

Our first candidate is the amount of money up to which the loan officer is entitled to lend on his own (model *b*) which is a direct and quantitative measure of power. We define a variable (*delegation_loan*) which is scaled down by the average loan granted by each bank i in the province z, to keep into account the variability of the average loan across banks and local markets.[9]

Delegation_loan turns out not to be significant: the maximum loan an officer can grant autonomously does not affect the bank specialization in SME lending in the specific local credit market. We argue that this happens because the amount of money a loan officer may lend does not capture to what extent a loan officer is effectively involved in lending decisions, and the effective control over decisions is crucial for loan officers' incentives to gather soft information and the lending to small businesses. We argue that loan officer authority may indeed depends on several factors and Delegation_loan seems non able to capture all the relevant ones.

We take a first step in model *c)*, where we control for the scope of loan officer delegation (model *b*). In particular, *delegation_approval* is a dummy variable which is equal to 1 if banks participating

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[9] In not reported estimates we plug into the equation (1) the maximum amount of money that branch managers are entitled to lend to any single borrower (delegation_loan), without a scaled measure, and we get a negative (and very significant) sign for its coefficient. This finding signals that – not controlling for loan size – the specialization of banks in small business lending is decreasing in terms of the amount of money branch managers are entitled to lend on their initiative. To interpret this result one has to take into account three aspects of lending. First, there is a strict positive correlation between firm size and the size of the loan. Second, firm opaqueness correlates positively with the firm size. Third, the effort branch managers have to exert in order to screen and monitor firms is positively correlated with firm opaqueness. Thus, when loan officers are able to choose among a wider set of loan contracts – because their headquarters have defined a higher threshold for the amount loan officers may lend on their own initiative – they tend to finance a set of larger firms which therefore allows them to lend the same amount of money overall while exerting less effort in screening and monitoring borrowers compared with the case in which they lend to a set of smaller firms. The negative coefficient for a simple measure of delegation_loan indicates that to better measure the real effect of the branch manager authority in terms of a quantitative index we have to correct its delegated power for the average loan in the bank portfolio (as used in our estimates), because loan officers tend to switch to less opaque borrowers when the amount they can lend to each firm increases.

in the survey reported that the role of branch officers in loan approval is "important",[10] and 0 otherwise. We find that compared with banks which delegate less power to their loan officers, banks reporting that loan officer power is "large" are more prone to lend to small businesses; in particular, their small business lending share is 3.6 percentage points greater. We consider this variable as crucial to capture the scope of the power delegated to loan officers that, within reason, goes beyond the strict approval decision. Indeed, it is reasonable to think about loan approval delegation as a pre-requisite for delegating the decision about specific loan contract covenants. For example some banks may place more emphasis than others on the discretion loan officers may have to set loan interest rates, while others may stress more the quantity of money loan officers are entitled to lend on their own initiative.

Model *d)* then adds a measure of loan officers' discretion in setting interest rates. The dummy *delegation_price* equals 1 if price discretion is "important",[11] 0 otherwise. We then interact this variable with *delegation_approval*. Results suggest that, conditional on having being delegated the power to approve loans, branch officers' incentives in gathering soft information and then in lending to small business are even greater when they have some discretion to set interest rates. In particular, the share of small business lending is on average 4.2 per cent greater for banks which delegate significant decision-making power to branch managers both in approving loan requests and in setting interest rates.

4.2 Loan officer tenure and lending technologies

In this section, we test whether banks' specialization in small business lending depends on branch manager turnover and the lending technologies adopted. We argue that both sets of variables may affect loan officer incentives: the tenure of branch managers at a given branch may affect their ability to benefit from efforts to gather soft information, which requires a prolonged interaction with borrowers. Lending technologies may differ in the use of soft or hard information. When a bank puts more emphasis on hard information (e.g. by adopting credit scoring techniques), this may entail a reduction in the capability of local managers to have control over lending decisions (i.e. loan officer's real authority) thus deterring soft information acquisition.

Model *a)* in Table 5 includes a control for the time spent by local managers at a branch (*LO_tenure*). The coefficient is positive and statistically different from zero, showing that banks which are more prone to lend to small firms allow a longer interaction of loan officers with the local credit market.[12] This result is consistent with the hypothesis that the investment in soft information requires a longer time to yield some return. As a consequence, loan officers have greater incentives to invest in *soft*

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[10] See Table 3 for many details on variable definition.
[11] See previous footnote.
[12] Scott (2006) found similar results for U.S. Banks. Ferri (1997) investigated a similar issue for Italian banks.

information if their stay at the same branch is expected to be longer, otherwise their efforts will mostly benefit incoming loan officers.

Another aspect which may affect loan officer authority is the kind of information considered more important within the bank. Equation *b)* includes a dummy variable (*Soft Information*), which is equal to 1 if banks make greater use of *soft information* than *hard information* and 0 otherwise. We find that the coefficient for the prevalence of *soft information* is positive and significant too (the relevance of soft information increases the share of small business lending by 1.6 per cent), reinforcing the interpretation that small business lending requires relationship lending technology. Similarly, by adding a control for the use of credit scoring techniques (*credit scoring*), we get a negative coefficient (the impact on small business lending ranges between 1 and 3 per cent) for this variable (model *c)*, indicating that the use of hard information is negatively related to the specialization of banks in small business lending.

Finally, model *d)* includes only one measure of loan officer power delegation (*delegation*) while it keeps the control for loan officer tenure and the use of soft information. This more parsimonious specification is used in the rest of the paper as a benchmark (baseline) equation.

4.3 Branch manager compensation schemes

The bank specialization in small business lending requires soft information gathering. The production of soft information is costly for the agent who produces it; thus, the effort to collect information is inversely correlated with agent's marginal utility. Consequently, bank headquarters have to create loan officers' incentive (compensative benefits or private benefits) to gather that information. Therefore, banks can strategically manage branch loan officer's pay-off to better meet this purpose, conditionally to their lending policy preferences, in terms of specialization towards small firms. This implies that principals (bank headquarters) not only have to delegate the production of soft information to loan officers but they have also to reward agents for their efforts and it seems also reasonable that the type of rewarding scheme affects agents' incentives. Once again, form a theoretical point of view, this kind of analysis is well nested in the Stein's model stated above (see the theoretical background) and with our holistic approach in order to reach the "real branch manager's authority", enhanced by appropriate compensation schemes.

In this section we test this further hypothesis by Stein's model and we take into account the characteristics of the branch manager compensation schemes (Table 6). In particular, we add some variables which are related to the branch loan officer pay-off[13]. We draw information from a specific question in the survey asking banks to rank in a descending relevance some branch targets to measure

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[13] As pointed out in section 3, in our organizational survey loan officer and branch manager are the same thing. In other terms, the survey stops at the branch manager level. We have not information of what happens within branches. However, anecdotic evidence suggests that branch managers play the crucial role at the branch level and that little is delegated to lower organizational levels.

loan branch officer's pay-off (see the Methodological Appendix for related questions and Table 3 for variable definition). Since in general loan officers get a bonus on short-run portfolio performance, one has to keep in mind when interpreting the relative coefficients that these variables are short-run constraint. First, we plug a dummy variable (*loan portfolio size*) that equals 1 if the size of the loan portfolio held by loan officers is a crucial target for his/her reward, and 0 otherwise. In other words, we compare banks which put great emphasis on lending portfolio size targets (*loan portfolio size* =1) with other banks which do not. So, following Udell (1989), our dummy *loan portfolio size* captures exactly the fact that loan branch officers are compensated for increasing the branch loan portfolio. Model *a*) shows that if loan portfolio size is a primary target for compensating branch managers then loan officers are more prone to lend to small firms. For those banks, the share of business lending is 1.3 per cent greater. This result is consistent with the view that when loan officers are rewarded for the expansion of a loan portfolio *per se*, they are less worried about lending to opaque borrowers whose ex-post profitability may depend on information which has been observed by them but that could not be transferred in a credible way to headquarters.

Model *b*) includes another control for the branch manager compensation scheme. In particular, the dummy *loan portfolio profitability* equals 1 if the profitability of the overall loan portfolio held by the branch manager is a stringent constraint, 0 otherwise. We find that the coefficient for profitability targets is negative (the impact on small business specialization is more than 4 per cent) indicating that lending to opaque firms requires an investment in soft information which yields some return in the medium-long run.

By interacting *loan portfolio profitability* and *loan portfolio size* (model *c*) we may also check whether the effect of loan portfolio profitability differs among banks which put a higher emphasis on the size of loan portfolio than other banks. The coefficient for this interaction term (model *c*) is positive, signalling that the effect of profitability constraints is smoothed by the quantity constraint. In other terms, the profitability constraint is less stringent when banks also emphasize quantity targets. Branch managers are therefore less concerned with generating returns in the short-run since they are also rewarded better if they expand their lending overall. It is important to notice that when we take into account the short term loan portfolio profitability (models b) and c)), the loan officer branch tenure does not still matter, in line with the depreciation of the incentive to collect soft information.

In the last model of Table 6 we have accounted for compensation schemes in a different way. In particular, by averaging the relative importance of each component of compensation schemes, we obtain a synthetic indicator of the compensation policy adopted by a bank (see the Methodological Appendix): The higher the value for that indicator the lower the importance of the compensation schemes. Our estimations suggest that loan officers are more prone to collect soft information when banks put less emphasis on compensation schemes which, due to the fact that may put too much

pressure to obtain results in the very short time, tends to discourage soft information gathering efforts, which, in turn, deliver their benefits in a longer time.

4.4 Robustness checks

In order to check the robustness of our main findings, we run some alternative econometric exercises on our baseline specification (Table 5, model *d*).

First, since our measure of bank specialization in small business lending is computed as a share (defined between 0 and 1), it can be considered as censored variable. Under this assumption, it would be more feasible to estimate our parameters using a tobit methodology. Secondly, we verify how our results are robust to a more severe measure of bank specialization in small business lending (e.g. firms with less than 5 employees). Table 7 (respectively, models *a* and *b*) shows that our baseline results are mostly confirmed and that findings are not affected by a different definition of our dependent variable or by different estimation techniques. In particular, the more important the role of the loan officer in loan approval process, the higher the bank specialization in small business finance. Moreover, banks which invest in loan officer tenure show a higher orientation towards small business finance.

Even within banks of comparable size we observe wide heterogeneity in terms of organizational characteristics. Looking at Tables 1 and 2, it is possible to note some meaningful differences in organization and lending techniques between large and small banks, especially for banks not belonging to groups. In particular, large banks exhibit on average higher loan officer turnover and delegation in lending to small firms; furthermore, large intermediaries usually assign less importance to soft information and make greater use of credit scoring systems in loan approvals. We then investigate whether our results are driven by some non-linear effect related to bank size. In order to confirm that our results, once we have controlled for size, are capturing this "within group" heterogeneity, we run our baseline regression only for the sub-sample of small banks. Table 7 (model *c*) shows that our results are all confirmed when we consider the sub-sample of small banks, with the exception of the dummy approval, which is not significant anymore. We interpret this result as an evidence of the fact that, due to their lower organizational complexity, within small banks, branch loan officer are better able at hardening soft information. As a consequence, even if headquarters do not formally delegated lending decisions to loan officers the latter have a great influence over the approval of a loan.

5. Conclusions

In this paper we investigate whether bank organization characteristics affect bank specialization in lending to small firms. By using a unique dataset based on a survey of Italian banks, we are able to go beyond the traditional large versus small banks comparison. We also exploit detailed data on lending

activity at province level to investigate how the "functional distance" between bank headquarters and borrowers affects bank specialization.

Our main findings are the following. In line with previous results, we support the idea that bank size negatively affects bank specialization in small firm finance due to small banks' comparative advantage in investing in *soft information* gathering and assessing opaque borrowers' creditworthiness. Moreover, we argue that, apart from size, a bank's organizational features (loan officer-specific ones) play an important role in explaining its orientation to small business lending. In particular, we show that the higher the *real* involvement of the branch officer in the loan approval process, as well as in setting interest rates, the higher the bank specialization in financing small and opaque firms. In the same direction, we find that the longer the local officer stays at the same branch, the more banks are focused on small business finance; experience gained over time can improve a loan officer's ability to establish long-lasting and informative relationships with opaque borrowers. We also find that the amount of money up to which loan officer may lend autonomously, scaled by the average loan in bank portfolio, is not statistically correlated with bank specialization in small business finance.

Bank specialization in small business lending depends crucially on lending technologies, too. Banks more involved in *soft information* gathering exhibit a greater share of credit granted to small firms, while the improvement of internal rating systems (mainly to monitor borrowers' creditworthiness) negatively affects small business lending orientation, giving a prominent role to hard information.

Finally, we show that banks are more prone to finance small firms in those provinces where they have a more developed branch network, which implies some informational externalities among branches closely located. On the other hand, we find that banks' willingness to lend to small firms is inversely correlated with borrowers located in the local market where they have their headquarters. This result contrasts with those obtained in the empirical literature on the so-called functional distance, which argues that distance affects negatively the incentives to gather soft information. A possible interpretation is that in this paper we already control for a wide set of variables measuring loan officer authority and then soft information production incentives. In this case, functional distance does not capture anymore the loan officer ability to harden soft information. This result signals that banks are less specialized in small business lending in the local market (province) where they are headquartered, due to a prominent role of the CEO.

All in all, our results suggest that, consistently with Stein's model (2002), an increase in a loan officer's authority is positively correlated with bank specialization in small business lending. However, in line with Aghion and Tirole (1997), we are aware of the distinction between loan officer's *formal authority* (the right to decide) and *real authority* (the effective control over decisions). Indeed, we control for a rich set of formal rules (loan officer's tenure, the power delegated to loan officers, both in terms

of the size of the loan and the interest rate charged, the structure of loan officers' compensation scheme, etc.) that all contribute to shape a loan officer's real authority.

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Questions and Variables

Delegation_loan: is the maximum loan that the first hierarchical level (branch local officer) can autonomously grant to SMEs. In the econometric analysis we have usually divided this measure for the average loan in bank portfolio.

Related Question – Consider **loans to first-time applicant non-financial firms** (1). Please specify **the maximum amount of credit (in thousand of euros)** that can be autonomously granted by each of the positions named in the previous question, distinguishing according to customer segment and technical form of credit (N.B.: if necessary, add additional lines to the table).

	SMEs					Large firms				
	Current account facility (2) (3)	Self-liquidating loans (2) (3)	Unsecured loans (2)	Mortgage loans (2)	Total credit (3)	Current account facility (2) (3)	Self-liquidating loans (2) (3)	Unsecured loans (2)	Mortgage loans (2)	Total credit (3)
1					********					
2										
3										
4										
5										
6										

(1) Answer for a firm which according to available information has no problems of solvency. – (2) If the category may include more than one case (as when the amount varies with type of branch), give the value representative of the largest number of loans. If the position responsible has no degree of autonomous power of decision, put "0". If the bank does not make this type of loan, put "NA". If a position has no lending ceiling save that set by law, put "max". – (3) Consider loans not backed by collateral.

***

Delegation_approval: a dummy that is equal to 1 if the LO has a "crucial" or "very important" role in loan approvals (answer 2 or 3).

Delegation_price: a dummy that is equal to 1 if the LO has a "crucial" or "very important" interest rate discretion (answer 2 or 3).

Related Question – Consider **loans to small and medium applicant non-financial firms** (which are not in financial distress). Please specify:

The role of the branch Loan Officer in the following lending activities:	*Loan approval* |_**2/3**_|	*Loan amount* |_**2/3**_|	*Loan princing* |_**2/3**_|	*Loan collateral* |_**2/3**_|
Please, use an increasing ranking: 0 = not important, 1 = less important, 2 = fairly important, 3 = very important.				

***

Loan portfolio size: a dummy that is equal to 1 if the LO's pay-off is related in a significant way (1 or 2) to the size of the loan portfolio (volume targets; growth in lending).

Loan portfolio profitability: a dummy that is equal to 1 if the LO's pay-off is related in a significant way (1 or 2) to the loan portfolio profitability.

Related Question – What is the weight of the following factors in determining incentives for branch managers' compensation? In the last three years has the importance of each factor increased, decreased or remained essentially unchanged?

	Order of importance (1)	Tendency (2)
Growth in lending	✱✱✱	
Bad debt and/or impaired loan ratio		
Change in bad debt and/or impaired loan ratio		
Net earnings on loan portfolio	✱✱✱	
Overall profitability of unit (e.g. gross income)		
Average potential riskiness of loan portfolio		
Growth of direct fund-raising		
Growth of indirect fund-raising		
Other (please specify)		
(1) 1 = very important, 2 = fairly important, 3 = not very important, 4 = not important at all; NA = not applicable. *(2) 1 = increased; 2 = essentially unchanged; 3 = decreased; NA = not applicable.*		

<center>✱✱✱</center>

LO tenure al the same branch

Related Question – Please indicate the average length of tenure of branch managers, in months (even an estimate). In the **last three years** has it lengthened, shortened or remained unchanged?"

Mean tenure: |▓▓▓▓| (months)   **Tendency in last three years**: *lengthened*|__| *unchanged*|__| *shortened*|__| *NA* |__|

<center>✱✱✱</center>

Credit Scoring: a dummy that is equal to 1 if for a given bank the internal rating system is "crucial" or "very important" (1 or 2) in monitoring SMEs' creditworthiness.

Related Question – In assessing creditworthiness, do you use automatic scores generated by **statistical/quantitative methodologies** (credit scoring and internal ratings)? Please indicate whether these methods are used for the types of lending listed below, the year they were introduced, whether they were developed internally or purchased from outside, and their importance in the decision whether or not to lend, amount, pricing, maturity, collateral and monitoring.

	Yes / No	Year of introduction (1)	Internal / external (2)	Importance of the method in decisions on:					
				Loan approval (3)	Amount (3)	Pricing (3)	Maturity (3)	Collateral (3)	Monitoring (3)
Loans to households									
Consumer credit									
Loans to SMEs									✱✱✱
Loans to large firms									
(1) Year when first introduced. – (2) Specify whether: 1 = the methodology was developed exclusively within the bank; 2 = it was developed in cooperation with other institutions or consortia; 3 = it was purchased from an outside company belonging to your group; 4 = it was purchased from an outside company not belonging to your group; 5 = other. – (3) Rank from 1 to 5 in decreasing order of importance: 1 = decisive, 2 = very important, 3 = fairly important, 4 = not very important, 5 = not important at all, NA = not applicable.									

<center>✱✱✱</center>

Soft information: a dummy that is equal to 1 if bank *i* ranked face-to-face relationships with the entrepreneur or the usage of non-traceable information in the first three places.

Related Question – For the granting of loans to non-financial firms that apply to you for the first time, please rank in decreasing order of importance the factors used in deciding whether or not to grant the loan. 1 for the most important, 2 for the next most important, and so on. No two factors can be given the same rank. If you do not use the factor, answer NA.

	SMEs	Large firms
Statistical-quantitative methods exclusively		
Financial statement data (1)		
Credit relations with entire system (data from Central Credit Register and/or other credit bureaus or public sources, *i.e.* Interbank register of bad cheques and payment cards, Bulletin of protests, etc. (1)		
Availability of personal guarantees or collateral		
Qualitative information (organizational structure of firm, characteristics of project, etc.) (1)	***	
Other assessments based on first-hand information	***	
Other (specify)		
(1) With respect to the statistical-quantitative methodologies referred to in question B2, please answer as regards the use of each source of information <u>outside</u> the algorithms.		

Table 1 – Bank size, delegation and loan officer ("LO") turnover (1)

(thousand of euros and months)

	Maximum amount of money LOs are allowed to lend autonomously				Months LO stays in a branch			
	mean	p25	p50	p75	mean	p25	p50	p75
Large and medium-sized banks	458	108	200	380	32	26	32	36
Small banks in banking groups	211	80	125	250	40	30	36	48
Stand-alone small banks	112	44	90	150	48	36	40	60
Cooperative banks	114	10	30	100	49	36	48	60
Total	176	18	71	150	45	33	38	60

(1) According to the size classification provided by the Bank of Italy, small banks have total assets of less than 7 billion euros.

Table 2 – Bank size, loan pricing and lending technology (1)

(units)

	Branch managers allowed to lower interest rate by more than 25 b.p.		Importance of soft information (2)		Credit scoring crucial in lending decision (3)	
	YES	NO	YES	NO	YES	NO
Large and medium-sized banks	2	12	20	17	30	6
Small banks in banking groups	3	38	38	36	32	19
Stand-alone small banks	0	14	10	10	8	9
Cooperative banks	12	91	108	76	45	41
Total	17	155	176	139	115	75

(1) According to the size classification of the Bank of Italy, small banks have total assets of less than 7 billion euros. – (2) This classification is based on a dummy variable that is equal to 1 (YES) for those banks that ranked face-to-face relationships with the entrepreneur or the usage of non-traceable information as "crucial" or "very important". – (3) In this case YES is used for banks using credit scoring and/or internal rating systems for SME finance, whose score index is crucial for the assessment of credit.

Table 3 – Descriptive statistics on the estimation sample

Variables	Description	Mean	Median	Std. Dev.	Expected sign
Dependent variable					
Specialization in small business lending	Share of credit granted by each bank i to sole-proprietorships and other non-financial enterprises with less than 20 employees operating in province z (103 provinces) and sector j (23 economic activities).	0.35	0.22	0.36	
Bank characteristics					
Size	Log of total assets.	23.02	23.21	1.74	–
Risk	Ratio of bad loans to total loans (percentage).	3.22	2.50	2.40	–
Cost_income	Ratio of operational costs to gross income (percentage).	61.04	60.10	11.68	+/–
Bank characteristics in local markets					
Branches	Number of branches of each bank i in each province z.	9.28	2.00	21.19	+
Lending_type	Ratio of advances to total loans (percentage) at province-sector level	18.60	14.36	18.58	–
Bank_head	This dummy is equal to 1 if SMEs are headquartered in the same province where bank i has its headquarters.	0.09	0	0.29	+/–
Local market characteristics					
Large_banks	Market share of large banks (percentage)	67.27	70.38	16.43	–
Bank organization					
Delegation_loan	Ratio of the value of the maximum loan that a loan officer can autonomously grant to SMEs to the average size of loans of the bank i in province z (percentage)	0.09	5.11	1.47	+/–
Delegation_approval	The dummy is equal to 1 if the LO has a "crucial" or "very important" role in loan approvals.	0.89	1	0.31	+
Delegation_price	The dummy is equal to 1 if the LO has a "crucial" or "very important" interest rate discretion.	0.58	1	0.49	+
Soft_information	The dummy is equal to 1 if bank i ranked face-to-face relationships with the entrepreneur or the usage of non-traceable information in the first three places ("crucial", "very important" or "important").	0.55	1	0.50	+
LO_tenure	The index is calculated as the logarithm of months the LO of bank i stays in the same branch.	3.52	3.58	0.35	+
Credit_scoring	The dummy is equal to 1 if for a given bank the internal rating system is "crucial" or "very important" in monitoring SMEs' creditworthiness.	0.55	1	0.50	–
Loan portfolio profitability	The dummy is equal to 1 if the LO's payoff is related in a significant way ("crucial" or "very important") to the loan portfolio profitability.	0.73	1	0.44	–
Loan portfolio size	The dummy is equal to 1 if the LO's payoff is related in a significant way ("crucial" or "very important") to the size of the loan portfolio (volume targets).	0.88	1	0.33	+
Mean index of rewarding schemes	The variable is equal to the average value of all ranks given to each target at branch level to compensate loan officer. It is decreasing as the importance of the compensation schemes increases	3.30	2.12	2.39	+

Table 4

Loan officer authority and small business lending: basic regressions

The dependent variable, ranging between 0 and 1, is the outstanding amount of loans granted by bank i to small businesses (firms with less than 20 employees) of sector j and headquartered in province z, as a ratio of the overall amount of lending to non-financial firms of sector j headquartered in province z, and granted by bank i. Sector and province dummies are always included. Robust standard errors are reported in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

	Model a	Model b	Model c	Model d
Bank characteristics				
Size	-0.0434***	-0.0434***	-0.0431***	-0.0424***
	[0.0010]	[0.0010]	[0.0010]	[0.0010]
Risk	-0.0029***	-0.0029***	-0.0029***	-0.0021***
	[0.0007]	[0.0007]	[0.0007]	[0.0007]
Cost_income	0.0017***	0.0017***	0.0020***	0.0017***
	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Bank –local market characteristics				
Branches	0.0011***	0.0011***	0.0011***	0.0010***
	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Lending_type	-0.0006***	-0.0006***	-0.0006***	-0.0006***
	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Bank_head	-0.0291***	-0.0291***	-0.0247***	-0.0230***
	[0.0050]	[0.0050]	[0.0051]	[0.0050]
Local market strucutre				
Large_banks	-0.0017***	-0.0017***	-0.0017***	-0.0017***
	[0.0002]	[0.0002]	[0.0002]	[0.0002]
Loan officer authority				
Delegation_loan		0.0000		
		[0.0000]		
Delegation_approval			0.0355***	0.0063
			[0.0049]	[0.0054]
Delegation_approval*Delegation_ price				0.0420***
				[0.0031]
Constant	1.1534***	1.1533***	1.0958***	1.1006***
	[0.0333]	[0.0333]	[0.0348]	[0.0348]
Observations	54,111	54,111	54,111	54,111
R^2	0.21	0.21	0.21	0.22

Table 5

Loan Officer authority and small business lending:
Loan Officer turnover and lending technologies

The dependent variable, ranging between 0 and 1, is the outstanding amount of loans granted by bank i to small businesses (firms with less than 20 employees) of sector j and headquartered in province z, as a ratio of the overall amount of lending to non-financial firms of sector j headquartered in province z and granted by bank i. Sector and province dummies are always included. Robust standard errors are reported in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

	Model a	*Model b*	*Model c*	*Model d*
Bank characteristics				
Size	-0.0389***	-0.0390***	-0.0369***	-0.0369***
	[0.0011]	[0.0011]	[0.0011]	[0.0011]
Risk	-0.0024***	-0.0027***	-0.0031***	-0.0039***
	[0.0007]	[0.0007]	[0.0007]	[0.0007]
Cost_income	0.0017***	0.0017***	0.0016***	0.0019***
	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Bank-local market characteristics				
Branches	0.0010***	0.0010***	0.0010***	0.0011***
	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Lending_type	-0.0005***	-0.0006***	-0.0005***	-0.0005***
	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Bank_head	-0.0233***	-0.0230***	-0.0224***	-0.0240***
	[0.0050]	[0.0050]	[0.0050]	[0.0050]
Local market structure				
Large_banks	-0.0017***	-0.0017***	-0.0017***	-0.0017***
	[0.0002]	[0.0002]	[0.0002]	[0.0002]
Loan Officer authority				
Delegation_approval	0.0131**	0.0169***	0.0137**	0.0395***
	[0.0054]	[0.0055]	[0.0055]	[0.0051]
Delegation_approval*Delegation_ price	0.0400***	0.0411***	0.0383***	
	[0.0031]	[0.0031]	[0.0032]	
Delegation_loan	0.0000	0.0000	0.0000	
	[0.0000]	[0.0000]	[0.0000]	
LO_tenure	0.0385***	0.0377***	0.0329***	0.0369***
	[0.0051]	[0.0051]	[0.0051]	[0.0051]
Lending technologies				
Soft information		0.0158***	0.0103***	0.0074**
		[0.0029]	[0.0030]	[0.0030]
Credit scoring			-0.284***	-0.0321***
			[0.0032]	[0.0032]
Constant	0.8834***	0.8729***	0.8705***	0.8415***
	[0.0443]	[0.0444]	[0.0444]	[0.0444]
Observations	54,111	54,111	54,111	54,111
R^2	0.22	0.22	0.22	0.22

Table 6

Loan Officer authority and small business lending: compensation schemes

The dependent variable, ranging between 0 and 1, is the outstanding amount of loans granted by bank i to small businesses (firms with less than 20 employees) of sector j and headquartered in province z, as a ratio of the overall amount of lending to non-financial firms of sector j headquartered in province z, and granted by bank i. Sector and province dummies are always included. Robust standard errors are reported in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

	Model a	*Model b*	*Model c*	*Model d*
Bank characteristics				
Size	-0.0297***	-0.0306***	-0.0300***	-0.0315***
	[0.0013]	[0.0014]	[0.0014]	[0.0012]
Cost-to-income ratio	0.0022***	0.000	0.0001	0.0019***
	[0.0002]	[0.0002]	[0.0002]	[0.0002]
Risk	-0.0059***	-0.002	-0.0039***	-0.0036***
	[0.0008]	[0.0012]	[0.0014]	[0.0008]
Bank-local market characteristics				
Branches	0.0011***	0.0010***	0.0010***	0.0010***
	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Lending_type	-0.0011***	-0.0006***	-0.0005***	-0.0005***
	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Bank_head	-0.0263***	-0.0161**	-0.0166**	-0.0246***
	[0.0059]	[0.0065]	[0.0065]	[0.0050]
Local Market strucutre				
Large_banks	-0.0018***	-0.0019***	-0.0019***	-0.0017***
	[0.0002]	[0.0002]	[0.0002]	[0.0002]
Loan Officer authority				
Delegation_approval	0.0662***	0.0383***	0.0378***	0.0286***
	[0.0065]	[0.0075]	[0.0075]	[0.0053]
Delegation_price				0.0467***
				[0.0031]
Loan Officer's tenure	0.0430***	0.0097	0.0062	0.0380***
	[0.0057]	[0.0065]	[0.0067]	[0.0051]
Loan Officer's compensation schemes				
Loan portfolio size	0.0127**	0.0368***	0.0145*	
	[0.0051]	[0.0056]	[0.0082]	
Loan portfolio profitability		-0.0427***	-0.0798***	
		[0.0040]	[0.0110]	
Loan portfolio size* Loan portfolio profitability			0.0459***	
			[0.0127]	
Mean ranking for LO's comp. schemes				0.0048***
				[0.0007]
Lending technologies				
Soft information	0.0061*	0.0210***	0.0235***	0.0098***
	[0.0033]	[0.0039]	[0.0040]	[0.0031]
Credit scoring	-0.0278***	-0.0295***	-0.0359***	-0.0318***
	[0.0036]	[0.0042]	[0.0046]	[0.0033]
Constant	0.6340***	1.1023***	1.1120***	0.8654***
	[0.0507]	[0.0549]	[0.0550]	[0.0464]
Observations	43,593	35,356	35,356	52,794
R^2	0.22	0.22	0.22	0.22

Table 7

Loan Officer authority and small business lending:
robustness checks

In the tobit estimation (model *a*) the dependent variable, ranging between 0 and 1, is the outstanding amount of loans granted by bank *i* to small businesses (firms with less than 20 employees) of sector *j* and headquartered in province z , as a ratio of the overall amount of lending to non-financial firms of sector *j* headquartered in province z, and granted by bank *i*. In the OLS estimation in model *b* the dependent variable, ranging between 0 and 1, is the outstanding amount of loans granted by bank *i* to very small businesses (firms with less than 5 employees) of sector *j* and headquartered in province z, as a ratio of the overall amount of lending to non-financial firms of sector *j* headquartered in province z, and granted by bank *i*. In the OLS estimation in model *c* the dependent variable, ranging between 0 and 1, is the outstanding amount of loans granted by small bank *i* to small businesses (firms with less than 20 employees) of sector *j* and headquartered in province z, as a ratio of the overall amount of lending to non-financial firms of sector *j* headquartered in province z, and granted by bank *i*. Sector and province dummies are always included. Robust standard errors are reported in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

	Model a) *Tobit estimation:* *whole sample* *(marginal effects)*	*Model b)* *OLS estimation:* *very small firms*	*Model c)* *OLS estimation:* *small banks*
Bank characteristics			
Size	-0.0190***	-0.0239***	-0.0561***
	[0.0007]	[0.0009]	[0.0030]
Risk	-0.0024***	-0.0014**	-0.0010
	[0.0004]	[0.0005]	[0.0010]
Cost_income	0.0013***	0.0011***	0.0006**
	[0.0001]	[0.0001]	[0.0003]
Bank-local market characteristics			
Branches	0.0008***	0.0005***	0.0002
	[0.0001]	[0.0000]	[0.0002]
Lending_type	-0.0003***	0.0001	0.0005**
	[0.0001]	[0.0000]	[0.0001]
Bank_head	-0.0090**	-0.0343***	-0.0163*
	[0.0037]	[0.0040]	[0.0074]
Local market structure			
Large_banks	-0.0009***	-0.0288***	0.0006**
	[0.0001]	[0.0001]	[0.0002]
Loan officer authority			
Delegation_approval	0.0209***	0.0288***	0.0139
	[0.0034]	[0.0042]	[0.0075]
LO_tenure	0.0205**	0.0200***	0.0530***
	[0.0029]	[0.0043]	[0.0067]
Lending technologies			
Credit scoring	-0.0159***	-0.0054*	-0.0003
	[0.0017]	[0.0027]	[0.0050]
Soft information	0.0025	0.0019	0.0296***
	[0.0018]	[0.0025]	[0.0047]
Constant	-	0.4537***	1.169***
	-	[0.0359]	[0.0876]
Observations	54,111	54,111	25,726
R²	0.13	0.19	0.19

Bank Decentralisation and Small Business Loan Pricing

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Abstract

Banks are heterogenous in organisational choices. Specifically, decentralised banks delegate branch managers to exert decision-making power, mainly in small enterprise lending, while hierarchical banks do not. Since branch managers are pivotal in collecting soft information, we argue that delegation fosters a matching mechanism by which decentralised banks lend to firms with better private information. Using a unique dataset on organisation of the Italian banks, we study the effect of decentralisation on interest rates. Controlling for bank, firm, market and relationship variables, we find that small businesses that apply to decentralised banks pay lower interest rates (17 basis points). We also identify two factors that, increasing the real authority of branch managers, strengthen the matching mechanism (40/50 basis points): a longer tenure and compensation schemes based on credit risk.

JEL classification: G21, L22, M52.

Keywords: bank organisation, branch manager, relationship lending, small enterprise lending, loan pricing, delegation, real authority.

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1 Introduction[1]

Since the 1990s, the banking industry has undergone a significant change, driven by market liberalisation and digital technology. The main effects have been a wave of M&A activity and the adoption of information and communication technologies. The former resulted in a size distribution polarized into a few large institutions and a great number of small banks. The latter dramatically shrunk the cost of dealing with information, thus affecting the diffusion of statistical models, the internal allocation of powers and the control systems. In this framework, in recent years a renewed attention has been devoted to the interaction with the borrower.

Organisational choices have been adapting in different ways. Using data from an *ad-hoc* survey of Italian banks, Albareto *et al.* (2008) show that banks are very heterogeneous in organisation. The number of hierarchical levels, the branch managers' decision-making autonomy, their tenure and monetary incentives, as well as the use of credit scoring techniques differ widely among banks, although driven by bank size to some extent. Indeed, large banks tend to have a more complex structure, a more extensive delegation and a shorter tenure of branch managers, and to rely more on quantitative models. Nonetheless, organisational choices are diverse even within groups of banks exhibiting a similar size. These results suggest that size is only a partial proxy for bank organisation.

Organisational issues do affect lending activity, as they shape the choice of the lending technology and the propensity/ability to deal with soft information. Complex and hierarchical organisations suffer from a competitive disadvantage in managing soft information (Stein, 2002). Branch managers are pivotal; they directly interact with customers, which makes them able to collect soft information and, if incentives are properly designed, to exploit it. As a result, they should be granted decision-making power. However, dele-

gating decision-making power to branch managers involves potential agency conflicts and, consequently, monitoring costs; the larger the bank, the higher these monitoring costs. We define decentralised banks as those who delegate decision-making power about small business lending to branch managers.

Small enterprises are perceived by banks as a core and profitable business. However, they are intrinsically opaque so that their creditworthiness is based not only on public, observable information (namely financial statements and banking history), but also on private information (for instance the quality of management, the competitive position, potential investment projects), which is more difficult to collect. The latter often prevails, mostly because of the lower accounting standard established for small enterprises and the significance of the entrepreneur's ability. Moreover, due to their small size, market funding is usually not available and small enterprise external financing has to rely on banks.

It turns out that private, 'soft', information, mainly collected by branch managers, is key to small business lending. There is empirical evidence that organisation does influence loan portfolio composition: Benvenuti *et al.* (2010) show that, after controlling for size, banks which delegate decision-making power to the branch managers are more prone to lend to small firms (i.e., have the highest proportion of small enterprise loans in their portfolio) than other banks. In order to obtain this result, the branch managers' delegation should be 'real', i.e., encompassing quantity, price, and collateral decision, combined with a tenure long enough to prevent the interaction with the clients to take place.

In this paper we address a complementary issue. We investigate, from an empirical perspective, whether the branch managers' authority affects interest rates charged on small firm loans. Why would this happen? Our main idea can be summarized as follows.

From the perspective of the firms, a small business faces a local credit market, with banks oriented toward either transactional or relational lending, depending on their organisation (hierarchical or decentralised). Firms with an overall creditworthiness higher than the observed one (i.e., firms with 'good' private information) will try to signal their quality by applying to relationship-oriented banks, which are able to recognize their real status. Oppositely, 'bad' firms would not want their real quality to be uncovered.

From the perspective of the bank, decentralisation implies a cost, which has to be offset by some benefit. Branch managers' authority may allow for cherry picking, i.e. selecting the small firms with the best private information.

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Therefore, in order to attract them, the bank has to share this informational advantage with them: the interest rate charged will be lower than hierarchical banks', but high enough to endow the bank with an extra-profit.

The implication of this setup is that decentralized banks will lend to the highest (unobservable) quality small enterprises, according to their private information; shortly, a separating equilibrium is going to occur and delegation acts as a proxy for the 'private' quality of the firm. Accordingly, interest rates charged by decentralised banks are expected, *ceteris paribus*, to be lower, reflecting the reduced expected loss generated by the lower probability of default. Therefore, an empirical test can be performed: the organisational variable that measures the propensity to deal with soft information should exhibit a negative correlation with lending rates.

Using the survey conducted by the Bank of Italy on the the Italian banks' organisation, we identify decentralised institutions as banks whose branch managers are fully entitled to exert decision-making power in small business lending. Moreover, we use a very large set of controls matching individual information about both the lender and the borrower and adding market and relationship variables, as well. Our dataset is a highly representative cross section of the Italian credit market, including 137 banks and more than 78,000 firms (about 150,000 combinations of borrower / lender / loan technology).

The main findings of the paper are the following. The decentralisation variable assumes the expected sign: *ceteris paribus*, empowering branch managers leads to lower interest rates. This evidence supports our matching mechanism. Nonetheless, formal authority may not be enough. If tenure is short, the branch manager may not be able to interface with the local market adequately to collect and process private information. By interacting our key variable with a tenure indicator, we show that the effect of decentralisation turns out to be economically and statistically significant only if branch managers' tenure is long enough. Moreover, monetary incentives may be incorrectly aligned. We show that the effect on interest rates is higher when a compensation based on the quality of the credit portfolio is put in place, while quantity-based incentives are not relevant. All of our results tackle the group structure of the covariance matrix of the error term.

The paper is organized as follows: in section 2 we review the related literature and put forward our hypotheses to be tested. In sections 3 and 4 we describe our empirical strategy and explain data and variables. We illustrate our results in section 5 and robustness checks in section 6. Section 7 concludes the discussion.

2 Literature review and testable hypotheses

Our paper is related to the strand of the literature that investigates the link between bank organisational choices and lending technologies.

Most economic studies of firm organisation fit the framework of individual incentives (Holmström & Tirole, 1989). The functioning of a given organisation is explained by the incentives that regulate the behavior of its members. Principal-agent is the main paradigm: a principal engages an agent to perform a task on his behalf. Aghion & Tirole (1997) address the trade-off between delegation and control, focusing on the distinction between formal and real authority. Delegation improves the agent's incentive to acquire relevant information and eases his participation in the organisation. However, delegation implies a costly loss of control for the principal and gives rise to potential conflicts of interest. Principal-agent models are well suited to lending activity and, specifically, the relationship between the headquarter of the bank and its branch managers. Since banks delegate some lending decision-making power to line managers, the design of the correct incentive scheme is crucial to the collection of information to be used to screen and monitor borrowers.

Another relevant point of the recent banking literature is that lending is no longer viewed as a monolithic process, opposed to the issue of corporate bonds[2]. Lending involves at least two different technologies: relationship and transaction based lending. Relationship lending relies on private information acquired by the bank through an iterated contact with the firm and all the people involved in its activities (suppliers, customers and so on). This 'soft' information, neither verifiable nor transferable, is used to assess creditworthiness and make decisions about credit availability and other conditions[3]. In contrast, transaction lending is a technology that processes 'hard' information, namely documented data which can be verified and transmitted (i.e., balance sheet and income statement, the value of a collateral and so on)[4]. It turns out that lending to opaque firms, such as small enterprises, mainly relies on relationship lending as an instrument to improve the assessment of

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[2]Cole *et al.* (2004), Berger *et al.* (2005).

[3]Boot (2000), Berger & Udell (1995), Udell (2008), Freixas and Rochet (2008).

[4]This rough dichotomy has been refined in Berger & Udell (2006). They identify trade credit, relationship lending, and six more technologies inside the broad class of transaction lending, arguing that some of these, such as asset based lending, might also be targeted to opaque borrowers.

creditworthiness.

Coupling the principal-agent paradigm with lending technologies, a generation of models has emerged.

Stein (2002) shows that in the banking industry Aghion & Tirole's general conclusions are effective only for relationship lending which, relying heavily on soft information, requires delegation to line managers. Considering two extreme organisational models, hierarchy and decentralisation, Stein argues that the former is better equipped to deal with hard information, while the latter has a comparative advantage in managing soft information. This difference stems from the *ex ante* incentives that regulate the loan officer's behavior. In a decentralised structure the loan officer has a motivation to gather soft information because he has the authority to grant a loan. Conversely, in a hierarchical structure he has to transmit this information to the upper management in order to get an approval; because of the nature of soft information, his effort may be wasted. It is more convenient to collect information that can be easily transmitted to and verified by the higher levels, increasing the likelihood of his proposal being accepted.

Berger & Udell (2002) reach a similar conclusion, although their argument emphasizes the adverse incentives resulting from the delegation of authority. Because of either their short horizons or the fact that their remuneration is based on short-term results, loan officers may overinvest in new loans, rather than monitoring the existing ones. Moreover, loan officers may have an incentive to hide the borrower's actual (worse) creditworthiness because of a personal relationship with him. As a result, banks that delegate more authority to their loan officers need to make more investment in monitoring their performance. Empirically, Udell (1989) finds a positive and significant relation between the investment in the loan review function and the degree of delegation of lending authority.

Empirical evidence supports the idea of decentralisation as the appropriate incentive mechanism to collect and use soft information. Liberti (2003) shows that delegation allows managers to spend less time on reporting activities and more on building relationships with customers. Thus, he argues that decentralised banks rely more on soft information compared to hierarchical structures. Similarly, Liberti and Mian (2009) find a decreasing sensitivity to soft information in hierarchical banks; credits approved at higher levels rely more on hard than soft information content. Agarwal and Hauswald (2010) show that more autonomous branches produce more soft information, and the more soft information is produced, the more real authority the local man-

ager benefits from. The role of branch manager is also explored in Uchida *et al.* (2008): officers play a critical role in producing soft information, and the smaller the bank, the more soft information is produced. Nonetheless, both small and large banks believe that small businesses represent a profitable segment, as shown by Beck *et al.* (2008) and de la Torre *et al.* (2008).

Therefore, relationship lending technology requires banks to delegate decision-making power to their branch managers, in order for the lending decision to encompass soft information. How decentralisation affects small business loan pricing is the issue we try to address; to our knowledge, no empirical research has investigated this topic yet.

During the nineties, different studies explored the effect of the length of the relationship on the cost of credit (see Degryse *et al.*, 2009, for a comprehensive review), following the idea that the longer the lender-borrower relationship, the more soft information is obtained. This phenomenon does not necessarily hold, for different reasons: a hierarchical bank may actually discourage the collection of private information; even a decentralised bank may fail if branch managers' turnover is too high or if their incentives are not appropriate. Organisational choices do affect competition, too (Degryse, Laeven and Ongena, 2009).

In this paper we try to fill the gap by using a unique dataset that allows us to distinguish between banks that delegate lending decisions to their branch managers and banks that do not. The main idea is that delegation strongly impacts the borrowers selection process, thus affecting interest rates. Only small firms with good private information are interested in matching with decentralised banks, because of their better (unobserved) quality. These firms have an incentive to be 'uncovered' and get a price that reflects both public and private information. Conversely, firms with bad private information will apply to hierarchical banks in order to pay an interest rate that only embodies public information. It can be argued that the branch manager's authority is not fully observable by outsiders *ex ante*; a repeated-game process can be imagined, and multiple bank relationships may be also viewed as a learning tool to pinpoint the bank with the desired propensity.

From the lender's point of view, selecting the best firms allows him to offset the higher costs associated with the choice of decentralisation. It is well known that relationship lending is a more expensive technology, compared to transaction lending, because it requires an informal and repeated interaction with the customer. In order to attract the best firms, decentralised banks have to share the informational advantage with them. That is, the rate of

interest charged should be more than a fractional amount lower than the rate charged from a hierarchical (uninformed) bank, though higher than the rate appropriate for the 'real' risk of the applicant. We do not enter into the more general issue about competition among banks with different information; however, the evidence of this strand of literature (Sharpe, 1990, and von Thadden, 2004) is compatible with our hypothesis (insiders charge lower rates than outsiders).

The implication of this theoretical setup is a separating equilibrium and a negative price difference between decentralised and hierarchical banks reflecting the different private quality of the borrowers. This is the main hypothesis that we will test in the paper.

The second issue that we address concerns the role of other organisational factors in small business loan pricing. We argue that bank choices are relevant to the extent to which they shape the incentives for branch managers to collect soft information. The choice of decentralisation may not be enough in the presence of other factors that induce the branch managers to make lending decisions relying upon different information. Following Aghion and Tirole (1997), we distinguish between the formal and real authority of the branch managers: the former only results from the bank choice of delegating decision-making power to the periphery; the latter also considers other organisational factors affecting the branch manager behavior in gathering creditworthiness information.

We take into account two of these factors, namely the tenure and the compensation schemes adopted by the banks. Our basic idea is that branch managers are encouraged to collect soft information and select borrowers with good unobservable quality only in the presence of a long tenure or a monetary incentive based upon the quality of their portfolio. If our argument is correct only decentralised banks that give a real authority to their branch managers should exhibit lower prices. This is the second hypothesis that we will test in our paper.

3 Data and methodology

3.1 Sources

We build our dataset using four different sources. The main one is the Italian Central Credit Register[5] (hereafter CCR), which contains loan-level detailed information about interest rate, loan size and collateral. Basically, CCR includes three lending technologies: advances, lines of credit and mortgages. In our analysis we only refer to short term loans (advances and lines of credit). The reason is that we can neglect maturity (which we do not know) and collateral (which we know only partially) as determinants of interest rate, and we focus on short term and unsecured loans whose price is frequently renegotiated to reflect creditworthiness. We use loan rates charged on borrowers during the first quarter of 2007 and match them with firm and bank individual-level data, as of the end of 2006[6]. Each observation is a combination of bank-borrower-lending technology information.

Firm-level data comes from *Cerved*, an Italian company that collects balance sheets and income statements on a yearly basis about all Italian limited liability companies. The database also contains details about the firm's age, sector of economic activity and geographic location. We focus on non-financial firms.

Bank-level information is mainly obtained from the Bank of Italy quarterly supervisory reports. Organisational variables come from two *ad-hoc* surveys conducted by the Bank of Italy in 2007 and 2008 on a high representative sample of 322 banks[7]. The surveys explored different facets of organisation, such as the number of hierarchical levels, the presence (and the actual use) of rating/scoring systems, the role of branch managers (turnover,

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[5]It is a database, administered by the Bank of Italy, collecting information at a micro level on the loans extended by banks and other intermediaries (not included in our sample) exceeding a fixed threshold (€ 75,000 at the time of our analysis). Moreover, a sample of 218 banks (accounting for 82 per cent of the market in terms of total loans) participates to a survey on interest rates, reporting individual lending rates charged to their customers.

[6]While bank, firm and relationship data are available continously, we have to resort to a cross-section analysis because organisational data refers only to the end of 2006.

[7]Accounting for more than 80 per cent of the total lending to the Italian non-financial firms; only very small banks were excluded, as well as intermediaries specialized in specific market segments (leasing, factoring, and consumer credit) and branches of foreign banks. A full description of the methodology and the outcomes is included in Albareto *et al.* (2008).

powers, compensation schemes) and the relevance of soft information; special attention was devoted to small firm lending.

We focus uniquely on loans granted by banks to small firms. It is important to note that we do not use a single criteria for defining small firms. The 2007 Bank of Italy survey asked banks to provide their own definition. Each bank indicated a threshold value of some discretional variables, such as sales or total assets. We then build our dataset applying this definition and including, bank by bank, only firms below the indicated threshold. Moreover, in order to avoid large differences among firms in the sample, we fix a € 2,5 million upper bound on sales. The advantage of this procedure is having a sample consistent with our variable of interest. The drawback is the possibility that a given firm granted by two different banks with two different thresholds might be included only for one of them. As a result, our definition of single lending relationship may not be entirely correct[8]. We tackle this issue in the section about robustness checks.

The final dataset includes 148,065 borrower / bank / loan type combinations. It involves 78,680 firms[9] and 137 banks. Table 1 summarizes the composition of the sample, after excluding both outliers (with reference to the interest rates and to firm's financial ratios) and banks who did not fully answer the organisational questions.

3.2 Empirical strategy

Our starting point is a reduced form equation where the interest rate charged to a small enterprise is affected by firm, bank, relationship and market variables. Here firm variables include observable phenomena (financial ratios, age, economic sector, location) that are directly or indirectly related to the quality of the firm and that any bank is able to assess whatever the organisation of the lending activity is. Considering firm i, bank j, and market k, the price is going to be (1)

$$r_{i,j} = f(firm_i, \; bank_j, \; relationship_{i,j}, \; market_k) \qquad (1)$$

However, small enterprises are intrinsically opaque and the assessment of

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[8]A similar problem also arises for firms granted by banks not participating in the survey on interest rate.

[9]25,327 of them are granted by only one bank in the sample, while the remaining 53,353 show multiple lending relationships.

their 'real' quality demands that soft information be collected. Our point is that organisational choices are pivotal here: since the branch manager is the collector of soft information, a small enterprise's creditworthiness can be fully measured to the extent the branch manager is involved in the lending decision.

The decentralisation of decision-making power plays a relevant role in loan pricing. It is expected to act as a proxy for unobservable quality, and to exhibit a negative sign because of the separating equilibrium resulting from the borrower's selection. In our dataset we capture this by introducing a bank dummy variable that equals one when the branch manager is significantly involved in small business lending decisions. More precisely, we define as decentralised those banks that declared during the survey an 'important' or 'very important' role of their branch managers in making decisions about both the amount and the interest rate on small business loans[10].

Introducing the dummy variable, the reduced form price equation becomes (2)

$$r_{i,j} = f(decentralisation_j, \ firm_i, \ bank_j, \ relationship_{i,j}, \ market_k) \quad (2)$$

The separating equilibrium that we conjecture is consistent with the existence of single banking relationships. However, in most countries (particularly in Italy) firms choose to borrow from more than one bank. There are several reasons for multiple banking, as pointed out by many studies (see for example Detragiache *et al.*, 2000, Farinha & Santos, 2002, and Ogawa *et al.*, 2005). The occurrence of multiple relationships may weaken the impact of decentralisation on the interest rate.

Let us consider the potential matchings between firms and banks of different types. Multiple banking borrowers, regardless of their type, can be divided into two main categories: 1- firms that borrow only from either hierarchical or decentralised banks; 2- firms whose loans are granted from both organisations at the same time. If our theoretical setup is true, multiple relationship has no effects for the former category. However, this effect may be positive for the latter category if firms are of 'bad' quality. Such firms will be 'uncovered' by decentralised banks that will charge an interest rate higher than that applied by hierarchical banks. At the opposite, if firms are of 'good' quality the negative effect will remain.

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[10]See below for a complete definition of the variable.

Obviously, we do not know whether a small business has good or bad private information; therefore, in order to take into account the 'noise' resulting from multiple relationship, we estimate separately the effects of decentralisation on a sample obtained excluding the firms belonging to the latter category. We refer to it as the reduced sample.

Last but not least, there is an econometric issue that is quite relevant in our framework. It is the clustering problem, also called Moulton problem, after Moulton (1986)[11]. Traditional cross-section inference relies on the hypothesis of data independence. But when data has a group structure it is hard to assume that the observations within the same group do not exhibit some kind of interdependence. It is exactly the case here, since our variable of interest (the delegation of power to the branch manager) varies across banks only; this holds for all bank variables, too. The result is a block structure of the covariance matrix of error terms, where independence can be assumed only between borrower-lender relationships belonging to different banks. It does not affect the consistency of the estimations, but their precision[12]. Therefore, we use the *cluster-robust* covariance matrix estimator, that is a generalization of White's (1980) robust estimator. It does not impose any restriction on the form of both heteroskedasticity and correlation within clusters, though it assumes independence of the error terms across clusters. It is worth noting that this estimator is consistent for an infinite number of clusters, while in practice 50 or more clusters are requested (in our sample the number of banks is 137).

4 Overview of variables

4.1 Definitions

Basically, our dataset contains 5 set of variables. A detailed description for each regressor is reported in Table 2.

ORGANISATION - The first set includes our key variables. *Decentralisation* is a dummy variable that equals one when the role of branch

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[11]A comprehensive treatment of the clustering problem is included in Angrist & Pischke (2009), ch. 8.

[12]It can be said that in computing the error of the coefficient estimates of bank variables, the degrees of freedom are proportional to the number of banks, that is 137, and not to the number of bank-borrower combinations, that is more than 148,000.

manager is either 'important' or 'very important' in both the decisions regarding the amount of the loan to grant and the interest rate to charge. *Tenure* is a dummy variable that equals one when the branch manager's tenure is longer than the median value (that is, the turnover is lower than the median). Furthermore, we have two variables related to the branch managers' compensation schemes. *Quantity* is a dummy variable that equals one if the bank declared to set a monetary incentive (considered either 'important'or 'very important') based upon some quantitative targets, such as the growth rate for small business loans. Similarly, *Quality* refers to the quality of the small firm loan portfolio as an alternative target. A bank can adopt more than one compensating scheme.

FIRM - We use standard indicators such as size, age, and two main ratios expressing the financial structure and the ability to generate an operating income. *Firm_size* is the natural logarithm of the total assets; *Age_2*, *Age_3*, and *Age_4* are dummy variables stating whether the age of the firm belongs to the second, third, or fourth quartile of the sample distribution; in this way, we take into account the usual nonlinear effect of this variable. *Leverage* is the ratio of external debt to the sum of external debt and equity; *Profitability* is the ratio of EBIT to sales.

BANK - This category includes bank characteristics that are different from organisational ones. *Bank_size* is the natural logarithm of total assets; *Cost/Asset* is the ratio of operating costs to total assets; *Liquidity* is the ratio of liquidity (cash and other liquid assets) to total assets; *Group* is a dummy variable that equals one when the bank belongs to a banking group.

RELATIONSHIP - These variables define the specific lender-borrower-lending technology combination. *Loan_size* is the natural logarithm of the amount of loan; *Line_of_credit* is a dummy variable that equals one for lines of credit and zero for advances; *Overdraft* is a dummy variable stating that the amount of the loan is breaching overdraft facilities, usually signaling firm difficulties; *Length* is a dummy variable equalling one if the bank-borrower relationship began at least two years before[13].

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[13]We also included a measure of the distance between the firm and the bank branch, which did not turn out to be significant. We therefore omitted it from our to report.

MARKET - For our purposes, a credit local market is defined by the province where the borrower is located[14] and its sector of economic activity[15]. Therefore, we use two sets of binary variables[16] in order to take into account local market competition conditions, which literature has proven to be relevant for small business pricing[17].

Table 3 reports the linear correlations among variables. As a whole, the coefficients are low enough to rule out serious collinearity problems. In two cases a value of 0.50 is exceeded: not surprisingly, bank size is correlated with the dummy stating whether the bank belongs to a group, and with the liquidity ratio. To a lesser extent, bank size is also correlated with the branch manager's tenure, too.

4.2 Summary statistics

A descriptive analysis of our dataset shows some insights into different phenomena: bank structure and organisation, firm financial ratios, lender-borrower relationships and interest rates.

Table 4 reports the values for the mean, the median and the standard deviation of the main bank balance-sheet and organisational variables. First of all, we note the huge difference between medium and large-sized banks and other institutions. The former's median value of total assets is eight time bigger than the latter's one. Moreover, while liquidity is monotonically decreasing in size, the operating costs indicator does not follow the same pattern. Both medium/large and credit cooperative banks (hereafter CCBs) exhibit a lower cost-to-asset ratio, a rough measure of efficiency.

Bank size plays a key role in determining organisational choices: the branch manager's tenure is positively correlated with size. It is well known in banking literature that the larger the organisation, the more it is afflicted with agency problems; in such a context, a branch manager's higher turnover is a viable way of control. Nonetheless, other organisational features are not universally determined by size. Considering our variable of interest, decentralisation, we note that in our sample of 137 banks more than half reported that they delegate decision-making power to their branch managers.

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[14]Italy is divided into 20 regions and 103 provinces.

[15]We adopt a classification based on 23 sectors.

[16]Used in all the regressions but not reported in the tables for the sake of brevity.

[17]Berger *et al.*, 2007

They are given such a responsibility in two thirds of medium-large banks, small group-member banks and CCBs, and only one third of small stand-alone banks.

Another organisational choice we are interested in concerns the branch managers' compensation scheme. Table 4 reports frequencies about the use by banks of the three main performance incentives: loan portfolio and branch profitability, loan growth and risk control. As can be seen, branch managers are mainly given incentives based on their portfolio or branch return; more than two thirds of the banks in the sample reported that they had adopted such a compensation scheme. For almost a third the incentives based upon the quality of portfolio are relevant; only 20 per cent relied on loan growth performance (indeed, multiple schemes can be adopted). Here we find again a significant heterogeneity among bank-size classes: while CCBs and stand-alone small banks are more likely to use *qualitative* incentives, medium and large banks tend to adopt more frequently *quantitative* ones. Therefore, it is arguable that compared to larger banks, smaller institutions adopt compensation schemes more consistent with their choice of decentralisation.

We move to Table 5 in order to examine descriptive statistics on the firms in our sample. Only small firms are included: the total assets of the median firm equals € 880,000. Although very small, firms are relatively established, as well, showing a median age of about 10 years. A distinctive feature of Italian small firms is a high leverage. In our sample the median value equals almost 90 percent and interests absorb 26 percent of the EBIT. The average profitability (EBIT to total assets) is 9.4 percent.

We conclude the descriptive section by carrying out a univariate analysis of the average interest rates. Results are reported in Table 6. Several phenomena are worth noting. The larger the bank, the higher the interest rate charged on small firm loans; this is true for almost any of the variables considered. The difference between medium/large and CCBs is about 70-80 basis points. A premium (250-300 basis points) is paid by lines of credit with respect to advances, due to the different risk involved in terms of probability of default (actually, advances rely upon two debtors) and loss given default (collateral). Loan size, firm size, and firm age do reduce the cost of credit. Leverage, as a main risk factor, is priced as expected, while profitability has no well-defined impact on interest rates. The relationship between organisational variables and interest rates has no clear-cut interpretation, apart from turnover (a longer tenure of branch managers ends in lower rates). Specifically, when the branch manager is fully involved in small firm lending,

interest rates are higher for medium and large banks and lower for the other three categories. This issue, pivotal in our paper, will be explored by the econometric analysis, in a *ceteris paribus* setup.

5 Empirical results

In this section we report the main results of our analysis. Firstly, we show the effects of decentralisation on the average interest rate charged on small enterprises. In the following step, we analyse how other bank organisational choices can influence the pricing process, by shaping branch managers' real authority (turnover and incentive schemes).

5.1 Baseline estimation

In our view, decentralised banks match with borrowers with good private information. As a consequence, when our dummy variable is equal to one, we expect the interest rate to be lower, reflecting a better quality of the borrower (conditioning on public information). Table 7 reports the baseline estimation. The first specification includes only bank, firm, market and relationship controls; the second one also adds our key indicator. The coefficient of *decentralisation* is statistically significant and shows the expected negative sign. On average, decentralised banks charge an interest rate 17 basis points lower than hierarchical banks. This result is consistent with our hypothesis.

In the third column of the table are reported the results of the same specification; however, the regression is run on the sample obtained excluding firms that borrow at the same time from both hierarchical and decentralised banks. As explained in section 3.2, these multiple banking relationships may weaken our results. Empirical evidence does confirm our prediction. The price reduction associated with the choice to decentralise decision-making power rises to 24 basis points. Moreover, the coefficient of *decentralisation* has a p-value lower than one percent, compared to 4.2 per cent of the previous regression.

As far as the other regressors are concerned, the results are in line with previous studies. We mainly refer to the regression conducted on the whole sample; however, results are basically the same in both cases (column II and III). Firm variables representing public information act as a predictor of observable risk: larger, older, less indebted and more profitable firms pay a

lower interest rate. A beta regression (not reported) shows that the effect of leverage is the most relevant in magnitude.

Inspecting bank variables, we find that larger institutions charge a higher interest rate. This result is consistent with the Italian evidence. The relation between bank size and interest rate has been long debated in empirical research, without establishing unambiguous conclusions. In the US, several studies find a negative coefficient (Carter *et al.*, 2004, and Berger & Udell, 2006). More recently, Berger *et al.* (2007) find no price difference between large and small banks once market characteristics and lender-borrower matching are accounted for. In the Italian market, Angelini *et al.* (1998) show that credit cooperative banks charge their members with lower interest rates, D'Auria *et al.* (1999) also find a positive correlation between interest rates and bank size, but the magnitude of the impact is low. Cost/Asset ratio exhibits the expected positive sign, while liquidity and affiliation dummies figure not to be statistically significant[18]. This outcome might be affected by the collinearity with the lender size that we noticed above.

The last group of variables describes the relationship between the bank and the borrower. The coefficient associated with the length of the relationship is positive and statistically significant. This result is consistent with the literature about the existence of switching costs (Ioanniddou & Ongena, 2008): the longer the relationship and the more expense associated with finding a new source of finance, the larger the rent a bank extracts. The other variables reveal the expected outcome: a smaller loan and the presence of an overdraft (usually an early distress signal) cause the firm to pay a higher interest rate. We also find that lines of credit are more expensive than advances (3 percentage points), due to the fact that advances rely on a commercial transaction and represent an obligation signed by two different debtors, which lowers the expected loss.

5.2 Formal and real authority of branch managers

Empowering branch managers does affect interest rates. Following Aghion & Tirole (1997), we now focus on two different factors that may actually strengthen or restrain the branch manager's real authority. The first one is the tenure (or its reciprocal, the turnover), namely the time period officers

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[18]The p-value is lower for the regression run on the reduced sample; however, the coefficient never happens to be highly significant.

are allowed to stay in a branch. The idea is that soft information is collected through a repeated interaction. If, in order to reduce a potential opportunistic behavior, branch managers are frequently moved, they will not be able to establish a fruitful link with the entrepreneur and his local background. As a consequence, soft information is not collected, or collected only partially, and the matching mechanism we describe is hindered. In our view, tenure is a measure of real authority because it allows the formal authority (delegation) to fully deploy its effects.

In order to disentangle the effect of decentralisation for banks with low or high officers turnover, we introduce into the price equation two new variables: 1 - the dummy *tenure*, that equals one for banks whose branch managers tenure is higher than 36 months, the sample median value; 2 - the dummy (*int_tenure*), that represents its interaction with our key indicator (*decentralisation*). Results reported in the first column of Table 8 (model IV) support our expectations. As can be seen, neither *decentralisation* nor *tenure* are statistically significant, but their interaction (*int_tenure*) is. Therefore, only decentralised banks that allow their officers to stay in a branch for a long time charge lower interest rates. The price reduction raises up to 46 basis points (the sum of coefficient values for *decentralisation* and *int_tenure*).

The second factor we introduce is related to the compensation scheme adopted by the bank. The Bank of Italy survey asked banks to indicate the importance of some distinct targets in determining loan officer compensation; main results have already been discussed in section 4.2. We now consider two of them, namely those we referred to as *qualitative* and *quantitative* targets. We argue that the existence of a bonus related to risk control (qualitative target) gives a further incentive to gather private information and grant loans to firms with good unobservable quality. Therefore, we should observe a stronger price effect of decentralisation for those banks adopting a qualitative target. Conversely, a monetary incentive based upon a credit portfolio growth (quantitative target) may induce the branch manager to accept a lower average (unobserved) quality of the borrowers, even firms with bad private information. As a result, we should observe a weaker price effect of decentralisation, even a positive difference with hierarchical banks. Again, we introduce two dummy variables for each of the two compensation schemes. The first one is a dummy accounting for the existence of either a qualitative or a quantitative incentive (we call them *quality* and *quantity*, respectively). The second one is their interaction with our key variable (we call them *int_quality* and *int_quantity*).

Results reported in Table 8 (models V and VI) support our predictions only for the qualitative target. Banks that give a monetary incentive to their officers in order to control the risk of their small firm loan portfolio charge an interest rate up to 40 basis points lower than other institutions (the sum of coefficient values for *decentralisation* and *int_quality*). It is worth noting that the price reduction concerns only these decentralised banks (the parameter of *decentralisation* is not statistically significant), similarly to what we have observed for branch manager tenure. Therefore, empirical evidence fully supports the idea that only banks giving real authority to their officers are able to select borrowers with good private quality and charge lower prices. As far as the quantitative target is concerned, results show no statistical significance of such compensation schemes. While the coefficient of *decentralisation* remains negative and significant, neither *quantity* nor *int_quantity* are statistically different from zero.

The last exercise we conduct concerns the content of soft information for different loan types. As we saw in section 3.1, our sample includes both lines of credit and advances. Berger & Udell (1995, 2006) argue that soft information is relevant for the former, because conditions are frequently renegotiated in order to reflect a firm's creditworthiness. Hard information is instead prevalent for the latter, being more related to the commercial transaction it is generated by. If the borrower selection that gives rise to a price reduction is based on soft information, we should observe the effect of lower interest rates mostly for lines of credit. From our point of view, we are interested in understanding the feasible technology through which the authority of the local manager is fully deployed. In order to verify the hypotheses, we introduce an interaction term between *decentralisation* and *line_of_credit* into the baseline regression. Results of model VII shows that the price reduction concerns only lines of credit, since the coefficient of *decentralisation* loses its statistical significance.

6 Robustness checks

In this section we first address the problem of endogeneity: since firms can to a degree choose their banks, the matching process may be driven by some unobservables that are correlated with our variable of interest. It is worth noting that robustness checks are not aimed at ruling out the existence of selection (that is exactly what we argue takes place), but rather to exclude

that a *different* mechanism acts. Secondly, we try to rule out different explanations of our results, by including in the baseline regression several new variables related to alternative interpretations of our results. Finally, we test our findings with different definitions of small firms.

6.1 Endogeneity issues

In our theoretical framework we suppose that a firm chooses its bank based on branch manager decision-making power. Firms having good private information will apply to decentralized banks, while other firms will choose hierarchical banks. As a result, *decentralisation* acts as a proxy of the borrower's unobservable average quality. Including this indicator in the regression enables us to account for the match between the lender and the borrower, and obtain an unbiased estimate of the bank variable.

However, our results may be driven by something different from our hypothesis. Let us suppose that another matching mechanism is in place and the negative sign of the coefficient of *decentralisation* arises from the correlation with some unobservables (to us, not to the banks) related to the firm's quality. For example, if more skilled managers prefer to deal with decentralized banks, our main variable would simply reflect this skill. In econometrics terms, our coefficient would be biased by an endogeneity problem. In this alternative scenario, the negative coefficient of *decentralisation* should vanish once we control for the matching problem.

We tackle the issue by carrying out two alternative estimations. The first one is to instrument our variable of interest (IV procedure); the second one is to estimate a firm fixed effect model (FE procedure), exploiting the existence of a very large number of multiple relationships in our sample.

For our purposes a good instrument is a variable that is correlated with a firm's propensity to be matched with a decentralised bank and, at the same time, uncorrelated with unobservables that may affect the interest rate it pays. Following the reasoning in Berger *et. al* (2005), we use as an instrument the market share of decentralised banks in the province where the firm borrows. The basic idea is that in a market controlled mainly by decentralised banks, firms will be forced to some extent to choose these institutions, regardless of their quality. It is also reasonable to assume that the instrument does not influence the interest rate charged by the bank[19].

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[19]Only if the choice of decentralisation were correlated with the presence in the market

We therefore perform a two-step feasible efficient Generalized Method of Moments (GMM) estimation, taking into account the problem of clustering. GMM procedure gives consistent and efficient estimates in the presence of both arbitrary intra-cluster correlation of errors and heteroskedasticity among clusters (see Baum, Schaffer & Stillman 2003, 2007). The instrument appears highly correlated with the suspected endogenous variable: the F statistics from the first-stage regression exhibits a value greater than seventy. Results of the second step (baseline specification) for both the whole and the reduced sample are reported in Table 9.

As expected, the use of an instrument leads to a loss of efficiency of the *decentralisation* coefficient estimate, compared to OLS[20]. However, the magnitude of the parameter is similar to OLS (16 and 26 basis points), and the coefficient remains statistically significant for the reduced sample; this gives further support to the idea of the "noise" introduced by firms borrowing from both hierarchical and decentralised banks (see section 3.2).

Also the results related to the branch managers' real authority support our previous findings. Table 10 reports results of the three specifications where we introduce, individually, the interactions between *decentralisation* and the other variables put forward to capture the real authority of the branch managers[21]. As we found with the OLS estimation, the interaction with the branch manager tenure (*int_tenure*) and the adoption of a compensation scheme based upon the quality of small business portfolio (*int_quality*) remain highly significant, both economically (more than 50 basis points in absolute value) and statistically (p-value less than 5 percent). Conversely, the adoption of a growth target for small firm portfolio does not seem to produce a statistically significant impact on the interest rate charged by the bank.

The second procedure we adopt to address the potential problem of endogeneity is to estimate a firm fixed effect model (FE procedure), exploiting the

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of firms with a given unobserved quality the assumption would be wrong. However, this means that decentralised banks would choose to open branches only in provinces where there are firms with good quality private information while hierarchical banks enter the markets where there are firms with poor quality private information. This is very difficult to prove definitely.

[20]It is well known the lower efficiency of the IV estimator compared to OLS, and the trade-off between bias and efficiency (Wooldridge, 2003). In our case, the efficiency issue is further exacerbated by the use of a dichotomic regressor.

[21]For the sake of simplicity, we only report results of the regressions for the whole sample. However, results are basically unchanged using the reduced sample.

existence of a very large number of multiple relationships in our sample. If not only decentralised but all banks were able to collect private information, the firm fixed effect would account for unobservables and differences between decentralized and hierarchical banks would vanish.

As shown in Table 11, our key variable is only partially correlated with some unobservables. The coefficient of *decentralisation* decreases in absolute value to only 5 basis points, but it remains statistically significant [22]. Furthermore, by examining the interactions we observe that the effect of decentralisation is both economically and statistically significant. Decentralised banks whose branch managers' tenure is long charge 28 basis points less than hierarchical institutions (the sum between the coefficient of *int_tenure* and *decentralisation*). Similarly, decentralised banks that pay incentives to branch managers related to portfolio risk charge, on average, 43 basis points less than hierarchical banks (the sum between the coefficient of *int_quality* and *decentralisation*). As expected, the magnitude of both effects is less pronounced than the IV procedure, being an estimation run only on multiple relationships.

Finally, fixed-effect procedure finds a statistically significant effect for banks adopting a monetary incentive based upon a credit growth target. The signs of the coefficients are consistent with our predictions. Indeed, as in OLS and IV estimations the parameter of *quantity* is negative. Therefore, hierarchical banks keen to expand their small business portfolio will bring down the cost of credit, regardless of whether they are able to observe the firms' private quality. Conversely, the coefficient of *int_quantity* is positive. That means decentralised banks, able to uncover the firms unobserved quality, will lend also to 'bad' firms at higher rates to fulfill their quantitative target.

6.2   Alternative explanations

So far, we have established that empowering branch managers to determine small firms' loan conditions produces lower interest rates. We believe that it is because a matching mechanism arises, based on private information.

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[22]Once more, we find evidence of a stronger effect of *decentralisation* for single banking relationships. As a matter of fact, in an unreported regression we estimate our equation separately for single and multiple relationships, finding that the price reduction is less pronounced for the latter firms.

Nonetheless, different explanations could engender a similar effect; the estimations reported in table 12 are aimed at ruling out alternative hypotheses.

Most small banks are local cooperative banks (CCBs). It is known that such banks are peculiar, due to their mutual nature (Angelini et al., 1998). Their member-customers benefit from lower rates and an easier access to credit. Since the smallest banks decentralise more frequently, our results might simply reflect the differential behavior of CCBs. Model OLS VIII shows it is not the case: adding a binary variable to account for whether the lender is a credit cooperative bank (CCB), we find that the magnitude and the statistical significance of *decentralisation* do not change. Model OLS IX includes a further dichotomic variable capturing all mutual banks, not only CCBs; similarly, results do not change.

Multiple banking relations are widespread in Italy. It can be argued that the bargaining power is different between the main banks and the others. Therefore, our results might be driven by the fact that decentralised banks are those with a smaller bargaining power, that is, banks holding a lower fraction of a firm's total debt. Including this variable (*bargaining_power*) as an appropriate control in model OLS X, we find it is statistically significant and exhibits the expected sign (a greater bargaining power allows banks to charge higher rates); however, the coefficient of *decentralisation* is not affected.

Finally, following a somewhat similar line, multiple banking relationships can be viewed as an auction mechanism to promote competition between banks and to obtain lower rates. Again, our results might be affected by the possibility that decentralised banks are mainly involved in multiple relationships. A binary control (*multiple*) that we introduce in our regression (OLS XI) is significant and behaves as expected; once more, it does not change the effect of decentralisation.

6.3   The boundaries of 'small' firms

In our view, the effect of decentralisation relies on the branch manager's decision-making power. Only if he is entitled to make relevant decisions in small firm lending, will the borrower selection mechanism take place. This is why we focus on small firms and adopt the definition given by each bank (moreover, we fix a € 2,5 million upper limit on sales; see section 3.1). Therefore, if our argument is correct, the price effect we find should vanish for firms that are not defined as *small* by banks in our sample, although they should be

considered of such size according to different definitions. In order to carry out this further robustness check, we run our baseline regression on firms whose sales are higher than € 2,5 million but less than € 10 million, the threshold used by the European Commission in its small enterprise definition.

Table 13 reports results of three regressions. In the first column the sample is composed by *all* firms whose sales are lower than € 2,5 million, regardless of the threshold fixed by the lender in its definition. Therefore, the sample is very similar to that we have used throughout the paper; indeed, results are very close: the price reduction is always 17 basis points[23]. In the other two columns are reported results for firms whose sales are, respectively, between 2,5 and 5 € million, and between 5 and 10 € million. As can be seen, the coefficient of *decentralisation* becomes far lower (respectively 10 and 8 basis points) and, more importantly, loses its statistical significance. This finding adds further robustness to our argument.

7   Concluding remarks

During the last decade, the view of lending as an industrial process has markedly evolved. It is distinguished by the complexity it encompasses: it is shaped by the very nature of the borrower, the sources of information it is based on and the organisational structure chosen by the bank. In small business lending, the branch managers are pivotal since they are the collectors of soft information.

Our paper tries to shed some light on how organisational features, namely the delegation of power to branch managers, interact with small firm screening and pricing. We argue that a matching mechanism takes place. If branch managers are empowered, and willing, to exert decision-making power, they will end up selecting the small firms with the best private information, because these firms want their overall quality to be embedded in the interest rates they are charged. Consequently, we expect delegation to produce lower interest rates. Our reduced form interest equation states that this is the case, accounting for (public) firm, bank, market and relationship variables.

If our hypothesis is correct, several issues do need further research. Delegation involves a costly loss of control because it generates agency costs arising from the potentially opportunistic behavior of branch managers. There-

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[23]We have run all the previous regressions using this sample and all results are very similar, although the statistical significance become slightly lower.

fore, banks will delegate power if it allows them to increase profits. In other words, the net return of small enterprises lending in decentralized banks should outperform that of hierarchical banks. Our paper does not tackle this issue[24]. A second topic addresses the statistical models used to assess borrowers creditworthiness: specifically, to what extent and how do they interact with the branch manager's delegation? We believe that credit scoring and rating systems may limit the 'real' authority of the branch managers; however, at the same time they may empower them by allowing to include their soft information into a model.

Finally, our data refers to the period before the recent financial crisis and we do not know to what extent our results would have been affected by the turmoil. On the one side, it may be argued that banks have increased the decision-making power of their branch managers in order to better assess borrowers' creditworthiness. On the other side, capital shortage resulted in a restriction of credit supply, thereafter demanding a stricter control of lending procedure, which in turn means lower delegation. The Bank of Italy is collecting new data on bank organisation, which may be the basis for further research.

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[24]Although there is empirical evidence that small banks earn a greater risk-adjusted yield on small business loans, such as Carter *et al.* 2004, our main point is that size is not enough to describe organisation, as we have observed both large and small bank decentralization.

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Tables and figures

Table 1: **Sample composition**

Bank size	Number of relationships						
	1	2	3	4	5	6+	Total
Medium and large	19,395	24,508	21,303	14,418	8,294	8,806	96,724
Small (subsidiaries)	3,635	4,410	3,598	2,524	1,583	1,798	17,548
Small (stand-alone)	4,780	5,723	4,730	3,431	2,190	2,636	23,490
CCBs	2,533	2,731	2,085	1,296	800	858	10,303
All banks	30,343	37,372	31,716	21,669	12,867	14,098	148,065

Table 2: **Variables definition, means, medians and standard deviations**

Variable	Description	Mean	Median	Std.dev.	Expected sign
	Bank Organisational variables				
Decentralisation	Dummy = 1 if branch manager exerts decision-making power	0.577	1.000	0.494	–
Tenure	Dummy = 1 if branch manager's tenure > median value	0.300	0.000	0.458	–
Quantity	Dummy = 1 if monetary incentives upon growth of loans are in place	0.287	0.000	0.452	+
Quality	Dummy = 1 if incentives upon loan portfolio quality are in place	0.159	0.000	0.366	–
Int_tenure	Interaction between decentralisation and Tenure	0.176	0.000	0.380	
Int_quantity	Interaction between decentralisation and Quantity	0.138	0.000	0.344	
Int_quality	Interaction between decentralisation and Quality	0.087	0.000	0.282	
Int_lines	Interaction between decentralisation and Line_of_credit	0.339	0.000	0.473	
	Firm's variables				
Firm_size	Log of firm's total assets	6.897	6.904	0.850	–
Age_2	Dummy = 1 if firm's age is in the second quarter of the sample distribution	0.269	0.000	0.443	–
Age_3	Dummy = 1 if firm's age is in the third quarter of the sample distribution	0.269	0.000	0.443	–
Age_4	Dummy = 1 if firm's age is in the fourth quarter of the sample distribution	0.243	0.000	0.429	–
Leverage	Debt / (Equity+Debt) * 100	84.991	89.801	14.268	+
Profitability	Ebit / Sales * 100	11.256	8.948	17.457	–
	Other Bank's variables				
Bank_size	Log of bank's total assets	16.627	16.710	1.519	+/–
Cost/Asset	Operating costs / Total assets * 100	2.295	2.161	0.606	+/–
Liquidity	Liquid assets / Total assets * 100	19.573	19.329	6.670	+/–
Group	Dummy = 1 if the bank belongs to a group	0.718	1.000	0.450	+/–
	Relationship's variables				
Loan_size	Log of loan size	3.714	3.891	1.344	–
Line_of_credit	Dummy = 1 if the technology is line of credit	0.507	1.000	0.500	+
Overdraft	Dummy = 1 if loan amount > loan granted	0.144	0.000	0.351	+
Length	Dummy = 1 if relationship is older than 2 years	0.714	1.000	0.452	+/–

Table 3: **Linear correlation among variables**

	Firm_size	Age	Leverage	Profitability	Bank_size	Cost/Asset	Liquidity	Group	Loan_size	Line_of_cr.	Overdraft	Length	Decentralisation	Tenure	Quantity	Quality
Firm_size	1.0000															
Age	0.2441	1.0000														
Leverage	-0.0955	-0.2099	1.0000													
Profitability	0.0931	0.0349	-0.1323	1.0000												
Bank_size	0.0003	0.0525	-0.0051	-0.0258	1.0000											
Cost/Asset	-0.0038	-0.0161	-0.0103	-0.0087	-0.0045	1.0000										
Liquidity	-0.0262	-0.0351	0.0248	0.0059	-0.5219	-0.2118	1.0000									
Group	0.0027	0.0395	-0.0049	-0.0126	0.6057	0.0340	-0.3586	1.0000								
Loan_size	0.2804	0.0301	0.0203	0.0434	-0.0434	-0.0349	0.0235	-0.0369	1.0000							
Line_of_credit	0.0682	0.0284	-0.0684	0.1238	-0.0234	0.0519	-0.0124	-0.0110	-0.2029	1.0000						
Overdraft	0.0682	0.0284	-0.0684	0.1238	-0.0234	0.0519	-0.0124	-0.0110	0.1233	0.1990	1.0000					
Length	0.1332	0.2615	-0.0733	0.0200	0.0232	-0.0735	-0.0012	0.0310	0.0702	-0.0007	-0.0295	1.0000				
Decentralisation	-0.0066	-0.0192	-0.0103	0.0020	-0.0439	0.3636	-0.1685	0.1245	-0.0166	0.0502	0.0111	-0.0435	1.0000			
Tenure	-0.0147	-0.0488	0.0085	0.0211	-0.4971	-0.2273	0.4048	-0.3121	0.0330	0.0111	-0.0072	0.0075	-0.0941	1.0000		
Quantity	0.0206	0.0228	-0.0223	-0.0060	0.2121	-0.1360	-0.2095	0.0293	0.0106	-0.0177	0.0251	0.0423	-0.1228	-0.0842	1.0000	
Quality	-0.0101	-0.0236	0.0044	0.0128	-0.3695	-0.0633	0.2705	-0.3373	0.0212	0.0033	0.0166	-0.0134	-0.0316	0.3031	0.1427	1.0000

Table 4: **Bank structure and organisation**

	Mean	Median	SD	Mean	Median	SD	Obs.
	Total assets (€million)			Branch managers' tenure (months)			
Medium and large	31.06	18.78	42.17	34.2	32.5	10.1	24
Small (subsidiaries)	3.02	2.12	1.99	38.1	36.0	11.1	31
Small (stand-alone)	3.32	2.87	2.24	43.4	36.0	17.4	43
CCBs	1.24	1.11	0.78	46.9	48.0	18.6	39
All banks	7.52	2.04	20.56	41.5	36.0	15.9	137
	Costs/total assets (%)			Liquidity/total assets (%)			
Medium and large	2.20	2.10	0.52	18.48	19.66	6.07	24
Small (subsidiaries)	2.58	2.62	0.41	20.98	21.13	7.16	31
Small (stand-alone)	2.36	2.33	0.52	24.63	25.39	8.47	43
CCBs	2.05	2.07	0.33	27.92	26.57	9.27	39
All banks	2.30	2.25	0.49	23.66	23.58	8.70	137
	Role in SME lending (1=yes)			Incentives on profit. (1=yes)			
Medium and large	0.67	...	0.48	0.88	...	0.33	24
Small (subsidiaries)	0.65	...	0.49	0.61	...	0.50	31
Small (stand-alone)	0.35	...	0.48	0.67	...	0.47	43
CCBs	0.62	...	0.49	0.51	...	0.51	39
All banks	0.55	...	0.50	0.65	...	0.48	137
	Incent. on quantity (1=yes)			Incentives on quality (1=yes)			
Medium and large	0.33	...	0.48	0.17	...	0.38	24
Small (subsidiaries)	0.10	...	0.30	0.19	...	0.40	31
Small (stand-alone)	0.19	...	0.39	0.37	...	0.49	43
CCBs	0.26	...	0.44	0.41	...	0.50	39
All banks	0.21	...	0.41	0.31	...	0.46	137

Table 5: **Firm ratios (by number of relationships)**

	Mean	Median	SD	Mean	Median	SD	Obs.
	Total asset (€million)			Age (years)			
Firms with single banking relationships	0.84	0.50	1.41	11.1	7.7	9.9	25,327
Firms with multiple banking relationships	1.68	1.09	2.65	14.1	11.7	10.6	53,353
All firms	1.41	0.88	2.36	13.1	10.2	10.5	78,680
	Leverage (%)			EBIT/Total asset (%)			
Firms with single banking relationships	81.63	87.87	17.72	14.91	10.12	24.00	25,327
Firms with multiple banking relationships	84.43	89.28	14.50	11.65	9.12	18.08	53,353
All firms	83.53	88.83	15.66	12.70	9.40	20.24	78,680
	Interest/EBIT (%)			Cash flow/Total asset (%)			
Firms with single banking relationships	40.55	20.00	140.14	5.11	4.23	8.13	25,327
Firms with multiple banking relationships	56.63	28.18	318.99	4.69	3.87	6.06	53,353
All firms	51.53	25.61	275.28	4.83	3.97	6.80	78,680

Table 6: **Interest rates**

	Line_of_credit		Overdraft		Length		Loan_size(1)	
	yes	no	yes	no	yes	no	yes	no
Medium and large banks	10.09	6.47	9.89	8.00	8.26	8.31	7.42	9.10
Small banks (subsidiaries)	9.75	6.35	9.69	7.84	8.15	8.07	7.35	8.91
Small banks (stand-alone)	9.59	6.15	9.77	7.64	7.99	7.85	7.16	8.74
CCBs	8.87	5.86	8.96	7.20	7.45	7.37	6.78	8.24
All banks	9.88	6.37	9.79	7.87	8.15	8.14	7.32	8.97

	Firm_size(1)		Age(1)		Leverage(1)		Profit.(1)	
	yes	no	yes	no	yes	no	yes	no
Medium and large banks	8.10	8.45	8.17	8.37	8.41	8.14	8.37	8.18
Small banks (subsidiaries)	7.90	8.38	8.06	8.20	8.24	8.02	8.25	8.01
Small banks (stand-alone)	7.79	8.09	7.83	8.05	8.03	7.85	8.07	7.81
CCBs	7.26	7.59	7.38	7.48	7.59	7.26	7.52	7.35
All banks	7.97	8.33	8.06	8.24	8.27	8.03	8.25	8.05

	Decentralisation		Tenure		Quantity		Quality	
	yes	no	yes	no	yes	no	yes	no
Medium and large banks	8.45	8.04	8.42	7.77	8.47	8.17	7.96	8.30
Small banks (subsidiaries)	7.99	8.54	8.17	8.03	7.90	8.19	7.91	8.22
Small banks (stand-alone)	7.69	8.16	8.01	7.86	7.92	7.95	7.95	7.94
CCBs	7.38	7.51	7.87	7.26	7.29	7.48	7.36	7.49
All banks	8.20	8.07	8.32	7.73	8.31	8.08	7.83	8.21

(1) Yes = above the median value; No=below the median value.

Table 7: **Baseline regressions**

Dependent variable			Interest rate			
Model	OLS I		OLS II		OLS III	
Organisation						
Decentralisation			-0.172	**	-0.236	***
Firm						
Firm_size	-0.177	***	-0.177	***	-0.181	***
Age_2	0.017		0.017		0.073	***
Age_3	-0.091	***	-0.091	***	-0.006	
Age_4	-0.129	***	-0.131	***	-0.063	**
Leverage	0.014	***	0.014	***	0.014	***
Profitability	-0.003	***	-0.003	***	-0.003	***
Bank						
Bank_size	0.162	***	0.142	***	0.162	***
Cost/Asset	0.197	**	0.271	***	0.282	***
Liquidity	0.011	*	0.009		0.013	**
Group	0.106		0.145		0.196	*
Relationship						
Loan_size	-0.478	***	-0.478	***	-0.553	***
Line_of_credit	3.134	***	3.135	***	3.047	***
Overdraft	1.190	***	1.191	***	1.163	***
Length	0.334	***	0.330	***	0.250	***
Intercept	5.146	***	5.399	***	5.489	***
Sector fixed effects	(yes)		(yes)		(yes)	
Area fixed effects	(yes)		(yes)		(yes)	
N	148,065		148,065		148,065	
Clusters	137		137		137	
R^2	0.482		0.482		0.458	
F	21,580.49		46,904.81		12,528.23	

Table 8: **Branch managers' real authority and interest rates**

Dependent variable					Interest rate			
Model	OLS IV		OLS V		OLS VI		OLS VII	
Organisation								
Decentralisation	-0.001		-0.082		-0.209	**	0.122	
Tenure	0.158							
Int_tenure	-0.463	***						
Quality			0.139					
Int_quality			-0.477	**				
Quantity					-0.104			
Int_quantity					0.123			
Int_lines							-0.587	***
Firm								
Firm_size	-0.175	***	-0.176	***	-0.176	***	-0.178	***
Age_2	-0.018		-0.015		-0.017		-0.015	
Age_3	-0.090	***	-0.094	***	-0.091	***	-0.093	***
Age_4	-0.130	***	-0.134	***	-0.130	***	-0.133	***
Leverage	0.014	***	0.014	***	0.014	***	0.014	***
Profitability	-0.003	***	-0.003	***	-0.003	***	-0.003	***
Bank								
Bank_size	0.141	***	0.134	***	0.155	***	0.146	***
Cost/Asset	0.229	***	0.240	***	0.270	***	0.269	***
Liquidity	0.011	*	0.012	**	0.009		0.010	
Group	0.095		0.205	*	0.120		0.152	
Relationship								
Loan_size	-0.479	***	-0.477	***	-0.478	***	-0.477	***
Line_of_credit	3.131	***	3.136	***	3.134	***	3.475	***
Overdraft	1.197	***	1.195	***	1.193	***	1.186	***
Length	0.335	***	0.335	***	0.334	***	0.329	***
Intercept	5.440	***	5.507	***	5.231	***	5.187	***
Sector fixed effects	(yes)		(yes)		(yes)		(yes)	
Area fixed effects	(yes)		(yes)		(yes)		(yes)	
N	148,065		148,065		148,065		148,065	
Clusters	137		137		137		137	
R^2	0.483		0.483		0.482		0.485	
F	45,011.02		27,424.19		271,705.96		101,110.45	

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Table 9: **IV: Baseline regressions**

Dependent variable	Interest rate			
Model	IV I		IV II	
Organisation				
Decentralisation	-0.157		-0.259	**
Firm				
Firm_size	-0.177	***	-0.181	***
Age_2	0.017		0.073	***
Age_3	-0.091	***	-0.007	
Age_4	-0.131	***	-0.063	**
Leverage	0.014	***	0.014	***
Profitability	-0.003	***	-0.003	***
Bank				
Bank_size	0.143	***	0.160	***
Cost/Asset	0.264	***	0.290	***
Liquidity	0.010		0.013	**
Group	0.142		0.200	*
Relationship				
Loan_size	-0.478	***	-0.553	***
Line_of_credit	3.135	***	3.047	***
Overdraft	1.191	***	1.162	***
Length	0.330	***	0.249	***
Intercept	5.380	***	5.522	***
Sector fixed effects	(yes)		(yes)	
Area fixed effects	(yes)		(yes)	
N	148,004		76,667	
Clusters	137		137	
R^2	0.485		0.459	
F	60,157.82		12,085.64	

Table 10: **IV: Branch managers' real authority and interest rates**

Dependent variable			Interest rate			
Model	IV III		IV IV		IV V	
Organisation						
Decentralisation	0.077		0.011		-0.182	
Tenure	0.184					
Int_tenure	-0.528	**				
Quality			0.195			
Int_quality			-0.569	**		
Quantity					-0.090	
Int_quantity					0.099	
Firm						
Firm_size	-0.175	***	-0.177	***	-0.176	***
Age_2	0.018		-0.015		-0.017	
Age_3	-0.090	***	-0.094	***	-0.091	***
Age_4	-0.129	***	-0.134	***	-0.130	***
Leverage	0.014	***	0.014	***	0.014	***
Profitability	-0.003	***	-0.003	***	-0.003	***
Bank						
Bank_size	0.147	***	0.142	***	0.155	***
Cost/Asset	0.201	**	0.203	**	0.261	***
Liquidity	0.012	*	0.013	**	0.009	
Group	0.077		0.203	*	0.120	
Relationship						
Loan_size	-0.479	***	-0.478	***	-0.478	***
Line_of_credit	3.129	***	3.134	***	3.133	***
Overdraft	1.197	***	1.195	***	1.193	***
Length	0.336	***	0.338	***	0.334	***
Intercept	5.365	***	5.391	***	5.241	***
Sector fixed effects	(yes)		(yes)		(yes)	
Area fixed effects	(yes)		(yes)		(yes)	
N	148,004		148,004		148,004	
Clusters	137		137		137	
R^2	0.484		0.483		0.483	
F	39,248.96		62,876.63		2.1e+0.5	

Table 11: **Firm fixed effects estimation**

Dependent variable					Interest rate				
Model	FE I		FE II		FE III		FE IV		
Organisation									
Decentralisation	-0.049	**	0.094	***	0.040	*	-0.103	***	
Tenure			0.109	***					
Int_tenure			-0.375	***					
Quality					0.179	***			
Int_quality					-0.472	***			
Quantity							-0.212	***	
Int_quantity							0.175	***	
Bank									
Bank_size	0.116	***	0.112	***	0.112	***	0.139	***	
Cost/Asset	0.290	***	0.253	***	0.260	***	0.279	***	
Liquidity	0.007	***	0.008	***	0.009	***	0.005	***	
Group	0.083	***	0.042	*	0.147	***	0.037		
Relationship									
Loan_size	-0.342	***	-0.343	***	-0.342	***	-0.342	***	
Line_of_credit	3.435	***	3.432	***	3.435	***	3.433	***	
Overdraft	0.528	***	0.532	***	0.529	***	0.532	***	
Length	0.637	***	0.642	***	0.644	***	0.650	***	
Intercept	4.394	***	4.490	***	4.388	***	4.159	***	
Sector fixed effects	(yes)		(yes)		(yes)		(yes)		
Area fixed effects	(yes)		(yes)		(yes)		(yes)		
N	106,141		106,141		106,141		106,141		
R^2	0.617		0.618		0.618		0.618		
F	9,149.18		7,640.86		7,632.08		7,626.40		

Table 12: **Determinants of interest rates: alternative explanations**

Dependent variable				Interest rate				
Model	OLS VIII		OLS IX		OLS X		OLS XI	
Organisation								
Decentralisation	-0.172	**	-0.172	**	-0.174	**	-0.173	**
CCB	-0.091							
Mutual			-0.040					
Bargaining_power					0.001	**		
Multiple							-0.132	***
Firm								
Firm_size	-0.177	***	-0.177	***	-0.163	***	-0.150	***
Age_2	0.017		0.017		0.021		0.026	
Age_3	-0.092	***	-0.092	***	-0.086	***	-0.078	***
Age_4	-0.132	***	-0.132	***	-0.125	***	-0.118	***
Leverage	0.014	***	0.014	***	0.014	***	0.014	***
Profitability	-0.003	***	-0.003	***	-0.003	***	-0.003	***
Bank								
Bank_size	0.138	***	0.142	***	0.142	***	0.143	***
Efficiency	0.271	***	0.263	***	0.273	***	0.275	***
Liquidity	0.010		0.010		0.009		0.009	
Group	0.135		0.141	*	0.144		0.143	
Relationship								
Loan_size	-0.477	***	-0.477	***	-0.482	***	-0.482	***
Line_of_credit	3.136	***	3.136	***	3.131	***	3.126	***
Overdraft	1.191	***	1.190	***	1.191	***	1.190	***
Length	0.332	***	0.330	***	0.326	***	0.327	***
Intercept	5.460	***	5.409	***	5.258	***	5.265	***
Sector fixed effects	(yes)		(yes)		(yes)		(yes)	
Area fixed effects	(yes)		(yes)		(yes)		(yes)	
N	148,065		148,065		148,065		148,065	
Clusters	137		137		137		137	
R^2	0.482		0.482		0.482		0.482	
F	.		50,036.78		44,489.81		40,347.60	

Table 13: **Small enterprises boundaries**

Dependent variable			Interest rate			
Model	Sales < 2.5		2.5 < Sales < 5		5 < Sales < 10	(1)
Organisation						
Decentralisation	-0.175	**	-0.108		-0.069	
Firm						
Firm_size	-0.178	***	-0.007		0.041	
Age_2	0.019		-0.013		-0.131	***
Age_3	-0.079	***	-0.066	*	-0.184	***
Age_4	-0.125	***	-0.144	***	-0.254	***
Leverage	0.014	***	0.024	***	0.024	***
Profitability	-0.003	***	-0.003	**	-0.003	**
Bank						
Bank_size	0.169	***	0.163	***	0.147	***
Efficiency	0.265	***	0.180	*	0.090	
Liquidity	0.013	**	0.010	*	0.007	
Group	0.151		0.071		0.017	
Relation						
Loan_size	-0.482	***	-0.328	***	-0.298	***
Line_of_credit	3.139	***	3.390	***	3.422	***
Overdraft	1.172	***	1.107	***	1.139	***
Length	0.332	***	0.440	***	0.409	***
Distance	-0.020	*	0.005		-0.035	
Intercept	4.766	***	1.964	***	1.585	***
Sector fixed effects	(yes)		(yes)		(yes)	
Area fixed effects	(yes)		(yes)		(yes)	
N	195,618		76,095		60,103	
Clusters	154		154		154	
R^2	0.476		0.522		0.525	
F	8,460.77		13,581.93		8,439.67	

(1) Sales are in millions of euro