DELEGATION AND PERFORMANCE

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Abstract

This paper empirically investigates how the level of authority delegation is related to the performance of an organization. Decentralized, horizontal organizational structure takes advantage of more efficient decision making, mainly due to more efficient use of "soft" information. The cost of such decentralization is the loss of control and the need to properly incentivise agents who are legitimately given the authority to make decisions. This is the trade-off organization faces when deciding on the level of authority delegation.

The effect of authority delegation is studied using empirical data from the banking sector. Different specifications were used to estimate the effect of authority delegation on performance characteristics. Estimates demonstrate that more authority delegated has a positive effect on quantitative measures of bank performance; however, it decreases the quality of decisions taken. Results demonstrate that there is a trade-off between the quantitative and qualitative performance characteristics. While the local bank branch is able to increase loan generation when more authority is delegated to it, there is also some evidence of loan quality deterioration.

Abstrakt

Toto pojednání empiricky zkoumá, jak delegování pravomocí souvisí s výkonem organizace. Decentralizovaná, horizontální organizační struktura využívá efektivnější rozhodování, zejména díky účinnějšímu využívání "měkkých" informací. Cenou za takovouto decentralizaci je ztráta kontroly a potřeba nabídnout správné pobídky zástupcům, kteří dostávají legitimní oprávnění činit rozhodnutí. Toto je kompromis, který organizace musí dělat při rozhodování na úrovni delegovaných pravomocí.

Dopad delegování pravomocí je studován na základě empirických dat z bankovního sektoru. Byly použity různé specifikace za účelem posouzení účinku delegování pravomocí na charakteristiku výkonu. Odhady ukazují, že více delegovaných pravomocí má pozitivní vliv na kvantitativní výkon banky, avšak snižuje kvalitu učiněných rozhodnutí. Výsledky ukazují, že dochází ke kompromisu mezi kvantitativními a kvalitativními charakteristikami výkonu. Zatímco místní pobočka banky je schopná zvýšit počet generovaných půjček, pokud k tomu bude mít více delegované pravomoci, existují rovněž určité důkazy o zhoršené kvalitě takovýchto půjček.

JEL Classification: D23, D83, G21, L22

Keywords: banking, organizational structure, authority delegation, soft information, small business lending

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1 Introduction

In the field of organizational theory, the choice between vertical and horizontal organizational structures is often considered as a crucial one for firms' performance. This choice includes an important trade-off. More horizontal, less vertically integrated organizations prove to be more effective in using "soft" information, compared to more hierarchical organization. I refer to "soft" information as the information which is to a large extent non-verifiable and non-transferable to the higher levels of the hierarchy, but the use of this information can increase the effectiveness of decisions taken. For example, if an organization has offices across a wide geographical area, it has to be able to adjust to changing local conditions, to compete successfully and to preserve its regional market shares. In this case, making the organization more horizontal, giving more decision power to the local offices, seems to be a reasonable response to fast changing local conditions, not fully observed by headquarters[1]. On the downside, more horizontal organizational structures have higher agency costs: incentives of the local managers rarely coincide with the incentives of the owners. With more authority delegated to the lower levels of the hierarchy, costs and the span of local offices monitoring become higher, and it becomes more difficult to coordinate and implement company-wide policies.

The problem of authority delegation in the organization has obtained substantial attention from a theoretical perspective, but empirically the importance of delegation remains unestablished. Empirical results suggest that the optimal choice of organizational structure should be considered in a context of a specific industry and

[1]I refer to the lowest level of the organizational hierarchy as local managers, and I refer to the highest level of hierarchy as headquarters, top managers, organization decision-makers or owners.

market. The problem is very broad definition of "soft" information, and organizations that operate in different environments can depend on the usage of "soft" information to very different extents. Therefore, the benefits of a more horizontal organizational structure could differ substantially across markets. Moreover, the monitoring costs of more horizontal organization may also vary across markets. It is not surprising that different businesses and organizations are trying to establish their own optimal organizational structure. In such structures, the level of authority delegation could differ substantially across organizations, and also for a single organization over time, as a natural response to changes in the business environment. Therefore, it is important to note that studying the relationship of the organizational structure and performance in many cases is limited to a specific market or industry or even sometimes to the specific organization studied (if that organization represents an exceptional example of organizational structure for an industry).

This paper presents new empirical evidence on the relationship between organizational structure and performance, using the banking industry as an example. Since the 1990s, the banking sector has gone through important changes related to its competitive environment, which resulted in substantial consolidation in the sector. Thus, large banking institutions have been created with multilevel hierarchical structures, where several managerial layers separate the decision-making agents from the agents who implement those decisions. Advances in informational technologies have played an important role in this consolidation. As information transferring has become cheaper, the costs of having more hierarchical (vertical) organizational structures have also decreased: banks have introduced standardized loan products

and have developed the credit-scoring borrower evaluation, etc. Changes in market regulation policies have also contributed to the consolidation taking place in the industry (a single-market policy in the European Union, the Riegle-Neal Act in USA, which allows interstate bank mergers). Several studies confirm that decision making in the banking sector has become more centralized, the delegation of control (in lending decisions) has decreased, and the agency costs of vertical distance has also decreased (Berger and DeYoung, 2006). The current trend in the industry is to transfer all decisions on loans to the head offices. This represents the highest level of hierarchy possible in the industry.

While several studies exist, which demonstrate delegation can be used to influence incentives inside the organization, not many empirical studies have investigated how the level of authority delegation influences organizational performance. The paper will address the question whether delegating more authority to the lower levels of a bank hierarchy (local bank offices) leads to an improvement or worsening of performance, both in quantitative and qualitative measures. A simple comparison of the outcome variables (performance) for the local offices with different levels of authority delegated to them might be misleading. The reason is the decision to delegate authority is not randomly distributed among local offices, but is endogenously determined and adjusted by headquarters, based on (possibly unobservable to the researcher) characteristics of the local market (competitive pressure, distribution of market shares, market growth perspectives) and the local branch (experience, monitoring costs, ability of the local office to adapt to local conditions)[2]. Therefore, it is important to account for possible endogeneity of the delegation decisions while

[2]I refer to those characteristics as a business environment.

estimating the effects of authority delegation on organizational performance.

An important reason why the level of authority delegation in the banking sector might play a crucial role is the following. In this industry, information collected by the local offices is very important for the evaluation of loan applications, which is especially true for small and medium enterprises (Berger and Udell, 2002). Moreover, this information is, to a large extent, "soft" and cannot be costlessly transmitted to the highest levels of a hierarchy. In addition, the banking sector is characterized by strong competition, and local expert knowledge can increase the effectiveness of decision-making. Therefore, the research is to describe how the level of authority delegation in the banking sector is related to the results of bank activities. This paper also contributes to the literature on the relationship banking[3]. More precisely, I provide empirical evidence that the level of lending to a SME significantly depends on the level of authority delegated to the local bank branches. To the extent that the local branch with more authority in lending is more likely to invest in its relationship banking and develop closer relationships with local clients, this paper demonstrates that more authority delegated to the local branch might increase the importance of relationship banking.

The rest of the paper is organized as follows. Section 2 reviews theoretical and empirical literature on the effects of authority delegation in the organization. Section 3 describes the empirical model specification, characterizes the dataset, and discusses the estimation results. Section 4 concludes by discussing how the estimation results could be related to the theories of optimal organizational structure choices.

[3]For a review, see for example, Boot (2000) and Boot and Thakor (2000).

2 Literature Review

Authority delegation proved to be an important instrument of shaping managerial incentives. Mookherjee (2006) presents an extensive overview of the literature related to the incentive benefits of delegation. The author concludes that assuming information communication is costly, and an upper bound on the size of the message to be communicated exists, decentralized decision-making can access much more information compared to centralized decision-making. In other words, if communication costs are introduced, delegation is more successful in utilizing "local" information. Aghion and Tirole (1997) build a model where they differentiate between formal authority (the formal right to make a decision by top managers) and real authority (the real control of local managers over the decisions due to better information and knowledge of the alternatives). The model demonstrates that delegating formal authority to subordinates would be beneficial because it increases their effort and initiative in collecting more information about alternatives, and subordinates possess power and become remunerated for their relationship-specific investments. An illustration is the following: local loan managers can exert an effort and obtain "soft" information about borrower — this will help to estimate loan risks more precisely. However, this soft information cannot be transferred to the higher levels the decision-making hierarchy because of its nature[4]. Also, the loan managers' investments in soft information production are not observed by other parties. As long as top-management would not use this information in their decision making,

[4]Aghion and Tirole (1997) make clear the distinction between hard information, which can be relatively costlessly communicated and verified, and soft information, which to a large extent represents a pure suggestion.

loan managers do not have incentives to generate soft information. Delegating can help to shape the managers' incentives such that they would produce loans of higher quality using soft information and would exert additional effort to obtain it.

Similarly to this paper, Stein (2002) motivates his theoretical model of authority delegation to local managers using the example of the banking sector. The author draws attention to the concentration trend in the industry and associates it with a decline in the lending to small businesses by larger banks. The model assumes that local managers have the research advantage for "soft" information about projects; therefore, smaller organizations, which have fewer subordination levels, are more efficient in providing services which are sensitive to "soft" information. Also, holding the size of the organization fixed and changing such characteristics of the environment as the "softness" of information, the author demonstrates that having a flatter[5] organization is more advantageous. Moreover, the model shows that increasing the number of managerial layers between decision-makers and local managers leads to an increase in the number of unnecessary bureaucratic procedures, such as the effort spent on "soft" information documentation.

The assumption of costly communication is crucial for the theoretical conclusions described above. In the literature, it is justified by several examples: limited ability (Radner, 1993); coordination costs (Becker and Murphy, 1992); managers' costs of communication (overload); and the costs of learning (Aghion and Tirole, 1997; Garicano, 2000; Stein, 2002; Dewatripont and Tirole, 2005).

There is large empirical evidence for "soft" information usage in relationship to a bank's organizational structure. For example, Sapienza (2002) studies the effect

[5]A "flatter" organizational structure has less hierarchical levels.

of bank mergers on the credit availability for small businesses. The paper finds that larger banks decrease lending to small firms more than smaller banks. This provides evidence for the relative efficiency of "soft" information usage in small, therefore, less hierarchical banks. Carter and McNulty (2005) provide empirical evidence that small banks have the advantage in small business lending (have a higher net return) using data on the lending activities of US banks from 1993-2001. Berger and Udell (2002) summarize earlier empirical research on the effects of bank mergers on credit availability for small borrowers and relationship lending practices. The authors conclude that empirical evidence exists that shows a reduction in lending to small firms due to bank consolidations, but this lending reduction might not be economically significant in some cases. Whether lending reduction is significant depends on external factors such as market conditions. The authors hypothesize that in some cases, a reduction in relationship lending by larger banks will be accompanied by an increase in relationship lending from other (smaller) banking institutions, and there would be no adverse effect of bank consolidation on loan availability for small firms in the market.

In addition to the studies which implicitly consider larger banks less efficient in "soft" information usage, and therefore conjecture that there should be less information-sensitive lending by larger institutions, there are some studies which directly estimate "soft" information usage in the lending decisions by banks. Berger, Miller, Petersen, Rajan, and Stein (2005) use the firm-level data from the National Survey of Small Business Finance and study the effects of lending institution's organizational structure on the lending conditions for specific firms. They find that

(1) firms communicate with larger banks in a more impersonal way (do not often meet in person but use mail); (2) firms that borrow from smaller banks also have more exclusive and longer lasting relationships with their banking institution; and (3) firms that borrow from larger banks are more credit constrained. Those findings are in line with theoretical predictions that smaller banking institutions are more efficient in providing services that require "soft" information.

Alessandrini, Presbitero, and Zazzaro (2009) use data on SMEs surveyed by an Italian banking group. The authors find that a larger "functional distance"[6] between local bank offices and the bank headquarters decreases the credit availability for local firms. Liberti and Mian (2009) test the Aghion and Tirole (1997) model's predictions on the use of "soft" information in the loan approval process, using the banking industry, and they use information on corporate loan applications from a large multi-national bank in Argentina. They find that if the loan is approved at the higher levels of the hierarchy, the size of the loan is more sensitive to the "hard" information on the applicant and less sensitive to "soft" information, as compared to loans approved at the lower levels of the hierarchy. Also, this decrease of "soft" information importance is not observed in the data if the information collecting officer is located in the same geographical area as the decision-making loan officer. These results support the view that some part of non-verifiable information is lost as it is communicated to the higher levels of a company's formal hierarchy.

Interesting empirical results are provided in Canales and Nanda (2012), who find that banks with more decentralized organizational structures issue larger loans to

[6] "Functional distance" is the distance between the local branch where information on the borrower is collected, and the bank headquarters.

firms in part relying on "soft" information compared to centralized banks. However, those decentralized banks also issue smaller loans in a more competitive environment compared to centralized banks. In addition, decentralized banks issue loans to larger firms (therefore, with more "hard" information) in a more competitive environment. The authors conclude that decentralized banks tend to cherry-pick their clients as a response to larger competitive pressure.

As stated above, generating soft information is a costly activity for agents, and agents need to be provided with enough incentives to exert this effort. If providing these incentives is too costly for the principal, he may choose not to provide them, there may be more decision centralization, and no soft information would be produced. Why the incentive costs of authority delegation may become more or less important can be explained by the changes in the firm's business environment. Therefore, it would be natural to expect that organizational structure (and the level of delegation) would evolve as a response to the changes in the environment.

Theoretical predictions in this field are ambiguous. For example, Marin and Verdier (2008) construct a general equilibrium model, in which the decision about organizational structure is endogenous and is optimally determined by the firms. The model demonstrates that intermediate levels of competition are associated with the highest levels of authority delegation. Legros and Newman (2008) investigate how other aspects of the business environment — market liquidity and productivity shocks — can influence the choice of optimal organizational structure. The authors demonstrate that positive shocks and the unequal distribution of liquidity will result in less control delegation.

In the banking sector, the centralization of loan decisions due to competitive pressure can be explained by the accompanying growth in technical advances. If information transmission becomes easier (through numerous intra-bank security enhanced networks), the costs of centralization decrease sufficiently. There are not many empirical studies which investigate how organizational structure evolves in response to the changes in the business environment. This is mainly due to a lack of panel or cross sectional datasets which would describe in detail the organizational structure of a company and to the complexity of this information and its privacy. However, some general conclusions were made by Degryse and Ongena (2007) and Degryse, Laeven, and Ongena (2009). Studying extensive data on the Belgian banking industry, they discover that tough price competition in the region is usually combined with the more hierarchical structures of competing banks.

The problem addressed in this paper is rather different. The choice of organizational structure, which is the level of authority delegation to the local management level, is an optimal decision of the bank, and it is based on the current and future characteristics of the market environment and the market strategy chosen by the bank. Therefore, in such conditions when the choice of the delegation level is an optimal decision of the bank, it would be interesting to measure whether different levels of delegation would result in differences in performance. If yes, and a more decentralized organizational structure (for example) is associated with better performance, the natural question remaining is why all firms do not choose to use a decentralized organizational structure. There is empirical evidence that the organizational form influences performance even if the organizational form is se-

lected optimally by the company. Mullainathan and Scharfstein (2001) demonstrate that vertically integrated producers make different investment decisions compared to non-integrated producers. Krueger (1991) finds that employees in company-owned food chains experience a steeper tenure-earnings profile than employees in franchised chains. Kosová, Lafontaine, and Perrigot (2013) provide a performance comparison between franchised and company-owned hotels, and find that there are significant differences in performance measures (revenue per room, price, occupancy rate, etc.) between the two structures, but those differences are not significant after the authors endogenize the choice of organizational form.

3 Econometric Model

I use the performance of a bank's local branches as the response variable, while the level of authority delegated is the main explanatory variable of interest. I use the heterogeneity in the branches' authority and changes in market conditions for regions to estimate the impact of the authority delegation level on the decision-making process in branches. Branches' performance is a function of the level of delegation, controlling for the factors, which I describe as market environment variables. The model in the panel setting is as follows:

$$Y_{it} = \alpha_1 + \beta_1 D_{it} + \beta_2 X_{it} + \gamma M_{it} + u_i + \varepsilon_{it}, \tag{1}$$

where i is the index for branch; t is the time period (month); Y_{it} is quantitative and qualitative data on branch performance; D_{it} is the level of delegated authority for

the branch; X_{it} is the vector of controls at the regional level; M_{it} is the vector of unobserved local market and branch conditions in the region at a given time, and possibly correlated with other explanatory variables; u_i is the fixed effect for the region; and ε_{it} is the error term.

The level of delegated authority for a branch is clearly an endogenous variable in my model. It can be illustrated by the following example. When headquarters makes a decision about the level of authority delegated to each branch, they consider X_{it} (observed regional characteristics) and M_{it} (local market and branch conditions unobserved by the econometrician). As a result of estimation (1) without being able to include M_{it} in the regression, I obtain $\mu_{it} = \gamma M_{it} + \varepsilon_{it}$ in the error term. By the decision process of headquarters, M_{it} and D_{it} are correlated, which means that μ_{it} and D_{it} are correlated in (2), and estimates b_1 in the regression

$$Y_{it} = a_1 + b_1 D_{it} + b_2 X_{it} + u_i + \mu_{it} \tag{2}$$

will be a biased estimate of β_1 from (1).

To obtain consistent estimates of β_1, I use the instrumental variable vector Z_{it}. Such instruments should be important factors in determining the variation in authority that I observe for different branches, but should not have a direct effect on branches' performance. As the excluded instruments Z_{it}, I use the distance of a regional branch from its headquarters and the number of months the bank was present in the region (duration). I assume that this distance is a proxy for monitoring costs and positively influences the decision to delegate the authority, and duration is a measure of how experienced management is with the local market and how much

headquarters know about the local market so that they can delegate more authority to the local level. For Z_{it} to be a valid instrument, I need the distance and duration to be uncorrelated with the performance of branch Y_{it}. This assumption is valid in cases where the local market conditions, local managers' experience, and performance (which determines the outcome variable) are distributed randomly across the country and not related to the branches' location with respect to headquarters or to the fact how long the bank was already present in the local market. I use the IV estimation to estimate the model with distance and duration as excluded instruments[7].

Thus, I exploit the heterogeneity in the branches' authority and changes in market and branch conditions to identify the impact of regional market characteristics on delegation level for branches, and further, estimate the effect of the authority delegated on the performance characteristics. More precisely, I am using an instrumental variable regression: In the first stage, I am estimating the authority delegation decision, and in the second stage, the impact of the authority delegated on the branches' performance.

3.1 Data

To test the effect of the authority delegated on the performance variables, I combine three monthly panel data sets, which cover the period 2004-2008:

(1) data on all loan contracts and loans' performance, loans for small and medium enterprises (SMEs) and loans for private individuals (PIs) for all branches of one representative bank in a European country. I refer to these variables as performance

[7]We discuss the validity of instruments in the subsection 3.2 further.

variables;

(2) for the same representative bank, monthly data on the level of lending authority delegated to regional branches, separately for SME and PI loans, and other characteristics of the branches. This level of authority is measured as the highest level of the loan size (I refer to this level as "limit" in the text below), for which the branch can make independent decisions without consulting with the headquarters (measured in EUR). The two data sets described above are privately obtained data from a commercial bank which operates in a European country, has a well-developed branch network, serves all types of clients and businesses, and has the second biggest market share in that country;

(3) panel (monthly) data set of market characteristics for a particular region: economic conditions and risks and the level of competitions from other lending institutions. This information is obtained from statistical agencies and financial registry of the unnamed country.

A detailed definition of the variables is provided in Table 1 in the Appendix, which divides the variables into two groups: performance and explanatory variables. Each bank-related variable is obtained separately for both SME and PI loans. Further, I shall discuss in more detail how the specific performance measures were generated and why they were selected.

First, I divide the performance measures into two groups: **quantitative** and **qualitative**. Quantitative performance measures include (1) the number of loans (per office) approved by the branch during a period of one month, and (2) the sum of loans (per office) approved by the branch during a period of one month (in EUR).

The two measures are expressed in per office terms because each regional branch, which makes the decision on the loans based on their delegated limits, may have many regional offices, which collect loan applications. Therefore, the branch with a larger office network will naturally have the larger number and amount of loans originated in a specific month. To control for this effect, I measure all quantitative variables in per office terms. Unfortunately, I do not have a measure for specific office size. Therefore, I treat all offices as equal in size.

Qualitative performance measures include (1) the average days the loans approved by a particular branch during a particular month (all offices of the branch) are overdue after 6 months of being on the books, and (2) the percentage of loans that became performing after having been recognized as non-performing during a period of 90 days, and (3) the number of loans that are overdue more than 30 days out of those approved by a particular branch during a particular month (all offices of the branch). In order to generate these performance measures, I created a series of loan pools. The pools consisted of all loans (SME or PI) approved by a specific branch in a specific month. Then, I followed each pool over time (for 3 months, 6 months, etc). After loans from this specific pool became non-performing, the mean days overdue, the quantity of non-performing loans was calculated from this pool of loans. This procedure allows us to trace the performance of all loans, which were generated in the specific month when the regional branch was experiencing a high or low level of delegated authority.

Figure 1 below describes how selected variables vary over time. On the horizontal axis is a time unit (month), and on the vertical are the average values (across the

branches) for the main outcome variables (quantitative): the number of generated loans per month, total amount of loans approved per month, and the average limits across regional branches. Again, all the values of outcome variables are calculated per one selling point (office) because there could be more than one office (selling point) operating under each regional branch authority.

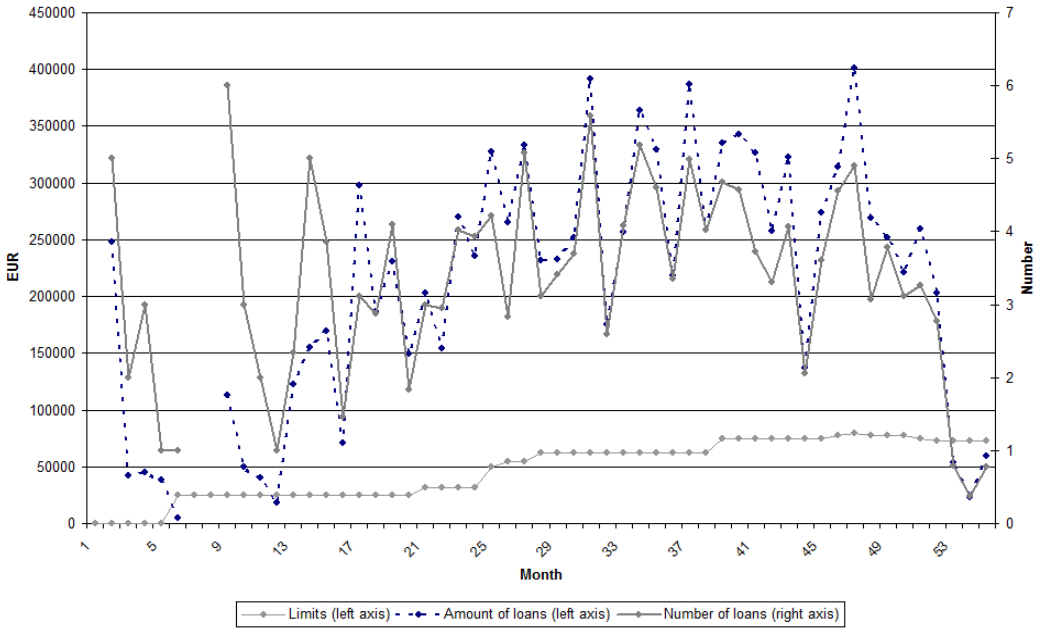

Figure 1: Quantitative Performance Measures and Branch Limits Over Time

From Figure 1 I infer the average limits increased overt time. At the same time, I observe that for the periods with higher limits, I have both a higher average number of loans approved (per office) and a higher average amount approved (per office).

The next two figures describe a similar pattern for the qualitative data (loan performance): the mean number of days the loans approved by the branch are overdue, the percentage of non-performing loans out of those approved by the branch, and the recovery rate. The recovery rate measures what percentage of loans became performing after they were recognized prior as non-performing during a period of

some time before (a ninety days' recovery rate is considered here). The observation period is shorter here compared to the quantitative measures because I have to observe the loans for certain period of time before I can make the conclusions about their quality. From the two figures, I conclude that an increasing trend exists

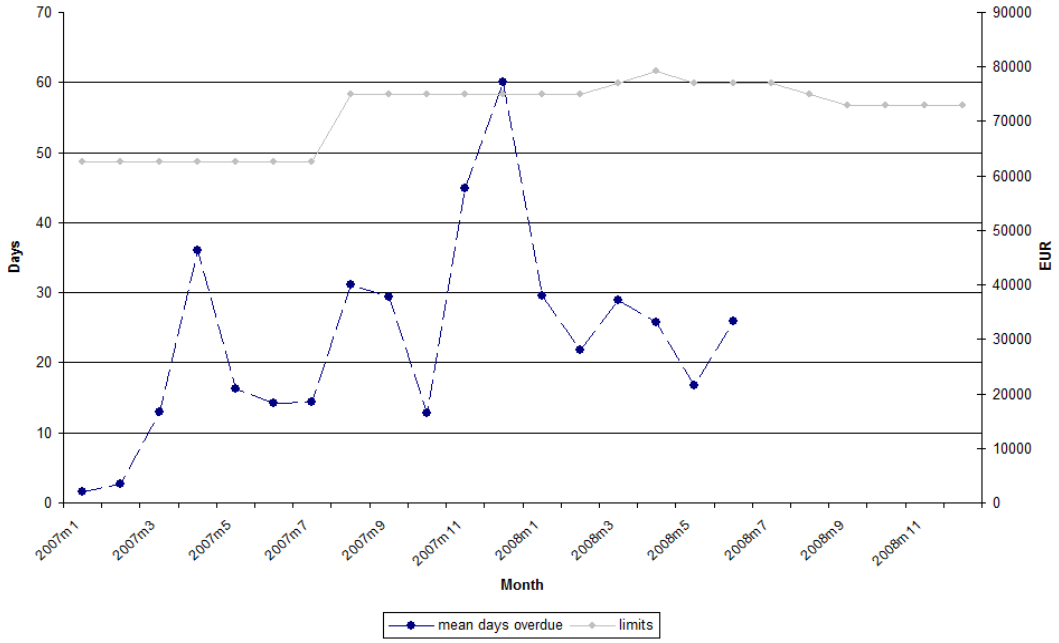

Figure 2: Mean Days Loans are Overdue and Branch Limits Over Time

in the average days the loans are overdue, and at the same time, average limits also experience an increasing trend. Also, a trend to a decreasing recovery rate is observed, and no clear conclusion can be drawn from the average values of the share of non-performing loans.

With these primitive observations, I could conclude that a positive influence of delegated authority (limits) exists on quantitative performance — more loans are issued. However, there is some evidence that increased authority leads to a worse quality in decisions made — more non-performing loans, longer overdue periods, and lower recovery rates.

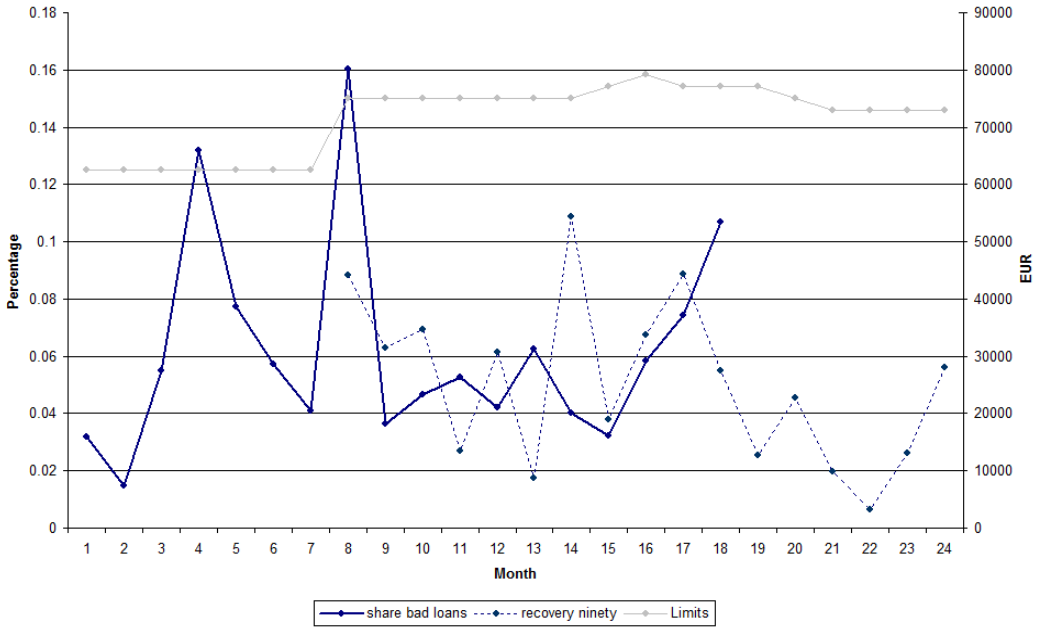

Figure 3: Share of Non-performing Loans and Recovery Rate

Table 2 provides the unconditional mean comparison for the observations (for SME loans only) with zero and positive limits. A comparison demonstrates that the level of limits has an important effect on the performance characteristics. Such measures as the number of loans originated by the branch and the number of loans originated by the branch per office, the total sum of loans, overdue measures, and non-performing loans measures differ dramatically between the observations with zero and non-zero limits. Interestingly, mean loan size and the recovery measure do not differ between the two groups. This might be considered as quite surprising because a branch with high limits is expected to approve larger loans, and this should lead to an increase in the average loan size.

However, such a comparison of means could be misleading because observations with different limits are characterized not only by very different performance measures, but also by very different explanatory variables. For example, observations

with non-zero limits have a higher amount of offices for each branch (1.5 versus 4.3), have twice as high a number of competitors in the regional market, have twice as long a presence on the regional market, and are located further from headquarters. Therefore, explanatory variables are closely related to the level of branch limits. As those explanatory variables could be also related to the performance measures, if I do not account for this association, I would over-estimate the effect of limits on performance (a real effect would come from exogenous explanatory variables like market characteristics, but I would incorrectly attribute it to the effect of limits).

The section below will check those predictions about the effect of limits more rigorously. More importantly, I shall test how the level of delegated authority is related to the results of bank activities, controlling for the endogeneity problem, and shall compare the results of the instrumental variable estimation to the simple OLS and FE specifications. I shall then conclude on the possible bias in the OLS and FE estimates.

3.2 Empirical Results

3.2.1 Regression Estimates (Quantitative)

Table 3 and 4 in the Appendix provide the estimates for the quantitative measures (the number of loans and the total amount of loans per office) regressions, both for SME and PI loans. Different specifications were used in the estimation: simple OLS (pooled panel data), fixed effect, and IV specification.

Real Wage Index positively influences performance measures, sign and size of the coefficient does not change in different specifications, which provides evidence

that the unobserved heterogeneity and omitted variables that possibly bias the estimates do not correlate with economic conditions in the region. Therefore, those omitted variables are bank-specific characteristics rather than the characteristics of the economic conditions in the region. The results of PI regression are similar to that for SME with respect to the index of the real wage coefficient.

The measure of competitive pressure, the *Number of Competitors* in the region, considerably changes size and sign if I use a fixed-effect specification. This provides evidence that there is a downward bias in the OLS regression if I do not control for unobserved branch effects. Moreover, it can be checked that unobserved fixed effects strongly and negatively correlated with the number of competitors variable. Therefore, unobserved fixed effects should be positively related to the outcome variable (quantitative performance) for the bias in the OLS regression to be negative. Establishing that omitted fixed effects are positively influencing performance and negatively related to the number of competitors, it is possible to hypothesize what exactly those fixed, unobserved effects are. They could be related to the market position of the respective bank. The higher the bank's market share, the better the bank is established in a particular region, and the higher loan origination activity is (a quantitative measure). Also, the number of competitors would be negatively related to the strength of the bank's market share (the degree to which the bank is recognized and established). Therefore, not accounting for the unobserved fixed effects brings a downward bias to the coefficient estimates. The results of the PI regression are similar to the SME regression with respect to the number of competitors coefficient.

For the *Number of Offices* variable, both linear and quadratic terms were included in the regression to control for a possible non-linear relationship between the number of offices and quantitative performance. Indeed, if only a linear term is included, the number of offices has positive effect on the quantitative performance, but including the quadratic term makes the coefficient for the linear term negative and positive for the quadratic term. For example, for the SME[8] regression, such coefficients mean that the effect of the number of offices on quantitative performance is described by a quadratic parabola with its minimum at approximately 15. It reflects the fact that the origination of loans is a not-linear technology, so that opening more offices does not necessarily equally bring an additional number of loans. As the number of offices is low (below 15), opening one more office brings less loans per office (and a lower amount of loans per office), but later after more offices are opened (above 15), each additional office is associated with a higher per-office quantitative performance. This provides evidence that the bank is working in the region first to establish its clientèle and presence, but with a higher number of offices, the bank can expect to increase its performance.

The *Distance* and *Duration* variables are not related to the performance in any of the regressions. Those variables are present only in no-IV regression because I am using them as the excluded instruments in the IV regressions. I shall discuss in more detail these results in the subsection 3.3 in relation to the discussion of the instrumental variables validity.

The *Limits* variable is the main variable of interest, and it is positively related

[8]For the PI regression, results are very similar with the only difference being the minimum of the parabola is at 12 offices.

to quantitative performance in both SME and PI regressions. The economic effect is also not negligible. For example, increasing limits on 1 EUR increases the amount of originated loans per office per month by more than 1 EUR. Taking into account statistics from Table 2, regarding the average loan amount originated, this represents quite an important effect of the limits on the quantitative measures. This result suggests that more authority delegation to the regional branch improves quantitative performance.

As I have explained earlier, potentially, branch limits are an endogenous variable because the variable is chosen not randomly by headquarters, yet is based on the current and expected market conditions and strategies. After I have controlled for the endogeneity in the limits variable, the coefficients for limits become higher (but not significant for FE IV specification). Therefore, the bias in the limits variable is negative. It means that, in fact, the effect of the limits on the quantitative measures is even more positive. This bias emerges from the fact that some unobserved characteristics (for example, the strong bank position in the market) positively influence the outcome variable, while limits are lower for observations where market position is strong. This devaluates the effect of the limits on the outcome variable because limits are high for those observations, where the market position is weak and this artificially decreases the limits effect on performance.

Results regarding the limits variable are similar for PI and SME regressions. However, it is important to note that the limits effect is weaker for the SME regression (size of the coefficient). The explanation is the following: Limits delegated to the regional branches are much higher for SME loans because SME loans are also

higher in their amount compared to PI loans (Table 7). Therefore, the same $1,000$ increase in SME limits has much a lower effect compared to the same increase in limits for PI loans.

3.2.2 Regression Estimates (Qualitative)

Further, I analyze the effect of authority delegation on the quality of approved loans. Tables 5 and 6 in the Appendix present the estimation results for qualitative measures as the outcome variable (mean days overdue, recovery measure, and the number of loans that are more than 30 days overdue).

The *Index of Real Wage* variable has noisier estimates in the quality regressions compared to the previous subsection. Using both PI and SME estimates, I cannot say that the real wage index positively or negatively influences qualitative performance. There could be some evidence that the higher real wage index is associated with a higher probability of loan recovery from a non-performing stage, but this effect is only significant for the SME regression, not for PI.

Number of Competitors is not significant for qualitative SME regressions, reflecting the fact that competitive pressure is not important for the quality characteristics of SME loans. Banks rather compete on the extensive margin (for customers), but not for better customers. However, for PI loans, the number of competitors is negatively related to the recovery rate and increases the number of loans, which are more than 30 days overdue. Thus, a more competitive environment decreases the quality of loans to PI.

The *Number of Branch Offices* variable is also not significant for SME loans; there could be only some evidence that the number of offices in the region is significantly

influencing quality of PI loans measures. *Distance* and *Duration* are not related to the performance measures in any of the regressions.

The main predictor variable, *Limits*, is positively related to *Mean Days Overdue* measure. Increasing the limits by $1,000$ increases mean days overdue by 0.11 for the OLS SME regression (and by 0.26 for fixed effect regression). For the PI regression, the coefficient is 0.23 days (same size for the FE regression). This limits effect on the mean overdue days is also economically significant because the average mean days overdue is 2.5 for branches with zero limits and 35 for the branches with positive limits (Table 2).

As OLS and FE specifications suggest, more authority leads to a lower quality of decisions made: an increase in the mean days loans are overdue. A comparison of the results of IV estimates with non-instrumented regressions suggests that endogeneity problem influences the coefficient for the branch limits variable. The limits effect on the overdue measure is not significant if I instrument the limits variable. For example, after observing that market perspectives in a particular branch are deteriorating (due to economic conditions, or competitors' behavior), headquarters may decide to delegate more authority to such a branch in order to use all local knowledge potential. Deteriorating market conditions, then, lead to both: a worse qualitative performance and more authority delegated to the region. As a result, if I neglect this endogeneity in the delegated authority, I will obtain a negative relationship between performance and authority, which is, in reality, not there. Therefore, it is important to control for the endogeneity of the limits variable.

Limits have also a positive effect on the number of loans that are *Overdue More*

Than 30 *Days*, out of those loans approved by a particular branch during a particular month (in all offices of the branch). For example, if limits are increased by $1,000$, the number of loans that will be overdue more than 30 days increases from 0.008 to 0.011 (for different specifications), and the coefficient is significant for both SME and PI regressions, but correcting for the endogeneity in limits makes the value of the coefficient insignificant.

It is important to note that the effect of limits variable is weaker for the SME regression (the size of the coefficient). It is explained by the fact that such limits are much higher for SME loans (Table 7) because these loans also have on average a higher amount. Therefore, the same $1,000$ increase in limits for SME loans has a much lower effect compared to PI loans.

Further, regression results demonstrate that limits have no significant effect on the *Recovery Rate* variable. This and the evidence from the above regression discussions illustrate the fact that limits influence quantitative measures in the first place as the level of delegation is positively related to loan-generation activities. On the other hand, higher limits might also lead to a deteriorated quality in the loan pool the branch originates. Correcting for the endogeneity of the limits variable reveals that the quality measures are no longer affected by the limits. Therefore, the regression provides only weak evidence that higher limits lead to a accumulation of loans with a higher default potential in the pool of all originated loans.

The results obtained could be interpreted in the following way. I demonstrated that there is positive effect from the level of delegated authority on quantitative performance measures. Also, evidence is weak for a negative effect from the level

of delegation on the quality of originated loans. The bank was not constrained in its delegation decisions but made rather optimal choices in its organizational structure. Therefore, the question stated at the beginning of the paper remains: if more delegation is positively (or negatively) influencing the performance, why is the bank not choosing the optimal level of delegation, which would lead to a best outcome? This paper suggests that there might be a trade-off between quantitative and qualitative performance characteristics. While the bank is able to increase its loan generation with higher limits, there is also some (weak) evidence of loan quality deterioration. Therefore, the bank would be optimally changing the level of delegation to its regional branches in order to find the balance between the two effects. A more aggressive (market share expansion) market strategy could be associated with the bank providing higher limits to local branches, and the loss-avoidance strategy could be associated with more centralized decision making (lower limits to the local branches).

3.3 Instruments Validity

The first stage regression estimates for *SME loans* are provided in the Appendix, Table 8 (panel 1 for SME loans). These results confirm the authority delegated (the level of limits) to the branch for SME loans is strongly positively related to the duration variable (how long the bank was present in the particular market), but the effect of distance from the branch to headquarters is positive and not significant. In fact, being present in the market for one more month increases the level of limits the branch receives by approximately $1,200 - 1,500$ EUR for SME loans and $500 - 600$

EUR for PI loans. The first-stage regression accounts for approximately 40% of the variation in limits for SME loans (but much less for PI loans). The F-test of excluded instruments also confirms that they are strongly related to the limits variable (they are not weak instruments).

In addition to this, a valid instrument has to be uncorrelated with the outcome variable in my model. For pooled OLS specification, Hansen J statistics (J-stat=0.0427, p-value=0.8362) confirm that the excluded instruments are orthogonal to the error term in the regression of main interest and are correctly excluded from the main regression.

In the FE IV specification, I am using only one excluded instrument (duration) because the distance variable is time-invariant and becomes part of the unobserved fixed effects in the FE IV specification. In such a situation, I cannot check for instrument validity by applying the usual test of over-identifying restrictions to the duration variable. I check the relationship between the branch duration and performance measures by including the duration variable in the OLS and FE regressions as additional explanatory variable (Table 3 and 5). If distance and duration have a direct effect on the performance of the branch, I would expect these variables to be significant in each of the estimated main equations. However, in all cases, the effects of distance and duration on performance are statistically insignificant. Moreover, including these additional exogenous variable does not change at all the coefficients for other estimated variables in the regression. This confirms my conjecture that the impact of distance and duration on performance work only through the "delegation channel". In other words, distance and duration themselves do not have

direct effects on the branches' performance, if we control for the level of delegated authority.

The first-stage regression estimates for *PI loans* are provided in Appendix, Table 8 (panel 2 for PI loans). These results confirm that the authority delegated (the level of limits) to the branch for PI loans is strongly related only to the duration variable, and the distance variable is not significantly related to the limits variable. The F-test of excluded instruments confirms that they are jointly strongly related to the limits variable, but in the FE specification, the F-value is quite low (3.66), and it is boundary a decision whether excluded instruments are strongly related to the limits variable (instruments might be weak for the FE specification, but are not weak for the pooled OLS specification). For the pooled OLS specification, Hansen J statistics (J-stat=10.72, p-value=0.001) do not allow us to conclude that the excluded instruments are orthogonal to the error term in the regression of main interest and are correctly excluded from the main regression (instruments are not valid for a pooled regression specification).

For the PI loans regression, the proposed instrumental variable *distance* is not affecting the level of limits, and the duration variable remains strongly correlated with the limits variable. However, the distance variable cannot be excluded from the main equation because it is related to the outcome variable. The conclusion is that when making the decision on the level of limits for PI loans, the bank is using different considerations other than monitoring costs and local experience. The IV specification for PI loan regressions suffers from either a weak or not orthogonal instrumental variables problem. Therefore, it casts doubts on PI loan regressions

whether the procedure for correcting for the omitted variable bias was helpful and whether the results are conclusive.

4 Conclusions

This paper considers the problem of delegated authority using an example from the banking sector. Recently, competition in the banking sector has become more severe, and as a result, the banking sector has come through many important changes in its organizational structure — decision making has become more centralized, and the delegation of control in lending has decreased. However, many studies demonstrate that delegating loan decisions is often used by the banks to compete for customers and facilitate lending.

Our regression estimates show that more authority delegated has a positive effect on quantitative measures of performance; however, it might also decrease the quality of decisions made. Different regression specifications were employed to control for the endogeneity of the delegation variable. For some of the qualitative performance regressions, after controlling for the endogeneity of the delegation level, these effects became insignificant, and for the quantitative performance measures, controlling for the delegation endogeneity made the estimates economically more significant. Therefore, results show that not controlling for the endogeneity problem might lead to false conclusions about the relationship between performance and authority.

Moreover, estimation results show that the validity of instruments remains an important problem for some of the regression estimates. Employed instruments (excluded) proved to be strong predictors of the delegation decision for the SME loans

but are weak instruments for the PI loans delegation decision. This could reflect the fact that the bank is using different considerations other than monitoring costs (distance variable) and local market experience (duration variable) when assigning the loan limits to the PI loans as compared to SME loan limits. With no evidence for instrument validity, the consistency of estimates and the instrumental variable specification estimates for the case of PI loans might be questioned.

Estimates demonstrate that there is a positive effect of the level of authority delegated on the performance measures. Also, there is only weak evidence of a negative level-of-delegation effect on the quality of originated loans. This result is consistent with the bank's optimal authority delegation behavior as a response to changes in local market conditions. The bank had not been constrained in its delegation decisions, and it was making optimal choices for its organizational structure. The paper shows that there might be a trade-off between the quantitative and qualitative performance characteristics. Therefore, the results are consistent with the following bank behavior: Headquarters are optimally balancing the level of delegation to the regional branch as a response to local market conditions. A more aggressive (market share expansion) market strategy could be associated with the bank providing more delegation to the local branches, and a loss-avoidance strategy could be associated with bank's decision-making being centralized (lower limits to the local branch).

5 Appendices

Table 1: Definition of Variables

Performance variables	
Number of loans	The number of all loans approved by the branch (all offices of the branch) during a period of one month
Amount of loans	The sum of all loans approved by the branch (all offices of the branch) during a period of one month (in EUR)
Mean loan size	Average size of the loan approved by the branch (all offices of the branch) during a period of one month (in EUR)
Number of loans per office	The number of loans per office approved by the branch during a period of one month
Amount of loans per office	The sum of loans per office approved by the branch during a period of one month (in EUR)
Mean days overdue	The average days loans (approved by a particular branch during a particular month, all offices of the branch) are overdue after 6 month of being on the books
Thirty plus	The number of loans that are overdue more than 30 days out of those approved by a particular branch during a particular month (all offices of the branch)
Recovery ninety	Percentage of loans that became performing after they were recognized as non-performing during a period of 90 days
Number of bad loans	Number of loans that became non-performing during a period of one month
Share of bad loans	Share of loans that became non-performing during a period of one month
Amount of bad loans	Total face value of loans that became non-performing during a period of one month
Share of the amount of bad loans	The share of the face value of loans that became non-performing during a period of one month
Explanatory variables	
Limits	The highest level of loan size, for which the branch can make an independent decision, without consulting headquarters (in EUR)
Number of offices	The number of offices the regional branch has in the region
Number of competitors	The number of other banks in the region
Real wage index	Real wage index in the region
Duration	The number of months the bank is present in the regional market
Distance	The (driving) distance from headquarters to the regional branch

Table 2: Comparison of Means for the Observations with Zero and Positive Limits

Variable	Observations with zero limits (20% of all obs.)	Observations with positive limits (80% of all obs.)	Difference in means is significant: *** (1%); **(5%); *(10%)
Number of loans	3.15 (2.37)	13.05 (11.4)	***
Amount of loans	256570.1 (259979)	925222.9 (897779)	***
Mean loan size	78214.44 (62622.8)	72804.93 (45929.9)	
Number of loans per office	2.58 (1.96)	3.56 (2.3)	***
Amount of loans per office	215450.3 (225399)	250884 (199659)	
Mean days overdue	2.31 (8.51)	31.51 (52.47)	***
Thirty plus	0 0	0.35 (0.83)	***
Recovery ninety	0.08 (0.25)	0.05 (0.12)	
Number of bad loans	0.14 (0.52)	1 (1.55)	***
Share of bad loans	0.03 (0.09)	0.06 (0.09)	***
Amount of bad loans	13570.49 (48668.4)	102725.7 (203071)	***
Share of the amount of bad loans	0.03 (0.13)	0.07 (0.12)	**
Limits	0 0	102760.7 (37705)	*
Number of offices	1.49 (1.15)	4.3 (3.4)	***
Number of competitors	32.93 (7.01)	65.62 (32.48)	***
Index of real wage	100.9 (7.04)	100.77 (5.53)	
Duration	8.03 (6.2)	18.16 (12.73)	***
Distance	413.13 (176.45)	540.45 (202.29)	***

Table 3: Quantitative Performance Measures for SME

	Number of approved loans (per office)				Sum of loans approved (per office)			
Variable	OLS	FE	IV	FE IV	OLS	FE	IV	FE IV
Limits[9]	0.0203***	0.0171***	0.0337***	0.0275	1206.2874***	1228.0067***	519.54315	2571.5921
	[0.0022]	[0.0033]	[0.0096]	[0.0141]	[205.44955]	[318.71793]	[894.50433]	[1355.3822]
Index of real wage	0.0479**	0.0515***	0.0489**	0.0524***	3243.186*	3666.8983**	3199.044*	3774.2971**
	[0.0145]	[0.0135]	[0.015]	[0.0137]	[1389.7309]	[1291.9851]	[1402.018]	[1316.1033]
Number of offices	-0.663***	-0.8046***	-0.8007***	-0.7664***	-39910.67***	-62346.504***	-31811.376*	-57421.056***
	[0.1007]	[0.1318]	[0.1678]	[0.1025]	[9618.2668]	[12595.807]	[15649.125]	[9867.8143]
Number of offices squared	0.0237***	0.0217**	0.0288***	0.0193***	1609.3899**	1581.4546*	1318.7987	1275.3809*
	[0.0058]	[0.0067]	[0.0076]	[0.0056]	[553.24065]	[643.93763]	[712.77628]	[541.40643]
Number of competitors	-0.0086**	0.3487***	-0.0112**	0.3213**	-680.20522*	29128.725***	-591.86241	25593.309*
	[0.0033]	[0.086]	[0.0037]	[0.1104]	[314.62491]	[8220.924]	[347.2635]	[10624.498]
Distance	0.0003				-29.951444			
	[0.0005]				[44.488134]			
Duration	0.0135	0.0162			-471.87726	2084.9759		
	[0.0122]	[0.0223]			[1163.0556]	[2129.4779]		
Observations	567	567	567	567	567	567	567	567
R-squared	0.221	0.2026	0.1666		0.1147	0.1350	0.0966	
R-squared adjusted	0.2112	0.1596	0.1592		0.1036	0.0883	0.0886	
Number of id		24		24		24		24

Robust standard errors in brackets
*** p< 0.01, ** p< 0.05, * p< 0.1

Table 4: Quantitative Performance Measures for PI (private individuals)

	Number of approved loans (per office)				Sum of loans approved (per office)			
Variable	OLS	FE	IV	FE IV	OLS	FE	IV	FE IV
Limits[10]	0.3331***	0.1968***	0.6315***	0.2117	8011.6471***	4820.5108***	13199.1044***	19212.3758**
	[0.0266]	[0.0237]	[0.1667]	[0.2965]	[621.8245]	[550.6499]	[3712.7085]	[10193.4606]
Index of real wage	0.5381***	0.5261***	0.5414***	0.5261***	12613.2757***	12748.6331***	12641.672***	12783.2738***
	[0.11]	[0.0846]	[0.122]	[0.0846]	[2570.8346]	[1964.1564]	[2716.4296]	[2908.6684]
Number of offices	-7.9527***	-10.3517***	-9.6196***	-10.3333***	-152166.5059***	-239799.9032***	-177142.6739***	-221982.7963***
	[0.7616]	[0.832]	[1.3422]	[0.6272]	[17806.8519]	[19307.7666]	[29894.931]	[21563.863]
Number of offices squared	0.3094***	0.3679***	0.4043***	0.3695***	5859.0109***	7655.8755	7423.2696***	9137.5949***
	[0.0449]	[0.0429]	[0.0775]	[0.065]	[1049.0755]	[995.0093]	1726.0597]	[2234.4776]
Number of competitors	0.1802***	2.2187***	0.1863***	2.1574	3177.1056***	75755.1383***	2989.3632***	16712.9661
	[0.0246]	[0.5291]	[0.0281]	[1.5578]	[576.1669]	[12278.8299]	[625.1437]	[53555.6718]
Distance	0.013***				114.7477			
	[0.0035]				[82.2966]			
Duration	0.0748	0.0068			2176.9695	6571.1355**		
	[0.0932]	[0.1359]			[2179.6108]	[3153.2771]		
Observations	601	601	601	601	601	601	601	601
R-squared	0.4271	0.565	0.2929		0.3581	0.5003	0.2809	
R-squared adjusted	0.4203	0.5429	0.2869		0.3506	0.4749	0.2749	
Number of id		24		24		24		24

Robust standard errors in brackets
*** p< 0.01, ** p< 0.05, * p< 0.1

Table 5: Qualitative Performance Measures for SME

	Mean days overdue				Recovery ninety				Thirty plus			
Variable	OLS	FE	IV	FE IV	OLS	FE	IV	FE IV	OLS	FE	IV	FE IV
Limits[11]	0.1091*	0.2598**	-0.1216	1.4775	0.0001	-0.0004	-0.0004	0.0099	0.0008**	0.0005	-0.0005	0.0201
	[0.0572]	[0.1304]	[0.2538]	[1.9637]	[0.0002]	[0.0008]	[0.0008]	[0.0171]	[0.0003]	[0.0007]	[0.0013]	[0.0298]
Index of real wage	0.466	0.4751	0.3621	0.6451	0.003**	0.0023*	0.0027*	0.0024	0.0006	-0.0002	0.0004	0.0031
	[0.3766]	[0.3787]	[0.3954]	[0.478]	[0.0015]	[0.0012]	[0.0016]	[0.0015]	[0.0022]	0.0022]	[0.0023]	[0.0062]
Number of offices	4.2345	2.6097	6.0124	9.0554	-0.0095	-0.0071	-0.0041	0.0051	-0.0068	-0.0075	0.0076	0.1
	[2.9574]	[4.394]	[4.6623]	[8.1963]	[0.0084]	[0.0129]	[0.0154]	[0.0337]	[0.0181	[0.0259]	[0.0287]	[0.1388]
Number of offices squared	0.0229	-0.0049	-0.0152	-0.7681	0.0003	0.0004	0.0002	0	0.0009	0.0006	0.0005	-0.0112
	[0.2151]	[0.2728]	[0.2367]	[1.1589]	[0.0004]	[0.0005]	[0.0005]	[0.0012]	[0.0012]	[0.0015]	[0.0014]	[0.0171]
Number of competitors	0.0629	-2.6155	0.0769	-7.8563	0.0006	-0.0097	0.0003	-0.0266	-0.0006	-0.0292	-0.0007	-0.1406
	[0.1148]	[4.166]	[0.1093]	[11.5055]	[0.0004]	[0.0139]	[0.0005]	[0.0276]	[0.0006]	[0.0243]	[0.0006]	[0.1996]
Distance	0.0047				0				0			
	[0.0124]				[0]				[0.0001]			
Duration	-0.364	0.8514			-0.0004	-0.0021			-0.0016	0.0085		
	[0.3505]	[1.234]			[0.0011]	[0.0028]			[0.0018]	[0.0066]		
Observations	381	381	381	381	311	311	311	311	325	325	325	325
R-squared	0.1161	0.0526	0.0769		0.031	0.0315	0.0092		0.026	0.017	.	
R-squared adjusted	0.0995	-0.0256	0.0645		0.0087	-0.0609	-0.007		0.0045	-0.076	.	
Number of id		24		24		24		24		24		24

Robust standard errors in brackets
*** p< 0.01, ** p< 0.05, * p< 0.1

Table 6: Qualitative Performance Measures for PI (private individuals)

	Mean days overdue				Recovery ninety				Thirty plus			
Variable	OLS	FE	IV	FE IV	OLS	FE	IV	FE IV	OLS	FE	IV	FE IV
Limits[12]	0.2374***	0.2287*	-0.008	0.4364	0.0006**	0.0002	0.0027	0.0013	0.0111***	0.0064**	0.0131	0.5631
	[0.0788]	[0.1324]	[0.3812]	[0.8038]	[0.0003]	[0.0004]	[0.0031]	[0.0019]	[0.0028]	[0.0033]	[0.0112]	[5.6102]
Index of real wage	0.2386	0.233	0.2212	0.2363	0.0002	0.0001	0.0002	0	0.0134	0.0133	0.0132	-0.0198
	[0.2783]	[0.2784]	[0.281]	[0.2787]	[0.0013]	[0.0013]	[0.0014]	[0.0013]	[0.0103]	[0.0093]	[0.0104]	[0.3439]
Number of offices	4.5359*	1.6966	4.4619	2.3075	-0.0223***	-0.0032	-0.0306	-0.006	-0.3293***	-0.657***	-0.3785***	-0.2503
	[2.409]	[3.2738]	[3.3988]	[2.5387]	[0.0081]	[0.0122]	[0.0194]	[0.0095]	[0.0824]	[0.1083]	[0.1129]	[3.5464]
Number of offices squared	0.0083	0.1151	-0.0128	0.072	0.0008*	0.0002	0.0013	0.0004	0.0169***	0.0314***	0.0187***	-0.0279
	[0.1765]	[0.199]	[0.2141]	[0.2143]	[0.0005]	[0.0006]	[0.001]	[0.0005]	[0.0056]	[0.0062]	[0.0066]	[0.5753]
Number of competitors	0.0263	0.5019	0.0715	0.2943	0.0002	-0.0248**	0	-0.0313***	0.0052**	0.1419*	0.0065***	-1.2486
	[0.0835]	[2.2701]	[0.081]	[2.6619]	[0.0004]	[0.0116]	[0.0005]	[0.0118]	[0.0025]	[0.0849]	[0.0023]	[14.3981]
Distance	0.0118				0				0.0005			
	[0.0094]				0				[0.0003]			
Duration	-0.3768	0.1943			0.0009	-0.0018			-0.0063	0.0195		
	[0.3008]	[0.7614]			[0.0011]	[0.003]			[0.0087]	[0.0223]		
Observations	578	578	578	578	549	549	549	549	410	410	410	410
R-squared	0.1128	0.0424	0.0944		0.0354	0.0452	.		0.1097	0.1692	0.1037	
R-squared adjusted	0.1019	-0.0082	0.0864		0.0229	-0.0082	.		0.0942	0.1081	0.0926	
Number of id		24		24		24		24		24		24

Robust standard errors in brackets
*** p< 0.01, ** p< 0.05, * p< 0.1

Table 7: Statistics for the Limits Variable for SME and PI Loans

	Mean	Median	St. dev	Min	Max
PI Limits> 0 (48.33% of all observations)	46,089.34	50,000	17,088.07	2,500	100,000
SME Limits> 0 (49.62% of all observations)	96,183.21	100,000	36,691.5	50,500	200,000

Table 8: First Stage Regressions

	SME Limits		PI Limits	
Variables	OLS	FE	OLS	FE
Index of real wage	-0.0726 [0.2858]	-0.0799 [0.1747]	-0.0002 [0.1696]	-0.0024 [0.1491]
Number of offices	9.7836*** [1.9346]	-3.6659** [1.6965]	4.0664*** [1.1631]	-1.238 [1.4652]
Number of offices squared	-0.3723*** [0.1127]	0.2278*** [0.0866]	-0.2854*** [0.0682]	-0.103 [0.0754]
Number of competitors	0.2133*** [0.0641]	2.6313** [1.1062]	0.091** [0.0378]	4.1025*** [0.9164]
Distance	0.0134 [0.0091]		0.0012 [0.0054]	
Duration	1.1023*** [0.2346]	1.5518*** [0.2802]	0.5837*** [0.1418]	0.4566* [0.2387]
Observations	567	567	601	601
R-squared	0.4140	0.3680	0.1652	0.1099
F test of excluded instruments	F(2,560) = 15.02	F(1,538) = 30.68	F(2,594) = 9.30	F(1,572) = 3.66
Hansen J statistics	0.0427 (p = 0.8362)		10.7222 (p = 0.0011)	

Robust standard errors in brackets
*** p< 0.01, ** p< 0.05, * p< 0.1

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