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THE IMPACT OF COMPETITION ON BANK ORIENTATION AND SPECIALIZATION

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Abstract

How do banks react to increased interbank competition? Recent banking theory offers conflicting predictions about the impact of competition on bank orientation − i.e., the choice of relationship based versus transactional banking − and bank industry specialization. We empirically investigate the impact of interbank competition on bank branch orientation and specialization. We employ a unique data set containing detailed information on bank-firm relationships and industry classification. We find that bank branches facing stiff local competition engage relatively more in relationship-based lending but specialize somewhat less in a particular industry. Our results illustrate that competition and relationships are not necessarily inimical.

Keywords: bank orientation, bank industry specialization, competition, lending relationships.

JEL: G21, L11, L14.

I. Introduction

In their seminal paper Petersen and Rajan (1995) investigate the effects of competition between banks on the loan rate and the availability of bank credit. Petersen and Rajan model how especially lower quality firms may be negatively affected by interbank competition. Their reasoning is that banks are unwilling to invest in relationships by incurring initial loan losses that may never be recouped in the future (as firms can later on obtain a low loan rate in a competitive interbank market).[1] Petersen and Rajan document that young firms in more concentrated banking markets obtain more relationship benefits, i.e., lower loan rates and easier access to bank credit, than firms in more competitive banking markets.

However, recent theoretical and empirical work is starting to question whether credit market competition is always "inimical to the formation of mutually beneficial relationships between firms and specific creditors" (p. 407). Boot and Thakor (2000), for example, revisit the presumed incompatibility between competition and relationship finance and argue that the source of competition matters in the determination of *bank orientation* (i.e., relationship-based versus transactional lending) and *bank industry specialization*. In their model, capital market competition reduces the relative amount of relationship lending chosen by banks but interbank competition actually *increases* relationship lending. Their reasoning is that banks when faced with stiffer interbank competition have greater incentives to offer relationship loans. Relationship lending (compared to transactional lending) allows banks to shield rents more effectively, as relationship banking differentiates the lending bank better from competing banks. Boot and Thakor reason that competition also affects the banks' investment in sector expertise. Interbank competition reduces bank industry specialization as the marginal returns to sector specialization decline.

Recent empirical work by Elsas (2003) carefully studies the determinants of relationship lending. Elsas employs a cross-sectional data set containing bank credit files on 122 large German firms to investigate the relationship between local bank market concentration and the likelihood a bank assesses itself to be the "Hausbank" of a firm. His study complements the approach taken by Petersen and Rajan (1995), who employ cross-sectional data to infer smoothing of loan rates and availability of credit over the lifetime of their firms. Elsas actually documents a mostly decreasing relationship between concentration and the incidence of the Hausbank status. Hence his preliminary findings suggest relationship banking prevails in more competitive banking markets as hypothesized by Boot and Thakor (2000).

Our paper aims to contribute to this literature by analyzing a unique data set containing loans to 13,098 firms (mainly single-person businesses), comprising the entire loan portfolio of an important bank in Belgium. This data set allows us to study how both local and national competition affect *bank orientation* and *bank industry specialization*. We control for branch, regional and firm characteristics.

We find, in line with Boot and Thakor (2000), that when local interbank competition is fiercer a bank branch is more likely to engage a borrower in relationship banking and somewhat less likely to specialize in lending to a particular industry (unlike in Boot and Thakor, this is the case for both relationship and transactional borrowers). In particular the presence (in the postal zone of the borrower) of many other banks with equal market shares or the presence of banks with multiple contacts across other postal zones results in more relationship lending and less industry specialization.

We further document that borrowers located closer to the bank branch are more

likely to be engaged as relationship borrowers. That is borrowers take other bank services and are serviced over a longer time period when close by. In addition, closer-by borrowers are less likely to operate in an industry in which the branch specializes. Finally, we find that larger bank branches lend substantially more on a transactional basis, a result suggestive of organizational size effects modeled by Stein (2002), but are less likely to be specialized in particular industries.

We organize the rest of the paper as follows. Section II reviews the theoretical predictions regarding interbank competition, bank orientation and bank industry specialization, and presents recent empirical findings. Section III introduces the data and discusses the variables used in our paper. Sections IV and V display and discuss the empirical results on bank orientation and industry specialization. Section VI concludes.

II. Theoretical Predictions and Recent Empirical Findings

A. Interbank Competition and Bank Orientation

Theory offers conflicting views on the relation between interbank competition and a bank's willingness to engage in relationship lending (Figure 1 summarizes the predictions of the different theoretical models). A first set of theories argues that competition and relationships are incompatible. Mayer (1988) is the first to apply this insight to banking competition and relationship formation. Mayer hypothesizes that long-term relationships, allowing firms to intertemporally share risks with their banks, only arise if the flexibility of the borrowing firms to switch banks is limited. Competition in the banking market undermines the ability of the firm to commit itself to the bank to guarantee future compensation for possible current losses.[2]

Petersen and Rajan (1995) model the impact of bank market power on the possibilities to intertemporally share risks. Market power is exogenous in their framework and a monopolistic bank extracts the high future surplus generated by the firm by backloading interest payments. A bank in a competitive (future) market does not have the same latitude to share surplus intertemporally and consequently the bank may be less willing to offer credit. Especially lower quality firms may be negatively affected by competition, as banks are unwilling to incur losses that may never be repaid. Hence, credit will be more widely available in banking markets where banks enjoy market power.[3]

Boot and Thakor (2000) extensively revisit the presumed incompatibility between competition and the nature of relationship specific financing. They argue that more interbank competition leads to more relationship lending. Boot and Thakor distinguish between two sources of competition, i.e., capital market competition and interbank competition, and they allow banks to choose between relationship lending and transactional lending. In their model capital market competition reduces relationship lending, while interbank competition actually increases the relative amount of relationship lending. A bank offering a relationship loan augments a borrower's success probability. Relationship lending then allows extracting higher rents from the borrower. Increased interbank competition pushes banks into offering more relationship lending, as this activity allows banks to shields rents better.[4]

Relationship lending is non-monotonically related to the degree of concentration in banking markets in Dinç (2000), Anand and Galetovic (2001), and Yafeh and Yosha (2001). Dinç (2000) focuses on the degree of competition and the bank's incentive to keep its commitment to lend to a borrower when the borrower's credit quality deteriorates. In the

absence of competition banks already earn rents in the arm's length market, so the cost of a relationship commitment may not be fully covered. On the other hand, reputational rents ultimately decrease with the number of banks that already have a good reputation, making the reputation mechanism most effective with an intermediate number of banks.

Establishing a relationship involves a specific sunk cost in Anand and Galetovic (2001).[5] Corresponding the so-called "loose linkage" between relationships and services in their model, banks cannot charge their customers for these costs. In addition the information gathered during relationships is non-excludable, as for example competing (transactional) banks could be shown relevant loan offers or could try to poach loan officers from the relationship bank. Consequently, relationships only survive through implicit contracting between banks sustained by intertemporal threats of reverting to a competitive outcome. In particular, relationships arise in their model when few banks with similar market shares can cooperate (resulting in an intermediate to high concentration).

Finally, Yafeh and Yosha (2001) analyze intra-temporal competition between a bank offering both relationship and arm's length loans and banks offering arm's length loans only. Starting from exogenously imposed market frictions, they find that increased competition in the arm's length market first increases relationship lending. The non-monotonicity is a result of the surplus sharing between banks and firms. Increased competition in the arm's length market forces the bank to increase the share of the surplus that goes to firms seeking relationship loans, making investment in relationships ultimately less profitable.

B. Interbank Competition and Bank Industry Specialization

Theory also provides hypotheses concerning the relation between interbank

competition and industry specialization. For example, competition affects the banks' investment in sector expertise and hence the "value" of bank-firm relationships in Boot and Thakor (2000). In their model interbank competition reduces bank industry specialization in relationship loans as on the margin the returns to sector specialization decline. Hence, the value added of the relationship loan for the borrower also decreases.

But in contrast to Boot and Thakor (2000), more interbank competition leads to more bank specialization across both arm's length and relationship loan categories in Dell'Ariccia and Marquez (2003) and Hauswald and Marquez (2003).[6] Hauswald and Marquez (2003) assume that the quality of the information signal deteriorates in the "informational distance" between bank and borrower. The informational distance increases for example when the firm operates in one industry and the bank specializes in another. Adverse selection problems faced by uninformed transactional banks exacerbate in distance and the incidence of relationship banking increases in "the vicinity" of the informed relationship bank. Hence, an increase in the number of banks in Hauswald and Marquez (2003) may lead to both more relationship banking and more bank industry specialization.

To conclude, how interbank competition affects bank orientation and bank industry specialization seems ultimately an empirical question, but we are unaware of any studies that have investigated both questions comprehensively.

C. Empirical Findings on Interbank Competition and Bank Orientation

All empirical papers so far investigate the effects of either local or nationwide interbank competition on indirect measures of bank orientation (Figure 2 summarizes the main empirical findings). In their seminal paper Petersen and Rajan (1995) investigate the effect of local interbank competition on the loan rate and the availability of bank credit for

credit-constrained (e.g., young or distressed) firms in the 1988 U.S. National Survey of Small Business Finance dataset. They employ a Herfindahl – Hirschman Index (HHI) in the local market for deposits to measure concentration. Petersen and Rajan find that young firms in more concentrated markets (HHI > 0.18) obtain lower loan rates and take more early (trade credit) payment discounts (i.e., have easier access to bank credit) than firms in more competitive banking markets. Banks seemingly smooth loan rates in concentrated markets and as a result provide more financing, in line with the predictions of their theoretical model.

Work by Bergstresser (2001a), Bergstresser (2001b), Scott and Dunkelberg (2001), Zarutskie (2003) revisits the issue from different angles exploring other U.S. datasets. These studies broadly confirm the original findings by Petersen and Rajan (1995).[7] An exception is a paper by Black and Strahan (2002). They investigate the rate of new business incorporations across U.S. states. They find that deregulation of branching restrictions positively affects new incorporations and that deregulation reduces the negative effect of concentration on new incorporations. They also find that the share of small banks decreases business formation.[8]

Recent papers by Fischer (2000) and Elsas (2003) take a different approach in investigating the competition – bank orientation correspondence in Germany. Fischer (2000) focuses on the transfer of information and the availability of credit and finds that both are higher in more concentrated markets. Elsas (2003) studies the determinants of relationship lending directly. His results are very interesting. He documents a non-monotonic relationship between local bank market concentration and the probability a bank is listed as a "Hausbank". In particular, he finds that the incidence of Hausbank status is

actually the lowest for an intermediate range of market concentration with an HHI of around 0.2, though he notes that most observations of the HHI are also in that low range. Nevertheless his findings seem to suggest the presence of more relationship banking in more competitive markets as in hypothesized by Boot and Thakor (2000).

Other papers study the effect of nationwide competition on commitment and relationship banking. Farinha and Santos (2002), for example, study the switching from single to multiple bank relationships by new Portuguese firms. They find that the arrival of new banks, potentially leading to less concentrated and more competitive banking markets, increases switching rates. There are also cross-country studies. Steinherr and Huveneers (1994), for example, document a negative correspondence between the share of foreign banks and equity investment by banks in 18 countries, Cetorelli and Gambera (2001) find that industries that rely heavily on external finance grow faster in countries with more concentrated banking systems (than those in countries with competitive systems), while Ongena and Smith (2000b) highlight the positive effect of concentration of the national banking markets on the incidence of single bank relationships. The latter two studies measure concentration by calculating the percentage assets by the largest three commercial banks.

To conclude, many empirical papers have investigated the effects of either local or nationwide interbank competition on indirect measures of bank orientation. However none of the aforementioned papers employs direct measures of bank orientation (with the exception of Elsas (2003)), controls for both local and nation-wide competition jointly, and/or studies the effects of interbank competition on bank industry specialization.

III. Data and Variables

A. Data

The unique data set we analyze consists of loans granted to 13,098 firms by an important Belgian bank that operates all over Belgium.[9] The sample includes all existing loans at the bank as of August 10, 1997 that were initiated after January 1, 1995.

Characteristics of both the bank and the Belgian financial landscape make this data ideally suited to investigate the effect of local and nation-wide interbank competition on bank orientation and bank industry specialization. The bank is one of a handful of truly national and general-purpose banks operating in Belgium in 1997. As such the bank lends to firms located in most postal zones[10] and is active in 50 different industries (according to a two-digit NACE classification).[11] Around 83% of the firms in its portfolio are single-person businesses and most borrowers obtain just one, relatively small, loan from this bank. For each borrower we take the characteristics at the time of the first contract observed in the bank's loan portfolio.

Table 1 provides summary statistics for the 13,098 fully identifiable borrowers. Table 1 shows the definition, mean, minimum, maximum and standard deviation of our variables, broken down into six sets of characteristics: (1) dependent variables measuring bank orientation and bank industry specialization, (2) competition measures, (3) the bank branch characteristic, (4) postal zone variables, (5) firm size and legal form dummies, and (6) other firm characteristics. We turn to each of these variables in the next subsections.

B. Dependent Variables Measuring Bank Orientation and Industry Specialization

Our main dependent variable measuring bank orientation reflects both the scope and

the duration of the engagement between bank and borrower. Boot (2000) and Ongena and Smith (2000a) argue that both scope and duration characterize relationship banking. We define a dummy *Relationship Banking* to equal one if the bank considers itself as the Main Bank and if the length of the relationship with the borrower exceeds one year, and to equal zero otherwise.

Main Bank captures the scope of the relationship and indicates whether this bank considers itself as the main-bank of the firm or not. The definition used by the bank to determine whether it is the main-bank is the firm is "having a monthly 'turnover' on the current account of at least BEF 100,000 (€ 2,500),[12] [13] and is buying at least two products from the bank." Only 54% of all borrowers are classified as Main Bank customers. In addition, de Bodt, Lobez and Statnik (2001), for example, document that even small Belgian firms employ multiple banks. Consequently our Main Bank variable seemingly captures variation beyond the mere mechanical outcome of the firms' choices for single bank relationships.

A relationship starts when a firm buys for the first time a product from that bank. The average duration of the relationship in the sample is around eight years. Duration proxies for the increased time for a firm to experience the banks' products and to appreciate the added flexibility the bank has to maintain and fulfill implicit contracts. While the bank gains private information about a firm to tailor its products, the firm may also become locked-in (for example, Boot and Thakor (1994), Sharpe (1990), and Rajan (1992)).

We find justification for using a duration cut-off of only one year in Angelini, Di Salvo and Ferri (1998) and Cole (1998) who document that credit availability does not increase much beyond the first years of a relationship (we replace one year by three years in

robustness exercises). We also note that the repayment duration of more than 60% of the observed loans is shorter than or equal to one year. Hence it seems likely that for the majority of the borrowers rollovers of loans take place within the first year of the relationship.

We frame the dependent variable as a dummy variable because theory suggests a dichotomy between relationship and transactional lending. However we will employ Main Bank and the duration of the relationship separately as dependent variables in robust exercises (hence in the latter case we employ a continuous dependent variable).

Additional advantages of our dummy approach are that: (1) given our definition about half the firms are engaged as relationship borrowers (i.e., the mean of our independent variable is close to 50%); (2) the reported partial derivatives allow for a straightforward percentage interpretation; and (3) comparison with results in other papers, in particular Elsas (2003), is possible.

We also construct a dependent variable measuring bank industry specialization. For every borrower we know which specific bank branch granted the loan. We classify the borrowers in the 50 two-digit NACE code classes and for each branch calculate a variable *Industry Specialization* as the proportion of loans of the bank branch loan portfolio in the same industry as the borrower. Notice that this measure puts more weight on high degrees of industry specialization and on large branches (in both cases, there are more borrowers in the sample), possibly introducing a bias against picking up an effect of competition on bank industry specialization.

C. Herfindahl – Hirschman Index of Market Concentration

As of December 31st, 1994, we identify 7,477 branches,[14] operated by 145 different

banks and located in 837 different postal zones. Each postal zone carries a postal code between 1,000 and 9,999 (the first digit in the code indicates a geographical region, which we call "postal area" and which in most cases coincides with one of the ten Provinces in Belgium). A postal zone covers on average 26 sq km,[15] and contains approximately six bank branches. A postal area covers 3,359 sq km on average. Not surprisingly borrowers are often located in more densely banked areas, with on average more than 17 bank branches per postal zone, resulting in around 250,000 possible borrower – bank branch pairs.

Previous research has argued that the relevant loan market is local in nature for small businesses.[16] Branch proximity continues to play an important role in determining bank choice by borrowers in Europe. For example, results reported in Degryse and Ongena (2003) show that loan rates in Belgium are not uniform across borrowers or across branches. In addition, physical distance between borrower and local financier affects loan conditions. We therefore *a priori* select each postal zone as the relevant market.[17] The median borrower in our sample is located less than 2.5 kilometers from the lending bank branch, and this distance seemingly hasn't increased by much over the last few decades.[18]

However firms are also influenced by other branch (convenience and hours of operation), bank (reputation, quality and reliability) and relationship (personal or long-term) characteristics when choosing a particular bank branch (Elliehausen and Wolken (1990); Binks and Ennew (1997)). For example, the lending bank is located closer than the closest competitor in 44% of the borrower contract cases in the sample, making distance the dominant bank (product) characteristic for only a sizeable minority of the borrowers in Belgium.

Our main measure of competition is the *Herfindahl – Hirschman Index* (*HHI*). This variable is widely used as a measure of concentration in the literature and is defined as the summed squares of bank market shares by the number of branches in each postal zone.[19] For postal zones without bank branches we set the HHI equal to one to facilitate decomposing the concentration index later in the paper (by corollary the *Number of Banks*, another competition variable introduced shortly, is also set equal to one). However, as a robustness check, we remove branchless postal zones in part of the exercises.

We also employ the total *Number of Branches* and the *Number of Banks* in each postal zone. The former measure assumes no coordination can occur between the branches of the same bank, while the latter measure presupposes coordination effectively takes place. We invert both variables to account for the decreasing effects of additional bank branches. Inversion also facilitates the interpretation of the estimated coefficients and comparisons across the competition variables, in particular with the HHI measure. Both transformed *Number* measures are bound between zero and one, with zero indicating no market concentration and one indicating maximum concentration. As some borrowers reside in postal zones without bank branches (i.e., the lending bank branch is located in another, possibly adjacent, postal zone), we add one to the Number of Branches before inverting.

D. Multi-Market Contact

The postal zone is our *a priori* chosen banking market. However, many banks are operating in more than one postal zone and may compete with other multi-location banks across zones (Barros (1999) or Park and Pennacchi (2003)). On the other hand, the banking product may be differentiated more by location than the postal zone delineation implies. To control for the factors at play in these "upstream" and "downstream" arenas, we introduce

additional variables.

Banks may meet and compete across many postal zones. Edwards (1955) introduced the "linked oligopoly" hypothesis that predicts cross-market contacts among banks to increase the incentives for banks to collude. The hypothesis implies that banks should compete less when geographical market-overlap increases. Multi-market contact may facilitate anti-competitive "mutual forbearance", as the punishment for deviation from collusion becomes large (Heggestad and Roades (1978), Bernheim and Whinston (1990)),[20] and coordination between banks may then foster relationship banking as in Anand and Galetovic (2001).

However, other theoretical work points towards a possible pro-competitive effect of multi-market contact (Scott (1982)). Mester (1987), for example, presents a model in which banks have incomplete information about their rivals' marginal costs. As a result banks claim to have low marginal costs to sway competitors to produce less. If costs are imperfectly correlated across markets, multi-market banks have an incentive to put larger quantities on the market than the profit-maximizing level. "In markets with high concentration, control is in the hands of a few banks. Thus incentives for these [banks] to mislead other [banks] are greater since they stand to gain more" (p. 540). Similarly, but in a different setting, Park and Pennacchi (2003) show that the presence of large multi-market banks promotes local competition, in particular in highly concentrated markets.

We construct a *Multi-Market Contact* measure as proposed in Evans and Kessides (1994).[21] The variable can be defined succinctly as the sum of all bank pairs in the borrower's postal zone weighted by the relative frequency of their bilateral contacts in other postal zones. The variable ranges between zero (banks in the postal zone have no contact

elsewhere) and one (all banks in the zone have contact with all other banks across all other postal zones).

E. Distance Variables

Competition across postal zones may determine the prevalence of relationship banking, but the same is true for more local, "spatial" competition. Transportation costs, for example, for either borrower (Hotelling (1929); Salop (1979)) or lender (Sussman and Zeira (1995)) may determine the degree of competition for the borrower. In standard spatial models, borrowers always select the closest bank and competition is fiercest for the median borrower. However, borrowers seek only one bank product and engage a lender only once in these models, hence no distinction can be made between "relationship" and "transactional" banking.

However in extended spatial models firms in need of multiple bank products, for example, may still engage a single bank, most likely the closest one, to minimize transportation costs (see, for example, Armstrong and Vickers (2001)). Consequently firms close to the lender may opt for "relationship banking" (in scope) on the basis of transportation costs. Alternatively, in Dell'Ariccia (2001) borrowers can switch, but the "close" borrowers are more likely to stay than the borrowers located far away from their lender. Again, close borrowers are destined to be "relationship borrowers" (now in duration). In addition, this effect may strengthen (Hauswald and Marquez (2003)) if the number of local banks increases.

We calculate the distance between the borrower and both the lending bank and the branches of all other, competing banks located in the same postal zone as the borrower. We employ both web-based MapBlast.com and PC-based MS Mappoint to track the shortest

traveling time (in minutes) by car between the borrower and each bank branch (Degryse and Ongena (2003) provide details). Address recording errors, incomplete map coverage, changes in street names and borrower relocation cut in our sample. We further conservatively remove the 1-% borrowers located farthest from their lending bank and drop borrowers located in postal zones without competing banks. We end up with *Distance to Lender* and *Distance to Closest Competitors* measures for 11,222 borrowers (we call this reduced sample the "Distance sample").[22]

We transform both measures to $(1 + \text{Distance to Lender})^{-1}$ and $[1 - (1+\text{Distance to Closest Competitors})^{-1}]$, respectively. Again, both transformations account at once for the possibly decreasing effects of distance and force the variables to run from zero ("competitive") to one ("not competitive"). For example, if both distance measures equal one, the borrower is located close to the observed lender but really far from a competing bank. Conditioning on the fact that we observe the close lender granting the loan, we expect, as in a multi-product problem or as in Dell'Ariccia (2001), that the engagement is more likely to be relationship-based. On the other hand, if both distance measures equal zero, the borrower is located far from the observed lender but really close to a competing bank. Conditioning on the fact that we observe a far-away lender granting the loan, we can expect the engagement to be transactional.

F. Control Variables

We introduce bank branch size, postal zone variables, and firm size, legal form and industry dummies in the base regressions. We include additional firm characteristics in robustness exercises.

Start with the variable *Branch Size*. Berger, Demsetz and Strahan (1999) argue that

organizational diseconomies (of engaging in different type of lending activities) may prevent large banks from efficiently providing both transaction-based lending to large corporations and relationship-based lending to small businesses. Stein (2002) models their intuition and distinguishes between "hard" and "soft" information to show that large hierarchical banks perform better when information can be "hardened" without incurring a cost and passed along inside the bank. Only loan officers at small banks on the other hand may have the proper incentives to collect and employ soft information, thereby encouraging relationship banking. Berger, Miller, Petersen, Rajan and Stein (2002) provide suggestive evidence corroborating elements of Stein's model. They find, for example, that large banks have less exclusive and shorter relationships and interact more impersonally with their borrowers. Liberti (2002) documents how delegation increases monitoring efforts by relationship managers.

We conjecture that Stein's arguments may also apply when comparing branches of one bank. Large branches may have one or two hierarchical layers. Loan officers employed in large branches may then be less willing to engage in the collection of soft information and relationship lending may suffer. Consequently, we include *Branch Size* to control for possible size differences across branches of the same bank. In effect, we pursue an even more stringent test of some of the size implications of Stein's model as all branches belong to the same bank, allowing us to control for bank heterogeneity. We measure Branch Size by the proportion of the business loan portfolio (in number of borrowers) at the bank branch. There are substantial differences in Branch Size across the bank. The smallest branch engages only 0.006% or 74 of the 13,098 borrowers, while the largest branch services 0.905% or 1,186 of the bank's borrowers.

To control for regional variation in corporate demand for banking services, we introduce a set of postal zone variables that also includes eight Postal Area Dummies. The variable *Number of Firms* measures the number of registered firms in the borrower's postal zone, while the variable *Assets of Firms* averages the amount of assets of registered firms in the borrower's postal zone. Both variables are constructed using *Belfirst*. We use the database containing end-of-1994 information on 176,382 Belgian firms. We similarly compile *Industry Concentration* to measure the proportion of registered firms in the borrower's postal zone in the industry of the borrower. The latter variable captures the probability that another (random) firm in the borrower's postal zone operates in the same industry as the observed borrower. Finally, we introduce a dummy variable *Urban* to control for general differences between businesses located in rural and urban communities. Urban may further capture heterogeneity in information available to banks. For example, banks in urban areas may rely more on hard information while rural banks may collect more soft information (Klein (1992)). Urban equals one when the borrower is located in an agglomeration with more than 250,000 inhabitants,[23] and zero otherwise.

To control for firm characteristics, we include two firm size,[24] four legal form and as many as 49 industry dummies (in addition to the base case). We can distinguish between Single-Person Businesses (82.8% of the sample), Small (16.0%), and Medium and Large (1.6%) Firms; and between Sole Proprietorships (82.1%), Limited Partnerships (12.1%), Limited Partnerships with Equal Sharing (1.0%), Corporations (3.9%), and Temporary Arrangements (0.9%). In the regressions, we exclude the dummies for Single-Person Businesses and Sole Proprietorships.

To control further for firm characteristics we also focus on the 9,213 (70.3%) of the

borrowers that are both Single-Person Business and Sole Proprietorship (this reduced sample we call the "SPB & SP sample"), collect Age for 1,991 firms (the "Age sample"), and glean Assets, Earnings / Assets, and Short-Term Debt / Assets from *Belfirst* for 645 firms (the "Augmented sample"). We will employ each of these samples in robustness exercises. We display some key sample statistics in Table 2.

IV. Empirical Results on Bank Orientation

We now discuss the regressions of our bank orientation and industry specialization measures on the competition and control variables. The correlations displayed in Table 3 between the main dependent and the discussed competition variables already indicate the direction of some of our results.

In this section we analyze the regressions of the dependent variable(s) measuring bank orientation on the set of competition and control variables. We start discussing the effects of the competition variables and return to a discussion of all the control variables at the end of the section. We first discuss the results for the dependent variable Relationship Banking and turn to the alternative measures of bank orientation, i.e., Main bank and Duration in robustness checks.

A. Postal Zone Competition and Relationship Banking

Since the *Relationship Banking* is a binary dependent variable, we employ a Probit model.[25] In Table 4 we report the partial derivatives, in percent, at the means and significance levels based on t-ratios for the coefficients. To conserve space we neither display partial derivatives for most of the control variables nor the standard errors.

In Model I we start with the commonly used (and previously detailed) measure of

market concentration, i.e., the *Herfindahl – Hirschman Index* (*HHI*). The coefficient on this measure is statistically insignificant and economically small. For example, an increase of 0.1 in the HHI, say from a competitive (HHI < 0.10) to a "highly concentrated" (HHI > 0.18) market,[26] would only increase the probability of Relationship Banking by around 0.3%.

We replace HHI by respectively $(1 + \text{Number of Branches})^{-1}$, $(1 + \text{Number of Adjacent Branches})^{-1}$, or $(\text{Number of Banks})^{-1}$, but none of the coefficients is statistically significant or economically relevant (we chose not to tabulate the results).

In Model II we add HHI^2 to capture the non-monotonicity present in for example Dinç (2000), Anand and Galetovic (2001), or Yafeh and Yosha (2001). Both coefficients are statistically significant, though in sign opposite to the non-monotonicity predictions, and economically modest but relevant. An increase in the HHI from 0.10 to 0.18 for example decreases the probability of Relationship Banking by around 1.5%, while an increase from 0.05 to 0.50 decreases the probability by close to 5%. Replacing HHI and HHI^2 by a set of dummies that equal one if HHI is situated in a certain range and are zero otherwise yields similar results. Adding squared terms to the specifications featuring $(1 + \text{Number of Branches})^{-1}$, $(1 + \text{Number of Adjacent Branches})^{-1}$, or $(\text{Number of Banks})^{-1}$ yield statistically insignificant and economically irrelevant results.

The regressions so far left two possibly important arenas of competition unaccounted for. First, banks may take into account exactly whom their competitors are in the postal zone given contact in other postal zones, i.e., banks may care about Multi-Market Contact. Second, as argued above, proximity may encourage firms to frequent the same bank for multiple services during a longer time period.

To control for either pro- or anti-competitive effects arising from Multi-Market Contact, we introduce the contact variable in Model III. To control for spatial effects, we add the two distance measures in Model IV. Removing Multi-Market Contact in Model IV does not alter the results and we center our discussion on Model IV (even though it is employing a somewhat smaller sample).

The coefficients on both HHI variables remain significant and actually become substantially larger in Model IV. Figure 3 displays the resulting schedule (at the means of the other variables). The percentage probability of observing Relationship Banking is measured along the vertical axis, while HHI is on the horizontal axis. The scale on the horizontal axis is proportionate to the number of observations with particular values for HHI. Increasing HHI from 0.10 to 0.18, indicated by vertical lines in the Figure, decreases Relationship Banking by 3.1% (from 55.0 to 51.9) while increasing the HHI from 0.06 to 0.50 decreases the probability by almost 10%.

These results confirm a key result in Boot and Thakor (2000) but are at odds with either Petersen and Rajan (1995) or the non-monotonicity predictions in Dinç (2000), Anand and Galetovic (2001), or Yafeh and Yosha (2001)). Branches seemingly engage in more relationship banking when competition becomes fiercer.

The substantial increase in Relationship Banking for HHI values close and equal to one requires further exploration. Replacing HHI and HHI^2 by a set of dummies that equal one if HHI is situated in a certain range and are zero otherwise (to partly neutralize the effects of these observations) yields qualitatively similar results. Similarly, removing observations for which HHI=1 (HHI > 0.9) and dropping HHI^2 yields a partial derivative equal to –20.5** (27.3***) on HHI, still statistically significant and economically relevant.

If Relationship Banking decreases with concentration in less concentrated markets, why then do we observe more relationship banking in very concentrated markets? Physical proximity, as pointed out earlier, may compel a firm to frequent a close-by bank for all its needs. A monopolist in a postal zone may simply provide all services, in particular when banks in other postal zones are far away. An increase in Relationship Banking for high HHI values then merely affirms our a-priori choice of the postal zone as the relevant geographical market. Alternatively, we note that Boot and Thakor (2000) predict that a monopoly bank should engage in little or no Relationship Banking. However, the monopolist bank may become an industry specialist by default (by servicing all firms in the vicinity) and hence take on relationship banking nevertheless. This is not modeled in Boot and Thakor, as in their model even a monopolist incurs specialization costs (that are not a function of market structure in their model).

At this point we also note that our findings regarding the HHI – Relationship Banking correspondence are qualitatively similar to the (somewhat stronger) non-monotonicity documented in Elsas (2003). In his paper the incidence of the Hausbank status drops from 80% to 40% as HHI increases from zero to 0.2, and then sharply increases to 100% for an HHI equal to 0.45. We conjecture that the differences in firm size and the corresponding number of bank engagements between his and our sample are responsible for this result.[27] The 11,222 firms in our "distance" sample are much smaller than the 122 firms in his sample;[28] hence our firms are possibly more opaque and may seek to engage fewer – sometimes one – banks to satisfy their credit needs.[29] As a result, an increase in the number of banks on the market may result in a smaller increase in the degree of competition for the firms in our sample than for the large firms in Elsas (2003) that had engaged many

(all) banks in the local market already.

B. Multi-Market Contact

Next we focus on the coefficient of *Multi-Market Contact* in Model IV. Multi-Market Contact carries a positive sign, is statistically significant, and economically relevant. An increase in the variable from 0 to 0.33 (the observed range) increases the probability of observing Relationship Banking by almost 10%. However, removing both HHI variables causes the coefficient on Multi-Market Contact to become insignificant, possibly indicating the need to control for market concentration and multi-market contact simultaneously. The contact variable is significantly and negatively correlated with HHI (see Table 3), and this is partly by construction. Indeed, an increase in the number of banks in a postal zone increases the likelihood that some bank pairs also meet in another postal zone hereby increasing Multi-Market Contact. However, an increase in the number of banks also decreases market concentration as measured by HHI.

Multi-Market Contact between banks across postal zones stimulates Relationship Banking. Hence, the contact variable possibly captures a pro-competitive effect if this variable would cut in the same direction as HHI. However, to shed further light on this issue we first examine more closely what occurs at the postal zone level (following Anand and Galetovic (2001)) and then turn to interacting HHI with Multi-Market Contact (as in Mester (1987) and Park and Pennacchi (2003)).

Recall that in Anand and Galetovic (2001) only coordination between a few banks with equal market shares fosters relationship banking. To test whether the effect of concentration on Relationship Banking arises through a decrease in the number of banks or through the inequality of bank market shares, we decompose HHI in $(Number\ of\ Banks)^{-1}$

and *[HHI – (Number of Banks)$^{-1}$]*. Column 1 in Table 5 reports the splits for the Base Model. The results are remarkable and suggest that it is only the change in the number of banks, and not the change in their market shares, that is driving our results (though admittedly our measure based on the number of bank branches is rather coarse when measuring market shares). An increase in the number of banks from 3 to 37 increases the probability of Relationship Banking by 8.5% (from 40.9 to 49.4%). Consequently the observed lender seemingly doesn't coordinate with other banks at the local level in offering relationship banking.

Alternatively we decompose HHI in *(Branch Share of the Lender)^2* and *[HHI – (Branch Share of the Lender)^2]* to check for possible coordination between branches of the lender. And indeed, a variety of specifications suggest that a larger relative presence of the lender increases Relationship Banking at about the same rate as the relative presence of other lenders decreases it, though the coefficients are not always statistically significant. Taken together these results suggest that within one postal zone, branches of the lending bank may coordinate among themselves but not with the branches of the other banks present there.

Now, given the local discretion in setting loan conditions (an assessment that is based on formal interviews and loan rate variation), it would be surprising if the bank would succeed in coordinating with other banks at the national level to achieve relationship orientation at the local level. However to test for the occurrence of national coordination (versus a pro-competitive effect) more directly, we also interact HHI and HHI^2 with Multi-Market Contact. Mester (1987), for example, argues that if the Contact variable measures "mutual forbearance" then the Contact variable itself should have the same sign as HHI (a

result we did not have so far) while the interaction terms should equal zero.

Column 2 in Table 5 tabulates the coefficients. Results are somewhat mixed. The size and also the sign of the coefficients on the interaction terms suggest no coordination takes place, but multicollinearity seemingly robs the coefficients of their significance. The coefficient on the Multi-Market Contact variable is still positive and opposite the coefficient on HHI but much smaller than in earlier specifications.

C. Distance Measures

Now we return to the distance measures in Model IV. The coefficient on *Distance to Lender* is positive, statistically significant, and economically relevant, confirming either a multi-product or switching hypothesis (as in Dell'Ariccia (2001)). The probability of observing Relationship Banking for a borrower close to the Lender (i.e., (1 + Distance to Lender)$^{-1}$ = 1) is more than 11% higher than for a far-away borrower (i.e., (1 + Distance to Lender)$^{-1}$ = 0). On the other hand, *Distance to Closest Competitor* is not statistically significant.

These results are unaffected if we remove either one of the two HHI and/or Multi-Market Contact variables. Similarly, removing both distance variables in Model IV leaves the other coefficients unaffected. Motivated by Hauswald and Marquez (2003) we further interact HHI and/or HHI^2 with our distance measures. The coefficients on HHI and HHI^2 remain broadly the same in sign and magnitude, but are no longer significant. The interaction terms are insignificant as well. We suspect collinearity problems.

As an alternative, we split the sample in firms that are closer to the lender than to the closest bank competitor (we call these firms the "relatively close" firms) and those firms that are closer to the closest bank competitor than to the lender (the "relatively far" firms).

The coefficients on our competition measures in both subsamples retain the same sign, significance, and magnitude. The distance measures are only significant for the firms that are "relatively far". Taken together, these results suggest the distance variables may proxy for other factors (transportation costs?) than those picked up by our measures of postal zone and national competition.

To conclude, the observed lender engages more borrowers in relationship banking if many other banks (with equal market shares) operate in the same postal zone or if the banks in the postal zone have multiple contacts across other postal zones. Coordination between banks does not seem to play a role in or across postal zones, such that the observed lender may turn to protecting rents by engaging in relationship lending as in Boot and Thakor (2000). More relationship banking is also being observed when firms are located close to the bank.

D. Robustness Checks

1. Subsample of Single-Person Businesses and Sole Proprietorships

Model V in Table 4 focuses on the 9,213 firms that are both Single-Person Businesses (SPB) and Sole Proprietorships (SP). There are a number of reasons to believe that the possible correspondence between competition and bank orientation may appear sharpest in this subsample. First, remember that we are looking at the loan portfolio of one single bank and that we now retain just one type of firm. Consequentially, important bank and firm characteristics potentially clouding our previous results are controlled for. Second, Single-Person Businesses / Sole Proprietorships are the smallest (possibly most opaque and locally restricted) firms that are affected most by the "structure of the local banking market".

The findings in Model V basically confirm our earlier results. The non-monotonicity in HHI is again economically relevant. For example, increasing HHI from zero to 0.4 decreases the probability of Relationship Banking by almost 15%, from 60 to 45%. We again replace HHI and HHI^2 by range dummies and confirm these findings.

2. Additional Independent Variables and Branch Effects

Models VI and VII in Table 4 add Age and other firm characteristics (Assets, Earnings / Assets, Short-Term Debt /Assets) to the specification. The main results go through almost unaffected, even though the samples are substantially reduced and quite different in their composition (for example, the Distance sample contains 16% small and 1% medium and large firms, the Age sample 89% small and 5% medium/large, and the Augmented sample 87% and 8%).

We further add Multi-Market $Contact^2$ to Model III and all possible combinations of Multi-Market $Contact^2$, $(1 + \text{Distance to Lender})^{-2}$, $[1 - (1 + \text{Distance to Closest Competitors})^{-1}]^2$ to specifications IV to VII. Admittedly we know of little theoretical justification for doing so (hence we choose not to tabulate the results). However, the coefficients of HHI, HHI^2, Multi-Market Contact, and $(1 + \text{Distance to Lender})^{-1}$ are virtually unaffected in significance, sign and size in all specifications and only the coefficient on the newly added $(1 + \text{Distance to Lender})^{-2}$ becomes negative and significant at a 10% level in a few specifications.

We further replace Branch Size by random branch effects,[30] remove Industry Dummies (to avoid collinearity problems), and employ OLS to re-estimate the main specifications. Results are unaffected, if anything are even more "striking" in statistical significance and economic relevance.

3. Alternative Definitions of the Dependent Variable

As the duration cutoff of one year in the construction of the dependent variable Relationship Banking was somewhat arbitrarily chosen (remember that results in Angelini, et al. (1998) and Cole (1998) suggested a short duration cutoff), we also run all specifications with a three-year cut-off. Results are virtually unaffected.

Next we employ our two other variables capturing bank orientation, i.e., Main Bank and Duration. Elsas (2003), for example, argues that duration may be a poor proxy for the intensity of the relationship. We report the almost unaffected results in Appendix Table A1. We also estimate a Tobit model (censored at zero) with ln(Duration of Relationship) as the dependent variable and report the results in Table A2. Again the results are very similar to the ones reported above, seemingly contradicting the claim of non-relevance of duration as a measure of relationship intensity by Elsas (2003). We again conjecture that the differences in firm size and the corresponding number of bank relationships between his and our sample are responsible for this result. The firms in our sample are much smaller and may have fewer bank relationships. As a result, for the firms in our sample the observed duration of a relationship may capture or at least be correlated with relationship intensity.

4. Omitted Factors

We are further concerned that duration is affected by factors that also caused current market concentration. For example, the presence of many high-quality firms in the postal zone 20 years ago may have lead to the initial engagement between lender and firms and may also have contributed to the longevity of the observed relationships (as both relationships and firms survived). But circumstances in the postal zone 20 years ago may

also have attracted other banks to set up branches there in the period since then. To deal with this pernicious problem we toss out all observations with durations exceeding 10 (7) years and rerun most specifications. Even though we loose more than one third (one half) of the sample, the competition results are almost unaffected.

E. Control Variables

Finally, we return to the coefficients on the control variables, starting with *Branch Size*. We reported the coefficient on Branch Size in all Tables discussed so far. The coefficient is almost always significant at a 1% level and economically quite relevant. The partial derivative at the means for both Relationship Banking and Main Bank varies around -14, indicating that an increase from the smallest to the largest branch (0.006 to 0.905) decreases the incidence of relationship banking by around 13%. The partials in the Duration Tobit models (Table A2) suggest an equivalent decrease by around 3 years in the length of the observed relationship for a similar increase in branch size. Hence, *ceteris paribus*, larger bank branches pursue more transactional banking.

Berger, et al. (2002) document that larger banks have less exclusive and shorter relationships than smaller banks. To make our results better comparable to theirs, we replace Branch Size by *ln(Branch Loan Volume)* defined as the natural logarithm of the loan portfolio of the branch in 1000s of US$ (they employ the log of bank assets). We estimate logit and OLS models with Relationship Banking and ln(1 + Duration of Relationship) as the dependent variables and report the results in the Appendix Table A3. For easy comparison we also tabulate their results (in the shaded columns). The resulting coefficients are comparable in magnitude, in particular for duration as the dependent variable. However, notice that the definition of their scope variable (dummy = 1, if only

lender) differs somewhat from our Relationship Banking variable.

Coefficients on the other control variables are reported in Table A4 in the Appendix. We report the representative coefficients from Model IV, VI, and VIII. None of the four postal zone coefficients are consistent in sign, size, or statistical significance. The legal form dummies in Model IV are highly significant. Banks engage Sole Proprietorships less likely in a Relationship and more profitable firms more likely, possibly because of bankruptcy risks. As such the specifications highlights the need to control carefully for firm characteristics, as we do in Models V to VII.

V. Empirical Results on Bank Industry Specialization

Next we analyze the regressions of the dependent variable(s) measuring bank industry specialization on the same set of competition and control variables.

A. Competition and Industry Specialization

We employ ordinary least squares. The dependent variable, *Industry Specialization*, is by construction always larger than zero, but it is censored at 100. However, as the variable is equal to 100 for only 19 borrowers we disregard this minor censoring issue. We follow the same line-up of exercises as for bank orientation and report the results in Table 6. Overall our results indicate that market concentration is not economically relevant in explaining industry specialization.

We start by focusing on the full sample. In Model I in Table 6, we introduce *HHI* as the measure for concentration. The coefficient turns out to be both statistically and economically insignificant. Theory suggests potential non-monotonicity; hence, we incorporate HHI^2 in Model II. The results remain insignificant providing no evidence in

favour of banks specializing in an industry when competition is low (Dell'Ariccia and Marquez (2003)) or intermediate (Boot and Thakor (2000)). Model III in Table 6 incorporates the *Multi-Market Contact* variable. If more contact implies a pro-competitive effect, Boot and Thakor (2000) hypothesize less industry specialization should be observed, whereas according to Dell'Ariccia and Marquez (2003) more industry specialization should be observed. Our empirical results are in line with the former suggesting that more competition leads to more specialization. But the effects seem rather modest. For example, an increase in the contact variable from 0 to 0.33 (minimum to maximum) decreases Industry Specialization by around 3% (Industry Specialization has a mean of 18.2%).

We again arrive at our Base Model (IV) by incorporating the two distance measures. *Distance to Lender* is again statistically significant, but only at a 10% level, and negative. The higher the Distance to Lender, the more specialization we observe. But the effects also seem modest. Industry Specialization for a far away borrower is only 1.4% higher than for a borrower close to the bank branch. *Distance to Closest Competitors* is not significant.

The Base Model also suggests a concave relationship between HHI and specialization, but the coefficients are seemingly small. Figure 4 plots the resulting schedule (at the means of the other variables) using a similar setup as in Figure 3. An increase in HHI from 0.10 to 0.18 (the vertical lines marking the regions with varying degree of competition), for example, increases industry specialization by only 0.4% (from 17.8 to 18.3%). Figure 4 broadly confirms that competition reduces industry specialization at the branch level, but also suggests small economic relevance.

To conclude, the branches of the analyzed bank engage somewhat fewer borrowers in the same industry if local market concentration decreases or when banks in the postal

zone have more contacts across other postal zones. Branches possibly reduce sector specialization as competition intensifies as in Boot and Thakor (2000). But the effects seem rather modest, both in statistical significance and economic relevance. Less industry specialization is also being observed when firms are located closer to the bank. In that case, industry specialization may become less prevalent because borrowers are less discriminate about their choice of bank branch.

B. Robustness Checks and Control Variables

In Model V we again restrict the sample to the 9,213 firms that are both Single-Person Businesses (SPB) and Sole Proprietorships (SP). However, we continue to assume that Industry Specialization is based on the entire loan portfolio of the branch. As expected, results are statistically somewhat more significant and economically relevant. Next we add Age in Model VI and other Firm Characteristics in Model VII. Now all coefficients on the Competition variables become insignificant confirming our earlier assessments of relatively weak statistical significance.

In Boot and Thakor (2000) competition affects bank industry specialization only for *relationship borrowers*. We run all models on the set of borrowers we identified as relationship borrowers, (i.e., Relationship Banking = 1). We first assume, as in Boot and Thakor (2000), that industry specialization should be measured only for the portfolio containing these relationship borrowers. Appendix Table A5 contains the results. Most coefficients are similar in sign and size, but somewhat less statistically significant. Next we measure industry specialization for the entire loan portfolio of the branch (assuming some positive knowledge spillovers from transactional lending) and re-run all seven models for the same sets of relationship borrowers as in Table A5. Results are virtually unaffected and

we choose not to tabulate them.

Next we are concerned about overweighing industry specialization by large branches (by definition many borrowers belong to those industries that large branches specialize in). We weigh all observations by the inverse of the number in each industry – branch group. None of the coefficients on the competition variables are statistically significant or economically relevant any longer indicating that in particular large branches adjust their degree of specialization in their focused industries to competition. This interpretation may also explain the percentage-wise small adjustments we pick up.

Finally, we discuss the control variables. The coefficient on *Branch Size* is always negative, significant, and economically relevant in Table 6. Increasing Branch Size from the smallest to the largest branch decreases Industry Specialization by around 6.5% to 12.5%. The other control variables are hardly statistically significant (see Table A4)

VI. Conclusion

Competition seemingly affects bank orientation and industry specialization. More competition results (in most cases) in more relationship banking and somewhat less bank industry specialization. Borrowers located closer to the bank branch are more likely to consume other bank services and to be engaged over a longer time period. In addition, closer-by borrowers are less likely to operate in an industry in which the branch specializes. Finally, larger bank branches lend substantially more on a transactional basis but are less likely to be specialized in particular industries.

Taken at face value these results cannot reject hypotheses proposed by Boot and Thakor (2000), among others, and partly match preliminary empirical work by Elsas (2003). However the results seem at odds with insights and results by Petersen and Rajan (1995),

among others. Reconciling both sets of hypotheses and results seems a natural but challenging task for future research.

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FIGURE 1. THEORETICAL PREDICTIONS

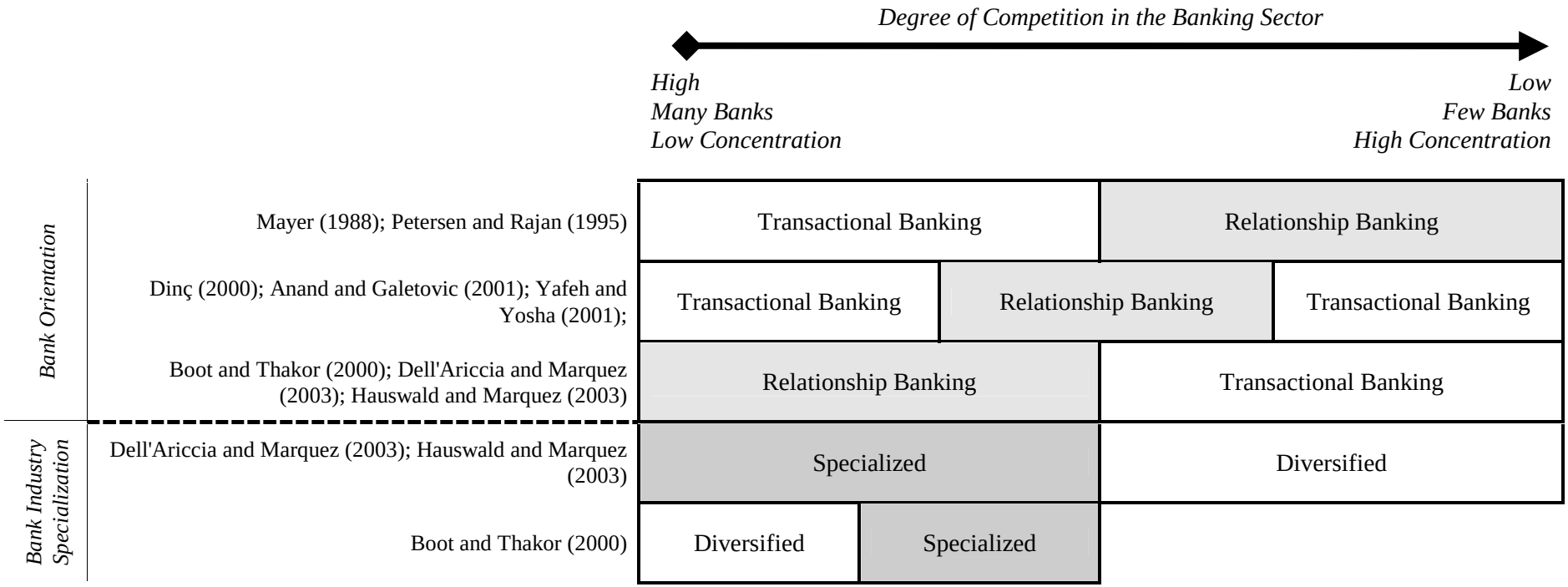
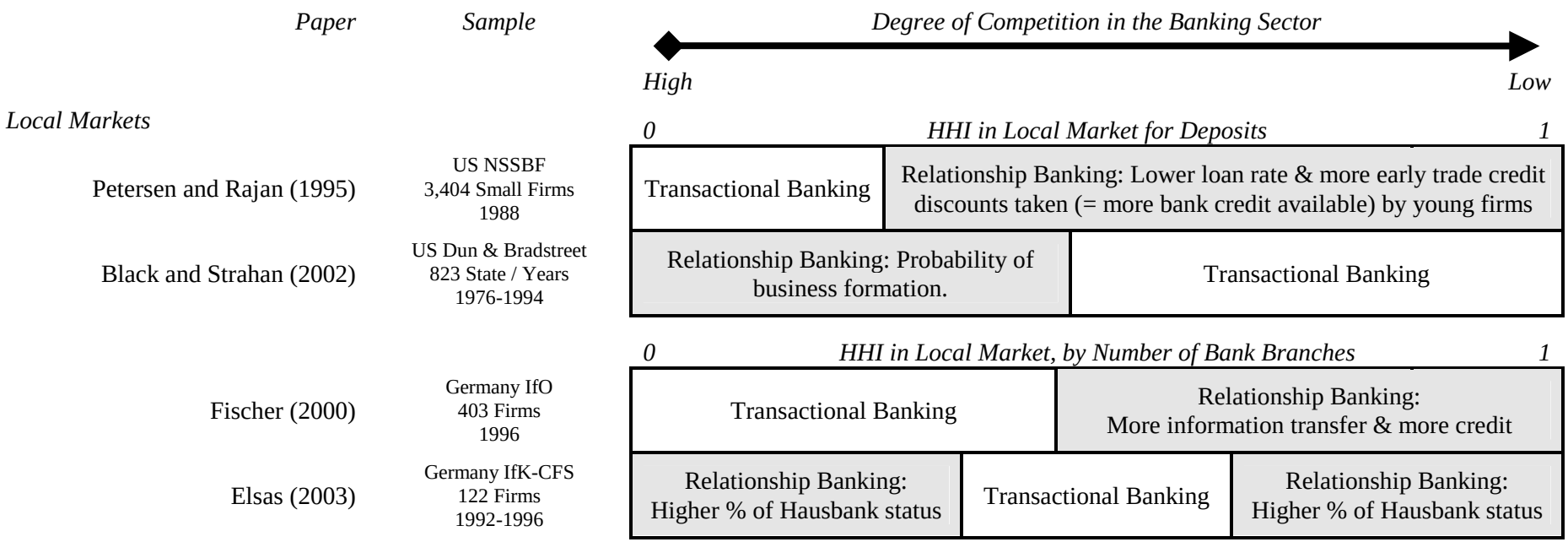


FIGURE 2. EMPIRICAL FINDINGS ON COMPETITION AND BANK ORIENTATION



Paper	*Sample*	*Degree of Competition in the Banking Sector*	
		High	*Low*
National Market(s)		*Many* — *Arrival of New banks*	*No*
Farinha and Santos (2002)	Portugal ±2000 Small Firms 1980-1996	Multiple bank relationships	Single bank relationships
		High — *Share of Foreign Banks*	*Low*
Steinherr and Huveneers (1994)	18 Countries 88 Largest Banks 1985-1990	Transactional Banking	Relationship Banking: Higher equity investment by banks
		0% — *Percentage of Assets by Largest Three Commercial Banks*	*100%*
Cetorelli and Gambera (2001)	41 Countries 36 Industries 1980-1990	"Transactional Banking"	Industries dependent on external finance are hurt less by bank concentration
Ongena and Smith (2000b)	18 European Countries 898 Largest Firms 1996	Multiple bank relationships	Single bank relationships

Figure 3: Bank Market Concentration and Bank Orientation

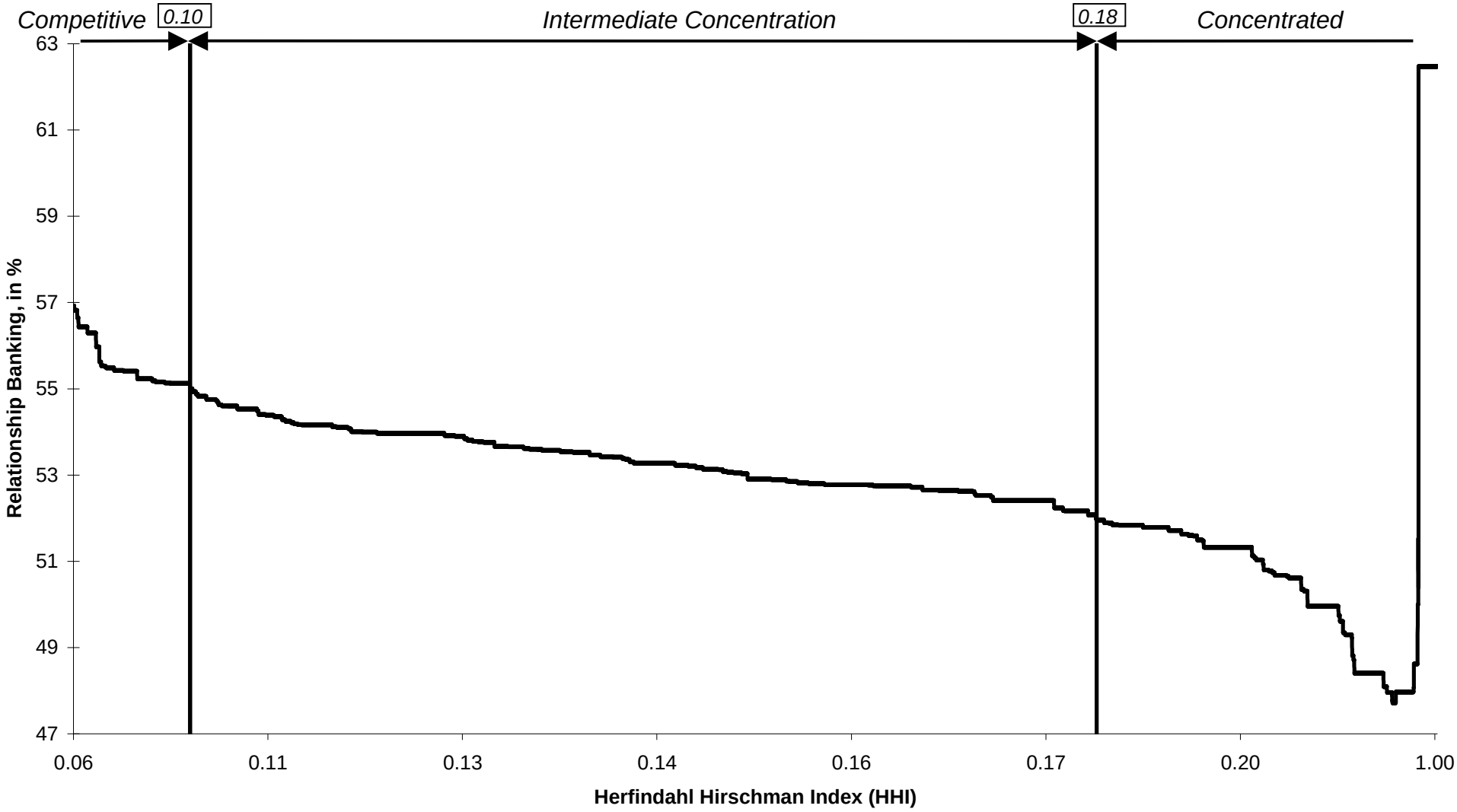


Figure 4: Bank Market Concentration and Bank Industry Specialization

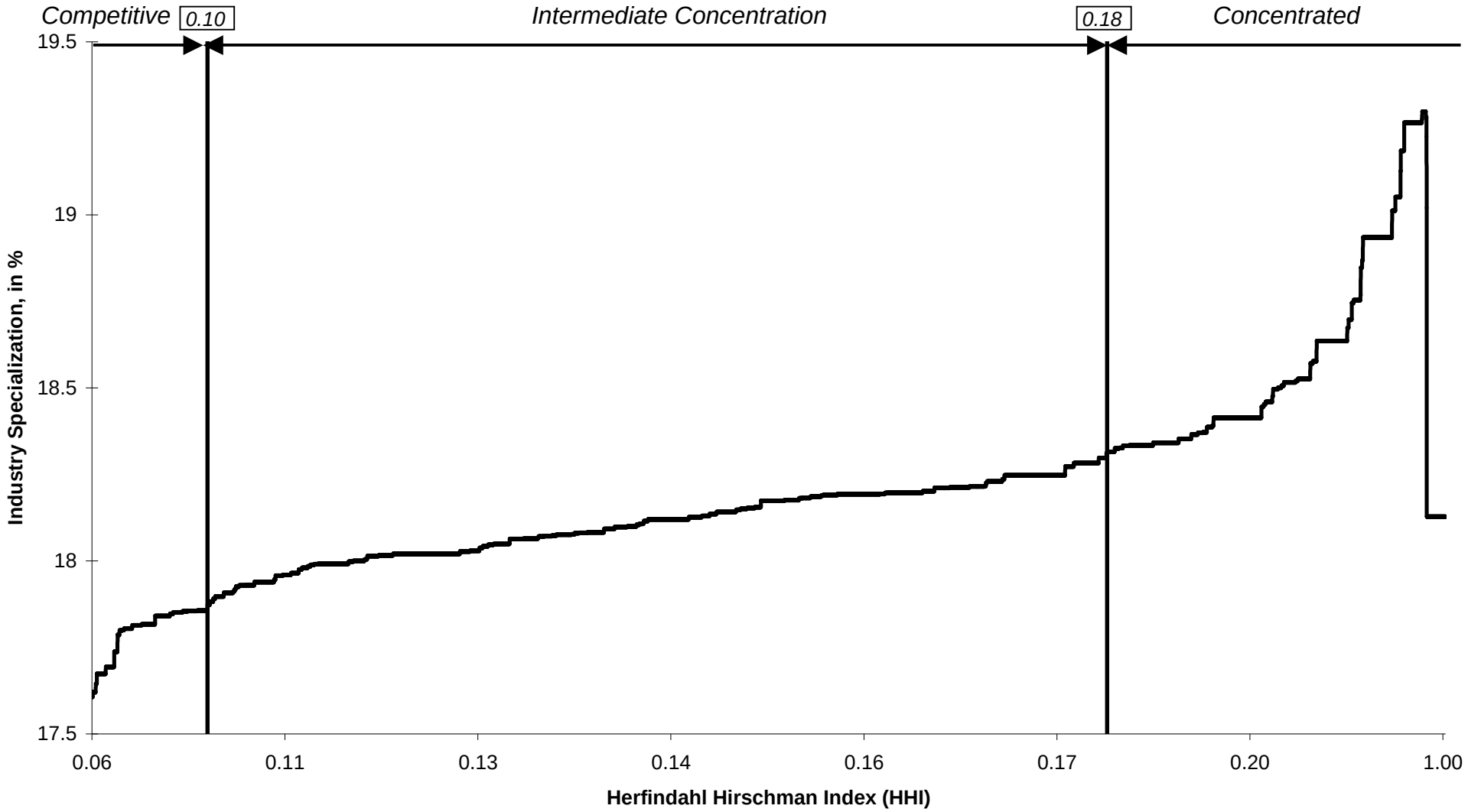


TABLE 1. DATA DESCRIPTION

Obs is the number of observations. [a] The definition used by the bank to determine whether it is the main bank is: for Single-Person Businesses and Small Firms, have a "turnover" on the current account of at least BEF 100,000 per month and buy at least two products from that bank. [b] We set HHI = 1 and (Number of Banks)$^{-1}$ = 1 if the Number of Branches = 0. [c] 40 Belgian Francs (BEF) are approximately equal to 1 Euro. [d] The dummies for Single-Person Businesses and Sole Proprietorships are suppressed in the regressions, hence not included in the Table.

Variables	Definition	# Obs	Mean	St.dev	Min	Max
Dependent Variables						
Relationship Banking	= 1 if bank considers itself as main bank[a] and the length of the relationship with the borrower exceeds one year, in percent	13,098	52.4	49.9	0	100
Main Bank	= 1 if bank considers itself as main bank,[a] in percent	13,098	54.3	49.8	0	100
Duration of Relationship	Length of relationship with current lender, in years	13,098	7.8	5.5	0	26.3
Industry Specialization	Proportion of branch loan portfolio in industry of borrower, in percent	13,098	18.2	13.9	0.6	100
	ln(1 + Duration of Relationship)	13,098	1.9	0.8	0.0	3.3
Competition Variables						
Number of Branches	Number of bank branches in borrower's postal zone	13,098	16.4	15.6	0	103
Number of Adjacent Branches	Number of bank branches in borrower's and adjacent postal zones	13,098	70.9	47.1	0	471
Number of Banks	Number of banks in borrower's postal zone	13,098	8.3	4.8	0	37
HHI	Herfindahl – Hirschman Index, i.e. the summed squares of bank market shares by number of branches in borrower's postal zone	13,098	0.205	0.194	0.057	1[b]
Multi-Market Contact	Sum of the bank pairs in borrower's postal zone weighted by the relative frequency of their bilateral contacts in other postal zones (see Appendix).	13,098	0.174	0.080	0	0.335
Distance to Lender	Shortest traveling time, in minutes	11,222	6.7	7.2	0	51
Distance to Closest Competitors	Shortest traveling time to closest quartile competitor in borrower's postal zone, in minutes	11,222	3.7	2.3	0	24
	Transformed Competition Variables					
	(1 + Number of Branches)$^{-1}$	13,098	0.123	0.178	0.009	1
	(1 + Number of Adjacent Branches)$^{-1}$	13,098	0.047	0.175	0.001	1
	(Number of Banks)$^{-1}$	13,098	0.183	0.199	0.027	1[b]
	HHI^2	13,098	0.079	0.214	0.003	1

	$(1 + \text{Distance to Lender})^{-1}$	11,222	0.223	0.151	0.019	1
	$1 - (1 + \text{Distance to Closest Competitors})^{-1}$	11,222	0.734	0.148	0	0.960
	$\text{HHI} - (\text{Number of Banks})^{-1}$	13,098	0.021	0.023	0	0.875
	$(\text{Number of Banks})^{-2}$	13,098	0.073	0.214	0.000	1[b]
	$[\ \text{HHI} - (\text{Number of Banks})^{-1}\ ]^2$	13,098	0.001	0.010	0	0.765
	$(\text{Number of Banks})^{-1}\ [\ \text{HHI} - (\text{Number of Banks})^{-1}\ ]$	13,098	0.002	0.004	0	0.140
Bank Branch Characteristic						
Branch Size	Proportion of bank loan portfolio at the bank branch, in percent	13,098	0.249	0.152	0.006	0.905
Postal Zone Variables	*Including 8 Postal Area Dummies*					
Number of Firms	Number of registered firms in the borrower's postal zone, in thousands	13,098	0.749	0.891	0.002	6.103
Assets of Firms	Average amount of assets of registered firms in the borrower's postal zone, in billions of BEF[c]	13,098	0.068	0.131	0.000	3.739
Industry Concentration	Proportion of registered firms in borrower's postal zone in industry of borrower, in percent	13,098	1.9	3.4	0	66.6
Urban	= 1 if located in agglomeration > 250,000 inhabitants, in percent	13,098	9.9	29.8	0	100
Firm Dummies[d]	*Including 49 Industry Dummies*					
Small Firm	= 1 if < 10 employees and turnover < 250 million BEF,[c] in percent	13,098	16.0	36.7	0	100
Medium and Large Firm	= 1 if > 10 employees or turnover > 250 million BEF,[c] in percent	13,098	1.2	11.1	0	100
Limited Partnership	= 1 if firm is limited partnership, in percent	13,098	12.1	32.6	0	100
Limited Partnership w/ ES	= 1 if firm is limited partnership with equal sharing, in percent	13,098	1.0.	10.3	0	100
Corporation	= 1 if firm is corporation, in percent	13,098	3.9	19.4	0	100
Temporary Arrangement	= 1 if firm is a temporary arrangement, in percent	13,098	0.9	9.5	0	100
Firm Characteristics						
Age	in years	1,991	16.4	24.3	0	96.2
Assets	in billions of BEF[c]	645	0.014	0.049	0.000	0.878
Earnings / Assets	in percent	645	0.117	0.148	-0.528	1.252
Short-Term Debt / Assets	in percent	645	0.406	0.216	0.001	0.957

TABLE 2. SAMPLES' CHARACTERISTICS

Sample	All	Distance	SPB & SP	Age	Augmented
Number of Observations	13,098	11,222	9,213	1,991	645
Number of Postal Zones	922	737	717	509	309
Average Relationship Banking, in %	52.4	53.0	51.4	60.5	65.7
Average Industry Specialization, in %	18.2	18.1	18.7	15.7	15.6

TABLE 3. CORRELATION TABLE

The number of observations is 13,098 in the area (1) – (6) and 11,222 elsewhere. *, **, and *** = significant at 10%, 5% and 1% level, using Pearson-correlation.

		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Relationship Banking	(1)	0.963***	0.361***	0.041***	-0.010	-0.003	0.003	0.034***	0.008
Main Bank	(2)	1	0.291***	0.043***	-0.007	-0.001	0.003	0.027***	0.009
ln(Duration of Relationship)	(3)		1	-0.020**	-0.030***	-0.023***	0.028***	0.098***	0.014
Industry Specialization	(4)			1	0.016*	0.011	-0.006	-0.026***	0.023**
HHI	(5)				1	0.980***	-0.286***	-0.180***	-0.046***
HHI^2	(6)					1	-0.420***	-0.149***	-0.017*
Multi-Market Contact	(7)						1	-0.045***	-0.153***
$(1+\text{Distance to Lender})^{-1}$	(8)							1	-0.281***
$1-(1+\text{Distance to Closest Competitors})^{-1}$	(9)								1

TABLE 4. BANK ORIENTATION

The dependent variable is Relationship Banking. The definition of the variables can be found in Table 1. The table reports the partial derivatives at the means, in percent , from binary Probit models. *, **, and *** = significant at 10%, 5% and 1% level, two-tailed. SPB & SP: Single-Person Businesses and Sole Proprietorships. The Pseudo R squared is calculated as in Zavoina and McElvey (1975).

Models	I	II	III	IV	V	VI	VII
Samples	All	All	All	Distance	SPB & SP	Age	Augmented
Number of Observations	13,098	13,098	13,098	11,222	9,213	1,991	645
Competition Variables							
HHI	3.1	-23.1*	-44.8***	-56.0***	-64.3***	-52.8	-118.1*
HHI^2		23.8**	46.0***	64.1***	67.4***	72.2*	158.7**
Multi-Market Contact			17.5*	28.0***	26.4**	47.4**	112.8***
$(1+\text{Distance to Lender})^{-1}$				11.3***	12.6***	11.9	33.0**
$1 - (1 + \text{Distance to Closest Competitors})^{-1}$				3.8	2.6	12.1	8.3
Bank Branch Characteristic							
Branch Size	-14.3***	-14.9***	-14.3***	-13.7***	-11.7***	-27.7***	-11.4
Postal Zone Variables and Constant	#	#	#	#	#	#	#
Firm Size and Legal Form Dummies	#	#	#	#			
Industry Dummies	#	#	#	#	#		
Age						#	
Firm Characteristics							#
Pseudo R squared	0.406	0.406	0.406	0.406	0.404	0.392	0.404

TABLE 5. BANK ORIENTATION AND COORDINATION

The dependent variable is Relationship Banking. The definition of the variables can be found in Table 1. The table reports the partial derivatives at the means, in percent , from binary Probit models. *, **, and *** = significant at 10%, 5% and 1% level, two-tailed. SPB & SP: Single-Person Businesses and Sole Proprietorships. The Pseudo R squared is calculated as in Zavoina and McElvey (1975).

	Model IV Anand and Galetovic (2001)	Model IV Mester (1987)
Samples	Distance	Distance
Number of Observations	11,222	11,222
Competition Variables		
$(\text{Number of Banks})^{-1}$	-66.4***	
$\text{HHI} - (\text{Number of Banks})^{-1}$	-21.7	
$(\text{Number of Banks})^{-2}$	75.5***	
$[\ \text{HHI} - (\text{Number of Banks})^{-1}\ ]^2$	286.9	
$(\text{Number of Banks})^{-1}\ [\ \text{HHI} - (\text{Number of Banks})^{-1}\ ]$	11.1	
HHI		-53.5
HHI^2		62.2*
Multi-Market Contact	35.9***	13.4
HHI * Multi-Market Contact		118.3
HHI^2 * Multi-Market Contact		-224.1
$(1+\text{Distance to Lender})^{-1}$	11.2***	11.4***
$1 - (1 + \text{Distance to Closest Competitors})^{-1}$	3.2	3.9
Bank Branch Characteristic		
Branch Size	-13.6***	-13.6***
Postal Zone Variables and Constant	#	#
Firm Size and Legal Form Dummies	#	#
Industry Dummies	#	#
Pseudo R squared	0.406	0.406

TABLE 6. BANK INDUSTRY SPECIALIZATION

The dependent variable is Industry Specialization. The definition of the variables can be found in Table 1. The table reports the coefficients from ordinary least squares models. *, **, and *** = significant at 10%, 5% and 1% level, two-tailed. SPB & SP: Single-Person Businesses and Sole Proprietorships.

Models	I	II	III	IV	V	VI	VII
Samples	All	All	All	Distance	SPB & SP	Age	Augmented
Number of Observations	13,098	13,098	13,098	11,222	9,213	1,991	645
Competition Variables							
HHI	0.2	-1.6	7.4**	7.3*	9.4**	5.0	-0.5
HHI^2		1.7	-7.5**	-6.4	-8.1*	-0.8	3.8
Multi-Market Contact			-9.0***	-5.0**	-6.4**	2.2	7.0
$(1+\text{Distance to Lender})^{-1}$				-1.4*	-1.5*	-1.6	-4.9
$1 - (1 + \text{Distance to Closest Competitors})^{-1}$				1.1	1.1	1.2	-0.0
Bank Branch Characteristic							
Branch Size	-8.7***	-8.7***	-14.0***	-8.1***	-7.2***	-10.3***	-10.5***
Postal Zone Variables and Constant	#	#	#	#	#	#	#
Firm Size and Legal Form Dummies	#	#	#	#			
Industry Dummies	#	#	#	#	#		
Age						#	
Firm Characteristics							#
Adjusted R squared	0.385	0.385	0.385	0.397	0.386	0.026	0.038

TABLE A1. BANK ORIENTATION: MAIN BANK

The dependent variable is Main Bank. The definition of the variables can be found in Table 1. The table reports the partial derivatives at the means, in percent , from binary Probit models. *, **, and *** = significant at 10%, 5% and 1% level, two-tailed. SPB & SP: Single-Person Businesses and Sole Proprietorships. The Pseudo R squared is calculated as in Zavoina and McElvey (1975).

Models	I	II	III	IV	V	VI	VII
Samples	All	All	All	Distance	SPB & SP	Age	Augmented
Number of Observations	13,098	13,098	13,098	11,222	9,213	1,991	645
Competition Variables							
HHI	4.0	-18.9	-45.5***	-58.4***	-65.0***	-66.4*	-134.4**
HHI^2		20.9*	48.1***	68.6***	70.0***	86.6**	170.4***
Multi-Market Contact			21.4**	34.0***	30.1***	58.8***	114.1***
$(1+\text{Distance to Lender})^{-1}$				9.6***	10.3***	12.5	32.0**
$1 - (1 + \text{Distance to Closest Competitors})^{-1}$				3.9	2.9	10.4	8.6
Bank Branch Characteristic							
Branch Size	-13.8***	-14.3***	-13.6***	-14.2***	-11.7***	-29.2***	-7.9
Postal Zone Variables and Constant	#	#	#	#	#	#	#
Firm Size and Legal Form Dummies	#	#	#	#			
Industry Dummies	#	#	#	#	#		
Age						#	
Firm Characteristics							#
Pseudo R squared	0.408	0.408	0.408	0.409	0.403	0.386	0.400

TABLE A2. BANK ORIENTATION: DURATION OF RELATIONSHIP

The dependent variable is ln(Duration of Relationship). The definition of the variables can be found in Table 1. The table reports the partial derivatives at the means from Tobit models. *, **, and *** = significant at 10%, 5% and 1% level, two-tailed. SPB & SP: Single-Person Businesses and Sole Proprietorships.

Models	I	II	III	IV	V	VI	VII
Samples	All	All	All	Distance	SPB & SP	Age	Augmented
Number of Observations	13,098	13,098	13,098	11,222	9,213	1,991	645
Competition Variables							
HHI	-0.0	-0.6***	-1.2***	-1.0***	-1.2***	-0.6	-1.6*
HHI^2		0.6***	1.1***	0.9***	1.1***	0.7	1.9**
Multi-Market Contact			0.4***	0.6***	0.7***	0.7**	1.6***
$(1+\text{Distance to Lender})^{-1}$				0.4***	0.4***	0.5***	0.9***
$1 - (1 + \text{Distance to Closest Competitors})^{-1}$				0.1***	1.7***	0.2*	0.2
Bank Branch Characteristic							
Branch Size	-0.4***	-0.4***	-0.4***	-0.3***	-0.4***	-0.1	-0.1
Postal Zone Variables and Constant	#	#	#	#	#	#	#
Firm Size and Legal Form Dummies	#	#	#	#			
Industry Dummies	#	#	#	#	#		
Age						#	
Firm Characteristics							#
Adjusted R squared (of equivalent OLS)	0.101	0.102	0.103	0.105	0.041	0.051	0.050

TABLE A3. BRANCH LOAN VOLUME

The dependent variable is Only Lender, Relationship Banking, or ln(1 + Duration of Relationship). Ln(Bank Asset Size) is the log of bank assets, in 1000s of US$. Ln(Branch Loan Volume) equals the natural logarithm of the loan portfolio of the branch, in 1000s of US$. The definition of the other variables can be found in Table 1. The table reports the coefficients from binary Logit and OLS models. *, **, and *** = significant at 10%, 5% and 1% level, two-tailed. BMPRS: Berger, et al. (2002); SPB & SP: Single-Person Businesses and Sole Proprietorships. Goodness-of-fit measures: [a] Adjusted R squared, [p] Pseudo R squared, for IV as in Zavoina and McElvey (1975).

Models	BMPRS Table 6	IV	BMPRS Table 5	IV
Dependent Variable	Only Lender	Relationship Banking	Duration of Relationship	Duration of Relationship
Model Estimation	Logit/IV	Logit	IV	OLS
Samples		SPB & SP		SPB & SP
Number of Observations	1,131	11,222	1,131	11,222
Competition Variables				
HHI	-0.242	-2.263***	0.408*	-1.076***
HHI^2		2.597***		1.021***
Multi-Market Contact		1.236***		0.626***
$(1+\text{Distance to Lender})^{-1}$		0.497***		0.410***
$1-(1+\text{Distance to Closest Competitors})^{-1}$		0.162		0.166***
Bank Branch Characteristic				
ln(Bank Asset Size)	-0.526***		-0.150***	
ln(Branch Loan Volume)		-0.037		-0.070***
Postal Zone Variables and Constant		#		#
Firm Size and Legal Form Dummies				
Industry Dummies		#		#
Age				
Other variables in BMPRS	#		#	
Goodness-of-fit measure	0.067^p	0.406^p	0.348^p	0.106^a

TABLE A4. CONTROL VARIABLES

The dependent variable is Relationship Banking (RB) or Industry Specialization (IS). The definition of the variables can be found in Table 1. The table reports the partial derivatives at the means, in percent , from binary Probit models (RB), or the coefficients from ordinary least squares models (IS). *, **, and *** = significant at 10%, 5% and 1% level, two-tailed. SPB & SP: Single-Person Businesses and Sole Proprietorships.

Models	IV	VI	VII	IV	VI	VII
Dependent Variable	RB	RB	RB	IS	IS	IS
Samples	Distance	Age	Augmented	Distance	Age	Augmented
Number of Observations	11,222	1,991	645	11,222	1,991	645
Competition Variables	#	#	#	#	#	#
Bank Branch Characteristic	#	#	#	#	#	#
Postal Area Dummies and Constant	#	#	#	#	#	#
Industry Dummies	#			#		
Number of Firms	1.1	-0.0	5.7**	0.1	-0.3	-0.8
Industry Concentration	-32.7	80.6**	-12.3	-6.1	31.6***	58.1***
Assets of Firms	-3.0	-8.2	6.0	-0.0	1.2	2.0
Urban	1.1	10.0**	26.6	2.0***	3.7***	7.8***
Small Firm	-8.0			0.2		
Medium and Large Firm	-7.0			0.2		
Limited Partnership	16.1***			-0.2		
Limited Partnership w/ ES	23.0***			-1.2		
Corporation	17.2***			-0.6		
Temporary Arrangement	12.5*			-0.1		
Age		-0.0	-0.1*		-0.2*	-0.0
Assets			-27.8			-7.5
Earnings / Assets			31.2**			-2.0
Short-Term Debt / Assets			-12.9			1.2

TABLE A5. BANK INDUSTRY SPECIALIZATION: RELATIONSHIP LOANS

The dependent variable is Industry Specialization (in the set of Relationship Loans only). The definition of the variables can be found in Table 1. The table reports the coefficients from ordinary least squares models. *, **, and *** = significant at 10%, 5% and 1% level, two-tailed. SPB & SP: Single-Person Businesses and Sole Proprietorships.

Models	I	II	III	IV	V	VI	VII
Samples	All	All	All	Distance	SPB & SP	Age	Augmented
Number of Observations	6,874	6,874	6,874	5,953	4,738	1,206	424
Competition Variables							
HHI	1.7	-0.4	17.8	7.4	13.1	2.4	2.8
HHI^2		1.1	-16.6	-5.2	-11.3	6.4	0.5
Multi-Market Contact			-13.8**	-7.4	-10.6**	-1.3	5.7
$(1+\text{Distance to Lender})^{-1}$				-4.8***	-3.8**	-9.9**	-7.5
$1 - (1 + \text{Distance to Closest Competitors})^{-1}$				1.8	1.6	3.8	2.2
Bank Branch Characteristic							
Branch Size	-17.8***	-17.8***	-18.1***	-22.4***	-20.0***	-24.7***	-18.2***
Postal Zone Variables and Constant	#	#	#	#	#	#	#
Firm Size and Legal Form Dummies	#	#	#	#			
Industry Dummies	#	#	#	#	#		
Age						#	
Firm Characteristics							#
Adjusted R squared	0.616	0.616	0.617	0.303	0.285	0.040	0.030

NOTES

[1] Arguments concerning the incompatibility between relationship-specific investments and competition are also fielded in other areas in economics. For example, employers will be reluctant to invest in training when other employers can easily poach the trained workers in the future (Becker (1975)). More in general, Schumpeter argued that a monopoly offers better incentives for innovation, as the monopolist-innovator is able to recoup its sunk R&D expenditures through the generation of future rents.

[2] See Sabani (1993) for an early critical discussion of this point and also Schnitzer (1999). In Chan, Greenbaum and Thakor (1986) bank competition undermines the reusability of screening information, bank rents, and the quality of bank assets, but does not reduce the availability of credit. In Caminal and Matutes (2002) bank market power has an ambiguous impact on bank failure rates. See also the application in Park, Brandt and Giles (2003).

[3] Market power is exogenous in Petersen and Rajan (1995) and the crucial information asymmetry is between borrowing firms and banks. Firms initially know their own quality, but banks do not. Banks learn the borrowers' type over time. In contrast Fischer (1990), Rajan (1992), Sharpe (1990), and von Thadden (2001) highlight the information asymmetry between banks to model endogenous informational monopoly power. By lending repeatedly "inside" banks gather proprietary repayment information. The resulting informational advantage vis-à-vis "outside" competing banks leads to some degree of monopoly power over the borrowing firms. Two points are worth noting. First, bank relationships arise endogenously in these models, even in perfectly competitive banking markets (as a fraction of the firms decides to stay with the current bank). Second, "learning by lending" does not require relationship specific investments. We will discuss a model with relationship specific investments at the end of this section.

In Dell'Ariccia (2001) banks combine market power from product differentiation (exogenous) with informational monopoly power (endogenous). The contours of the informational asymmetry *per se* determine both the choice of banking type and the resulting market structure. Abatement in the informational problem in his model may lead to more banks operating in the market and more transactional banking, resulting in a similar correspondence (though not causality) between market structure and banking choice as in Petersen and Rajan (1995). More product differentiation on the other hand leads, for a given number of banks, to more price discrimination in the second period and higher loan rates in the first period.

[4] Fiercer interbank competition also results in more relationship lending in Banerjee (2002), Schmeits (2002), Dell'Ariccia and Marquez (2003), and Hauswald and Marquez (2003). Similarly, more competition fosters renegotiation of contracts in Berlin and Butler (2002).

[5] See also Anand and Galetovic (2000) and Anand and Galetovic (2002).

[6] Recent papers also investigate how changes in technology or bank regulation affect bank specialization and competition: for example Bouckaert and Degryse (1995), Degryse (1996), Schargrodsky and Sturzenegger (2000), Stomper (2001), and Hauswald and Marquez (2002).

[7] Closest in spirit to Petersen and Rajan's study is the paper by Zarutskie (2003). She employs a dataset containing almost 200,000 small firm – year observations. She finds that the probability of small firms utilizing bank debt increases when the concentration (in local deposit markets) is high. Similarly Bergstresser (2001a) finds that in more concentrated markets there are fewer constrained consumer-borrowers, while Bergstresser (2001b) documents that in more concentrated markets banks raise the average share of assets lent. Scott and Dunkelberg (2001) find that more competition not only increases the availability of credit but also decreases the loan rate and improves service performance (including knowledge of business, industry, provision of advice, etc.) by banks.

[8] Cetorelli (2001), Cetorelli and Strahan (2002), Cetorelli (2003a), and Cetorelli (2003b) also find that banking market power may represent a financial barrier to entry in product markets. However Bonaccorsi di Patti and Dell'Ariccia (2003) find opposite results for Italy.

[9] Degryse and Van Cayseele (2000) and Degryse and Ongena (2003) employ the same data set.

[10] 549 bank branches lend to firms located in 921 out of 1,168 postal zones. The concentration index of the number of loans (sum of shares squared) is 22 (equal shares would yield an index equal to 9).

[11] NACE is the European industrial classification system subdividing industries. The industry concentration index across the 50 industries is around 1,200 (equal shares would result in an index equal to 200).

[12] We use Belgian Francs (BEF) throughout the paper but indicate equivalent amounts in Euros. Belgium switched to the Euro on January 1st, 1999.

[13] Banks may obtain an important informational advantage from observing checking accounts (Nakamura (1993), Vale (1993), Mester, Nakamura and Renault (2002)).

[14] The Annual Report of the *Belgian Bankers Association* reports 7,668 branches. We consolidate multiple branches of the same bank at the same address.

[15] Belgium covers 30,230 sq km in land surface (source: *CIA Factbook 1995*).

[16] See for example Hannan (1991) and Sapienza (2002).

[17] An incorrect *a priori* choice of the relevant geographical market cuts against finding significant results for the simple reason that with inappropriate market delineation we expect the resulting "markets" not to be relevant in determining competitive conditions.

[18] For details see Degryse and Ongena (2003). Buch (2002) and Corvoisier and Gropp (2001) finds similar evidence for other European countries. This evidence contrasts with studies showing that U.S. bank branch – borrower distance has grown substantially (Cyrnak and Hannan (2001); Petersen and Rajan (2002)).

[19] U.S. bank concentration studies always use deposit market shares. However, Fischer (2001) also employs branch market shares for Germany and shows that for U.S. Metropolitan Statistical Areas the "branch HHI" is highly correlated with the "deposit HHI".

[20] Pilloff (1999) finds a positive but economically small effect of multi-market contact on U.S. bank profitability, except for a group of large banks for which the effect becomes somewhat meaningful.

[21] We consolidate the branches in 104 banks (sometimes banks comprise distinctly incorporated sets of branches in Brussels, Flanders, and Wallonia). There are 837 postal zones with bank branches. Let $D_{ij} = 1$ if bank i operates in postal zone j, and = 0 otherwise, for $i = 1, \ldots, 104$; $j = 1, \ldots, 837$. Let $a_{kl} = \sum_{j=1}^{837} D_{kj} D_{lj}$, and f_j: the number of different banks offering service in postal zone j. The Multi-Market Contact measure is then defined as:

$$MMC_j = \frac{2}{837 f_j (f_j - 1)} \sum_{k=1}^{104} \sum_{l=k+1}^{104} a_{kl} D_{kj} D_{lj} .$$

[22] We actually employ the distance to the *quartile* closest competitor. The quartile closest competitor is the bank branch with the 25-percentile traveling time located in the same postal zone as the borrower. We select this measure to gauge competitor proximity for obvious measurement reasons. Omissions and recording or mapping errors are less likely to influence the 25-percentile statistic than the shortest distance statistic. In addition, bank branches may not be entirely homogeneous in their product offerings. In that case, we also conjecture that our 25% measure is more highly correlated with the distance to the closest, "truly" competing bank branch than the minimum distance metric.

[23] Antwerpen, Brussel – Schaarbeek, Charleroi, Gent, and Liege (source: *UN Demographic Yearbook 1995*). We assign postal zones on the basis of the current circumscription.

[24] It may be more profitable for banks to reserve relationship lending for loans of larger size (Stanton (2002)) and for large firms.

[25] We also employ a Logit model throughout, but given the mean of the dependent variable is close to 50%, not surprisingly results are unaffected.

[26] The U.S. Department of Justice and Federal Trade Commission Horizontal Merger Guidelines (April 1997) label markets with an HHI above 0.18 'highly concentrated' and an HHI below 0.10 'unconcentrated'.

[27] The local markets in his paper are also substantially larger than in ours. The average postal zone in Belgium contains less than 10,000 inhabitants, while the mean *Landkreise* in Germany counts around 175,000 people.

[28] The average firm in Elsas (2003) has an annual turnover of approximately 4,000 million BEF, while the average firm in our Augmented sample reports 14 million BEF in total assets.

[29] German and Belgian corporations seem to maintain a similar number of bank relationships (Ongena and Smith (2000b)), but small firms in general are found to have fewer bank relationships (the empirical evidence is reviewed in Ongena and Smith (2000a)). The average small Belgian firm surveyed by de Bodt, et al. (2001) employs two banks. The firms in the latter sample are on average more than three times larger and 7 years older than the firms in our sample.

[30] A Hausman test cannot reject at a 1-% level that random effects should be favored.