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Distance, Lending Relationships, and Competition

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ABSTRACT

We study the effect on loan conditions of geographical distance between firms, the lending bank, and all other banks in the vicinity. For our study, we employ detailed contract information from more than 15,000 bank loans to small firms comprising the entire loan portfolio of a large Belgian bank. We report the first comprehensive evidence on the occurrence of spatial price discrimination in bank lending. Loan rates decrease with the distance between the firm and the lending bank and increase with the distance between the firm and competing banks. Transportation costs cause the spatial price discrimination we observe.

BANKS DERIVE MARKET POWER ex ante from their relative physical proximity to the borrowing firms or ex post from private information they obtain about firms during the course of the lending relationship. Banks located closer to borrowing

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firms enjoy significantly lower transportation and monitoring costs, to such an extent that "if other banks are relatively far, close banks have considerable market power" (Petersen and Rajan (1995, p. 417)).

We study the effect of geographical distance on bank loan rates, taking into account the distance between both commercial borrowers and their bank branch and commercial borrowers and other competing banks, while controlling for relevant relationship, loan, bank branch, borrower, and regional characteristics. For our study, we employ a unique data set containing detailed loan contract information, including firm and lender identity and location, from more than 15,000 bank loans to (predominantly) small firms.

In line with the predictions emanating from theory modeling spatial price discrimination, we find that loan rates decrease with the distance between the firm and its lending bank, and increase with the distance between the firm and competing lenders. We identify banking competition and pricing strategies in our analysis by including both the number of bank branches (or, alternatively, branch concentration) and the distance between the borrower and competing bank branches in the vicinity. We observe that increasing distance between the borrower and alternative lenders significantly relaxes price competition and results in substantially higher borrowing costs for the firm. From a variety of exercises we infer that transportation costs, not informational asymmetries, are probably the main basis for the spatial price discrimination we observe.

Economists have long analyzed price discrimination and inferred its importance (Phlips (1983), Thisse and Vives (1988), Stole (2001)). Recent empirical work focusing, for example, on race, gender, and social price discrimination in the auto, private mortgage, and business loan markets has rekindled interest (Ayres and Siegelman (1995), Goldberg (1996), Morton, Zettlemeyer, and Silva-Risso (2003), Gary-Bobo and Larribeau (2003), Cavalluzzo, Cavalluzzo, and Wolken (2002)). We contribute to this literature by empirically investigating *spatial* price discrimination and by demonstrating its relevance for the pricing of financial contracts.

Our analysis has two distinct advantages over current empirical work on price discrimination. First, in contrast to race, gender, and many other social variables, measures of distance are continuous and possibly less correlated with important but unobservable characteristics. Second, the estimated coefficients in our analysis capturing the presence of spatial price discrimination can be linked to a well-defined primitive (i.e., the transportation costs resulting from the location of borrowers and bank branches). This linkage makes it possible to benchmark the economic relevance of our estimates. For example, our estimated coefficients suggest that in order to obtain a loan, a new borrower may have to visit the bank branch between two and three times. A repeat customer, on the other hand, is not required to undertake additional visits. Our estimates also indicate that spatial price discrimination targeting borrowers located near the lending bank branch yields average bank rents of around 4% (with a maximum of 9%) of the bank's marginal cost of funding.

Taken at face value, our findings substantiate an important source of rents accruing to financial intermediaries, based on location. Location rents are distinct from rents derived from customer switching costs (Klemperer (1995)), which in credit markets are often attributed to pervasive informational asymmetries (Fischer (1990), Sharpe (1990), Rajan (1992), von Thadden (2004)). Kim, Kliger, and Vale (2003), for example, provide the first estimates of switching costs faced by bank borrowers. Their findings imply average annualized bank rents of roughly 4% of the banks' marginal cost of funding.[1] In our data set, the increase of the loan rate during the average bank–firm relationship points to annual information rents of less than 2% of the bank's marginal cost of funding.

Sweeping global consolidation of the banking industry (Berger et al. (2000)) and widely observed innovations in information technology (Berger (2003)) may erode both location and inside information as sources of bank rents. Petersen and Rajan (2002), for example, document dramatic increases in distance and substantially changing modes of communication between small firms and their lenders in the United States over the last 25 years. Our study complements their work by entering the distance between the firm and the competing banks in the vicinity into the analysis of the loan rate, by documenting that the distance between the firm and the bank in Belgium did not increase substantially over the period 1975 through 1997, and by arriving at estimates of bank rents generated by spatial price discrimination.

Characteristics of both the Belgian financial landscape and the analyzed bank make our data set ideally suited to investigate spatial price discrimination. Belgium has a continental bank-based financial system, but is otherwise similar to the United States in general economic, financial, and technological (both transportation and communication) development. The aforementioned finding of moderate changes in distance in Belgium greatly facilitates the interpretation of the estimated coefficients and suggests that, in contrast to the United States, small business lending in continental Europe may not yet have been affected much by recent improvements in communication and information technology.

The bank we study operates across the nation and across industries. Most firms in its portfolio are single-person businesses, and many firms obtain only one loan from the bank. Hence, even though distances are typically rather small in Belgium, transportation costs may be important on the margin for the small borrowers in the data set. In addition, formalized interviews with bank managers indicate that loan officers located in the bank's branches enjoyed substantial autonomy when granting and pricing small business loans. The officers' own assessment of the development of the relationship with the firm, the skills and reputation of the firm's management, and the quality of the

[1] The mean loan rate in Kim et al. (2003) equals around 11.8% and the mean T-bill rate is around 9.2%. They calculate that the proportion of the marginal value of a locked-in customer to the marginal increase of the bank's present value that is due to an additional locked-in customer is 0.16 (ranging from 0.01 to 0.33 in various classes). Hence, bank rents as a percentage of the banks' marginal cost of funding equal (11.8% to 9.2%) $\times$ 0.16/9.2 = 4.5%, assuming that relationships last long (the median duration of bank–firm relationships in Norway reported by Ongena and Smith (2001) is 18 years).

firm's business vision (i.e., "soft" information in Stein (2002)) played key roles in the lending decision. Though loan officers were required to "harden" their assessment internally by supplying key statistics and other relevant written information, much local discretion remained.

To conclude, we consider our empirical setting to be uniquely suited to study spatial pricing and to analyze whether transportation costs resulting from the distance between borrower and lender, and borrower and competing banks, provide sufficient and reasonable grounds for loan officers to price discriminate. In this regard, our work also contributes to a rapidly widening strand of the literature revealing the considerable impact of geographical distance on activities of financial intermediaries, such as spatial loan rationing (Petersen and Rajan (2002)), cross-border bank lending (Buch (2004), Berger et al. (2003)), and domestic and international bank branching (Grosse and Goldberg (1991), Fuentelsaz and Gomez (2001)).[2]

We organize the rest of the paper as follows. Section I reviews the theoretical predictions regarding distance, lending relationships, and competition. Section II introduces the data and discusses the methodology used in our paper. Section III displays and discusses the empirical results. Section IV concludes.

I. Theoretical Predictions

A. Distance

Recent theoretical papers highlight the importance of distance in explaining the availability and pricing of bank loans. Lending conditions may depend on the distance between the borrower and the lender and the distance between the borrower and the closest competing bank (Table I summarizes the theoretical predictions). In location differentiation models (Hotelling (1929), Salop (1979)), borrowers incur distance-related transportation costs from visiting their bank branches. Banks price uniformly if they cannot observe borrowers' locations or are prevented from charging different prices to different borrowers.

However, if banks observe the borrowers' locations and offer interest rates based on that information, they may engage in spatial price discrimination. Banks are often informed about the borrower's address before even granting or pricing a loan. If borrowers incur their own transportation costs, as is most likely to be the case, a bank charges a higher interest rate to those borrowers that are located closest to its bank branch (Lederer and Hurter (1986)). Closer borrowers face higher total transportation costs when visiting competing banks

[2] Distance also determines the effectiveness of internal control mechanisms within bank holding companies (Berger and DeYoung (2001, 2002)), the strength of informational contagion between banks (Aharony and Swary (1996)), and the representation of venture capitalists on the boards of U.S. private firms (Lerner (1995)). Physical distance further influences activities in financial and product markets in general. International capital flows seem bound by geographical proximity (Portes and Rey (2001)), but so are the composition and returns on actively managed U.S. mutual funds (Coval and Moskowitz (2001)), the trading profitability of traders on the German electronic exchange Xetra (Hau (2001)), and the portfolio choices of American (Huberman (2001)) and Finnish investors (Grinblatt and Keloharju (2001)).

Table I

Theoretical Models Linking Loan Rates and Distance

The table lists models, categorized by argumentation, hypothesizing the impact of distance for a given number of competitors on the loan rate.

	Impact on the Loan Rate of the		
Arguments & Discussed Models	Distance to the Lender	Distance to the Closest Competitor	Number of Competitors
Transportation Costs (for borrower)			
Uniform pricing	no	no	negative
Discriminatory pricing	negative	positive	negative
Monitoring Costs (for lender)			
Marginal cost pricing	positive	negative	negative
Discriminatory pricing	negative	positive	negative
	Distance to the Relationship Bank	Distance to the Transactional Bank	Number of Competitors
Asymmetric Information			
Dell'Ariccia (2001)	negative	no	negative
Hauswald and Marquez (2003)	negative	positive	positive/negative

(which are located further away than the lending bank), resulting in some market power for the lender. Similarly, a monopolist bank optimally charges a higher loan rate to close borrowers, since these borrowers incur lower total transportation costs. Consequently, discriminatory pricing based on location (and associated transportation costs) implies, for a given number of banks, a negative relationship between the loan rate and the borrower–lender distance and a similar, positive relationship between the loan rate and the distance between the borrower and the closest competing bank.

The cost of monitoring a borrower could also be related to physical distance. Total monitoring costs increase with borrower–lender distance because of extra communication costs or transportation costs incurred by banks visiting the borrowers' premises. Loan rates passing through such costs increase with distance. However, distance-related monitoring costs might also allow for discriminatory pricing. In Sussman and Zeira (1995), banks face monitoring costs known to be increasing in distance. As a result, lenders extract rents from close borrowers because more distant competing banks take into account their own higher monitoring costs in their loan rate offers. Spatial price discrimination based on bank monitoring costs again implies a negative (positive) relationship between the loan rate and the borrower–lender (borrower-closest competing bank) distance (for a given number of banks).

B. Distance and Lender Information

Lenders may initially be unsure about the exact location of the borrower (e.g., if the borrower is an independent salesman or a software consultant and maintains multiple centers of activity). In that case, the bank can engage in discriminatory pricing only upon becoming informed about the location and transportation costs faced by their borrowers. In Dell'Ariccia (2001), banks become informed about the location of the borrower through first-period lending. In his model, only relationship banks, those lending to the same firm for a second time, can engage in spatial price discrimination, while de novo transactional banks have to resort to "mill pricing."

The severity of the asymmetric information problem itself may also increase with distance. Hauswald and Marquez (2003) develop a model in which the precision of the signal about a borrower's quality received by a bank decreases with distance. Because banks receive more precise signals about close borrowers, competing banks face increasing adverse selection problems when approaching borrowers closer to the most informed bank. Hence, the informed relationship bank can charge higher interest rates to closer borrowers, while the uninformed transactional banks charge higher interest rates to borrowers located farther afield (due to the increase in the adverse selection problem). Ceteris paribus, Hauswald and Marquez derive a negative (positive) relationship between the loan rate and the distance between the borrower and the relationship (transactional) bank.

C. Number of Banks

In spatial models, the number of banks in the market is typically inversely related to the distance between the lender and the (closest) competing banks. An increase in the number of banks (harsher competition) increases the likelihood of receiving lower loan rate offers. A decrease in the fixed setup costs per bank (e.g., Sussman and Zeira (1995)) increases the number of banks, decreases the distance between any two neighboring banks, and decreases the loan rate for each bank–borrower distance combination.

On the other hand, an increase in the number of banks may aggravate an adverse selection problem by enabling lower-quality borrowers to obtain financing, resulting in moral hazard and credit rationing (Petersen and Rajan (1995)) or a higher interest rate (Broecker (1990)). In Dell'Ariccia (2001), adverse selection generates an endogenous fixed cost, constituting a barrier to entry in the industry by limiting the number of banks competing in the market. Similarly, a decrease in the fixed-cost component of the relationship-building technology in Hauswald and Marquez (2003) not only leads to an increase in the number of banks and more competition, but also results in a retrenchment toward relationship lending.

D. Distance, Borrower Information, and Experience

Casual observation suggests that borrowers do not always frequent the closest bank, as most spatial models presume they should. First, borrowers may not be fully informed about the precise location of all competing banks and the availability and conditions of the loans offered there. Grossman and Shapiro (1984) and Bester and Petrakis (1995) model such location-*cum*-informational differentiation. In Grossman and Shapiro, consumers buy a product from a particular seller upon becoming informed of its location through advertising. The advertising itself is not localized. The sales price in their model exceeds the full information price, by the magnitude of the transportation cost, as informational differentiation lowers the elasticity of demand. In addition, consumers in their model, as they are unaware of all sellers, do not necessarily patronize the closest one. Bester and Petrakis model the advertising of lower price offers. In the absence of advertising, customers are only informed about local prices. Producers advertise lower prices to attract customers from more distant locations. Hence, more distant informed customers are observed to receive lower prices.

Second, location is just one characteristic of a bank's product that is important for its customers. For example, Elliehausen and Wolken (1990) document that small- and medium-sized firms in the United States are also influenced by other characteristics of the branches (convenience and hours of operation), banks (reputation, quality, and reliability), and relationships (personal or long-term) when choosing a particular bank. Hence, borrowers may not visit the closest bank branch when another bank's loan product exhibits other, more preferred characteristics (e.g., Pinkse, Slade, and Brett (2002)). And once borrowers have experienced a good match and have observed the high quality of the services provided by their current bank, they switch to another bank only when it offers a considerably lower price (Tirole (1988, p. 294)).

To conclude, most theoretical models imply a negative (positive) correspondence between the borrower–lender (competing bank) distance and the loan rate, caused either by transportation costs (for either the borrower or the lender) or asymmetric information. Information availability, experience, and other product characteristics may abate the strength of the distance–loan rate relationship. However, we know of no paper that has yet empirically investigated this association and its causes directly and comprehensively.

II. Data

A. Loan Contracts

The unique data set we analyze consists of 17,776 loans made to independents or single-person businesses, and to small-, medium-, and large-sized firms by an important Belgian bank that operates throughout Belgium. The sample commences with 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 spatial price discrimination. The bank is one of a handful of truly national and general-purpose banks operating in Belgium in 1997. The bank lends to firms located in most postal zones and is

Table II

Bank and Postal Zone Statistics

The table provides key statistics about the lending bank and the Belgian postal zones/areas.

Total number of banks	145				
Total number of bank branches	7,477				
	Postal Zones	Postal Areas			
Total number with bank branches	837	9			
Total number with borrowers of the bank	921	9			
Total number	1,168	9			
Average surface area, in km^2	26	3,359			
Average population	8,632	1,120,209			
	Mean	Median	Minimum	Maximum	*SD*
Number of banks per postal zone	6.4	4	0	103	10.4
Number of adjacent postal zones/postal zone with bank branches	5.1	5	0	16	2.0
Number of banks in postal zones adjacent to postal zones with bank branches	53.6	44	2	471	42.4

active in 53 different industries.[3] However, around 83% of the firms in its portfolio are single-person businesses and most borrowers obtain just one (relatively small) loan from this bank. Consequently, even though distances are typically rather small in Belgium, transportation costs may be important on the margin for the small borrowers in the data set. In addition, geographical clustering of economic and financial activity in northern and central Belgium results in substantial variation across the country in the average distances traveled.

For each borrower, we calculate the distance both to the lending bank and the branches of all other competing banks located in the same postal zone as the borrower. As of December 31, 1994, we identify 7,477 branches, operated by 145 different banks and located in 837 different postal zones (Table II). 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 a postal area and which in most cases coincides with one of the 10 provinces in Belgium. A postal zone covers on average 26 km^2 and contains approximately six bank branches. A postal area covers 3,359 km^2, on average. Not surprisingly, borrowers are often located in areas more densely occupied by banks, with on average more than 17 bank branches per postal zone, resulting in around 250,000 possible borrower–bank branch pairs.

[3] These 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). The industry concentration index across the 53 NACE industries is 1,238 (equal shares would result in an index equal to 204).

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. We choose the shortest traveling time, the default setting in both programs, over a number of other mapping alternatives, since we suspect that for most entrepreneurs in our sample, variable transportation costs consist mainly of traveling time spent. We provide concrete statistics on this issue when we discuss the results, and employ the fastest driving distance (in kilometers) in robustness exercises.

Address recording errors, incomplete map coverage, and changes in street names cut down our sample. We drop 801 contracts that were relocated to another branch or to a new branch after the closure of the original branch. Next, we conservatively remove the outlying 1% of borrowers located farthest from their lending banks, as we discover that a combination of address-recording errors, mapping problems, and nonstandard borrowing motives and business arrangements are responsible for most of these longer distances. Finally, we lay aside 612 contracts located in postal zones without competing banks. We return to this set of contracts later in the paper.

Table III provides summary statistics for the remaining 15,044 contracts.[4] Table III shows the definition, mean, median, minimum, maximum, and standard deviation of our variables, broken down into nine sets of characteristics: (1) geographical distances, (2) relationship characteristics, (3) competition measures, (4) loan rate and size, (5) loan contract characteristics, (6) loan purpose, (7) firm characteristics, (8) firm location, and (9) interest rate variables.

B. Distance to Lender

The median borrower is located around 4 minutes and 20 seconds from the lender, which (depending on the local road conditions) translates into 2.25 km (1.40 miles) of driving at 31 km/h (20 mph). In contrast, Petersen and Rajan (2002) find that the median distance between lending banks and small U.S. firms covered by the 1993 National Survey of Small Business Finance (NSSBF) is more than double that distance, that is, 4 miles. However, the median firm in the NSSBF employs two to four employees (e.g., Cole and Wolken (1995)), while the median firm in our sample is a single-person business. In addition, costs of driving differ substantially between Belgium and the United States, and Belgian businesses may be limited by the size of the country in their choice of domestically located banks. These arguments may also explain the even larger differences in the other distance statistics reported by Petersen and Rajan (2002). For example, the average (75 percentile) borrower–bank distance in our sample is around 3 (3.5) miles, while the same borrower in Petersen

[4] The loan rate and type of the 2,732 discarded contracts on average does not significantly differ (at a 1% level) from the 15,044 remaining contracts, though the borrowers are somewhat more transactional (mean *main bank* = 52.5%; mean duration of relationship = 7.2 years) and larger than the firms remaining in the sample (the means of the small-, medium-, and large-firm dummies are 20.6%, 3.4%, and 0.4%, respectively; the mean loan size is BEF 1.09 million).

Table III
Data Description

The table defines the variables employed in the empirical specifications and provides their mean, median, minimum, maximum, and standard deviation. The number of observations is 15,044.

Variables	Definition	Mean	Median	Minimum	Maximum	*SD*
Geographical Distance						
Distance to lender	Shortest traveling time, in minutes	6.90	4.29	0.00	51.00	7.30
Distance to closest competitors	Shortest traveling time to the closest quartile competitor in the borrower's postal zone, in minutes	3.82	3.27	0.00	24.00	2.33
Relationship Characteristics						
Main bank	= 1 if bank considers itself as main bank,[a] in %	58.82	100	0	100	49.22
Duration of relationship	Length of relationship with current lender, in years	7.93	7.47	0.00	26.39	5.44
Competition Measures						
Number of competitors	Number of branches (minus the lender's) in the borrower's postal zone	17.18	13	1	103	15.49
Herfindahl–Hirschman Index	Summed squares of bank market shares, by number of branches, in each postal zone	0.17	0.15	0.05	1.00	0.11
Loan Rate and Size						
Loan rate	Interest rate on loan until next revision, in basis points	812	782	200	2,200	236
Loan size	Size of loan, in millions of BEF[c]	0.88	0.30	0.005	80	1.83
Loan Contract Characteristics	Including Four Loan Revisability Dummies					
Collateral	= 1 if loan is secured via collateral, in %	26.40	0	0	100	44.08
Repayment duration of loan	Repayment duration of loan, in years	2.35	0.55	0.00	20.00	3.26
Loan Purpose						
Mortgage	= 1 if loan is a business mortgage loan	n/a[b]				
Term	= 1 if loan is a business term loan (investment credit)	n/a[b]				
Securitizable term	= 1 if loan is a securitizable business term loan (investment credit)	n/a[b]				
Bridge	= 1 if loan is a bridge loan	n/a[b]				
Prepay taxes	= 1 if loan is credit to prepay taxes	n/a[b]				
Consumer credit	= 1 if loan is a consumer credit loan (capturing installment loans)	n/a[b]				
Other	= 1 if loan is given for another purpose or its purpose is not specified	n/a[b]				
Rollover	= 1 if loan is given to prepay another loan, in %	10.20	0	0	100	30.27

Firm Characteristics	Including 8 Postal Area and 49 Industry Dummies					
Small firm	= 1 if <10 employees and turnover <250 million BEF,[c] in %	15.99	0	0	100	36.64
Medium firm	= 1 if >10 employees or turnover >250 million BEF,[c] in %	0.89	0	0	100	9.40
Large firm	= 1 if turnover >1 billion BEF,[c] in %	0.14	0	0	100	3.73
Limited partnership	= 1 if firm is limited partnership, in %	11.97	0	0	100	32.46
Limited partnership w/ES	= 1 if firm is limited partnership with equal sharing, in %	1.18	0	0	100	10.78
Corporation	= 1 if firm is corporation, in %	3.78	0	0	100	19.07
Temporary arrangement	= 1 if firm is a temporary arrangement, in %	0.85	0	0	100	9.18
Firm Location						
Average real estate price	In the Postal Zone in 1995, in millions of BEF[c]	2.40	2.19	0.35	7.84	0.99
Urban	= 1 if located in agglomeration with >250,000 inhabitants, in %	9.73	0	0	100	29.64
Interest Rate Variables	Including 2-Year Dummies					
Government security	Interest rate on a Belgian government security with equal repayment duration as loan to firm, in basis points	389	350	305	805	87
Term spread	Yield on Belgian government bond of 5 years—yield on Treasury bill with maturity of 3 months, in basis points	179	177	100	268	31

[a]The definition used by the bank to determine whether it is the main bank is: for single-person businesses and small firms, these 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]For bank-strategic considerations we cannot reveal the relative importance of the types of loans.
[c]Forty Belgian Francs (BEF) are approximately equal to US$1 during the sample period.

and Rajan communicates across 42.5 (14) miles with his or her bank, or across a whopping 252 (255) miles with his or her other financial institutions.

Petersen and Rajan (2002) also report that the distance between U.S. borrowers and banks has increased dramatically over time. For example, the median bank–borrower distance more than doubled between the mid-1970s and the early 1990s (from 2 to 5 miles), while the average distance more than quadrupled (from 16 to 68 miles). In contrast, in our sample the median and average distances between the borrowers and the Belgian bank we study increased by only around 30%, from 4 (6.85) minutes in 1975 to 5.2 (8.86) minutes in 1997.

We calculate the traveling time statistics for each year, which are calculated by subtracting the duration of the relationship between lender and borrower from the initiation year of each loan contract. In effect, we assume that the address of the borrower did not change during the relationship period.[5] Most of the modest increase of around 25% in traveling time in our sample seems to occur during the early 1990s (Degryse and Ongena (2003) contains a figure). This increase may be partly driven by the small decrease in the number of bank branches caused by regulatory driven despecialization of financial intermediation and resulting consolidation. Branch closures seem to explain most of the observed variation in traveling time.[6]

Possible selection issues may further complicate the assessment of this moderate growth in the distance between bank and borrowers (Petersen and Rajan (2002)). Actually, if we look at the evolution of distance by loan origination date, we find that average distance decreases from 7.7 minutes in 1995 to 6.7 minutes in 1997. We are therefore tempted to conclude that our findings with respect to the evolution over time of the lender–borrower distances broadly match results in Buch (2004) and Corvoisier and Gropp (2001). Both studies suggest that physical proximity continues to play an important role in European bank loan markets. We nevertheless control for possible changes over time in lending technology in robustness exercises.

C. Distance to Closest Competitors

We now turn to our other main variable of interest, *distance to the closest competitors*. The median (average) borrower in our sample is located 2 (2) minutes from the closest competitor or 3 minutes and 15 (50) seconds from the

[5] Only 179 borrowers report different addresses on loan contracts written in the same year, and an additional 75 borrowers report different addresses across different years. There are 351 contracts with the same address listing a different borrower name.

[6] We regress the distance to lender on an intercept, the starting year of the relationship, a large firm dummy, and an interaction term between the latter two variables. We want to investigate whether technology affects larger firms in a different way than it affects other firms. Distance grows significantly, but only by around 9 seconds per year, while the growth in distance between large firms and their lenders is indistinguishable from the growth in distance between small firms and their lenders. When we add the (national) number of bank branches to this specification, the growth in distance drops to a significant but small 4 seconds per year. The closure of one branch in each postal zone (implying a decrease in the number of bank branches about equal to the observed drop between 1990 and 1997) increases the traveling time by around 1 minute and 40 seconds.

quartile closest competitor located in the same postal zone. 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 second 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. In any case, we also check for the robustness of our results with respect to this a priori choice of proximity metric.

The lending bank is located closer than the quartile (closest) competitor in more than 44% (25%) of the borrower contract cases, making distance a relevant bank (product) characteristic for a sizeable minority of the borrowers in our data set. While distance is important, a majority of the borrowers do not patronize the closest bank branch.[7] Hence, our statistics suggest that if banks price uniformly, then transportation costs must be negligible for branch choice to be random. On the other hand, if banks do not price uniformly, then information, reputation, and other bank product characteristics in addition to location must play a role in the choice of bank branch and the determination of loan conditions.

D. Relationship Characteristics

Relationship characteristics control for information and experience effects and are therefore central to our analysis. The first characteristic in this category, *main bank*, indicates whether this bank considers itself to be the main bank of that firm or not. The definition used by the bank to determine whether it is the main bank is having a monthly "turnover" on the current account of at least BEF 100,000 (USD 2,500), and buying at least two products from that bank. More than half of all borrowers are classified as *main bank* customers. *Main bank* captures the scope of the relationship. If these sources of information improve the accuracy of the bank's information or reduce the monitoring costs, then the measure *main bank* should reduce the expected cost of such loans. But *main bank* also proxies for the exclusivity of the relationship and the resulting lack of information a borrower has about alternatives.[8] In that case, a *main bank* customer pays a higher loan rate.

[7] In less densely branched areas, proximity may play a more prominent role. For example, regressing distance to lender on distance to closest competitors yields a slope coefficient of 0.57*** and an intercept equaling 4.69***. (As in all tables, *, **, and *** indicate significance at a 10%, 5%, and 1% level, two-tailed.) These estimates suggest a crossover point of around 11 minutes, at which the distance to the lender on average becomes smaller than the distance to the quartile closest competitor. Less than 1% of all borrowers in our sample are located in such areas.

[8] Large Belgian firms maintain more than 10 bank relationships (Ongena and Smith (2000)). On the other hand, the average small Belgian firm surveyed by de Bodt, Lobez, and Statnik (2001) employs only 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.

The second relationship variable is the *duration of the relationship* in years with that particular bank at the time the loan rate is decided upon. A relationship starts when a firm buys a product from that bank for the first time. The average duration of the relationship in the sample is about 8 years. Duration proxies for the increased time for a firm to experience using 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. In that case, a long-term bank customer may end up paying a higher loan rate.

E. Competition

We also enlist in our main analysis the *number of competitors*, which is defined as the number of bank branches (minus the lender's) in the borrower's postal zone. In most of the spatial models discussed, the number of competitors corresponds inversely to the sum of the distance to the lender and the closest competitor. This is also the case in our sample, although the correlation coefficient seems small in absolute value, that is, only -0.023^{***} (actual closest) or -0.103^{***} (quartile closest).

An obvious candidate for explaining the small correlation coefficient is the spatial simplification embedded in the theoretical models discussed earlier in the paper. Geographical clustering of business and banking activities across a land surface may weaken any correspondence between distance and the number of bank branches. In addition, there are also the differences in the surface area covered by the different postal zones. Many postal zones are roughly equal in size, except for the postal zones in Brussels (which are small) or the postal zones in the provinces Luxembourg or West-Flanders (which are large). We include eight postal area dummies (that cover around 100 zones each), in addition to the base case to control for these differences in zone size. We also introduce postal zone and bank branch effects in robustness exercises.

F. Other Variables

The rest of the variables are less unique to our analysis (see Degryse and Van Cayseele (2000)), so we limit the discussion here. Consider the *loan contract characteristics*. The first is the dependent variable, the *interest rate* on the loan until the next revision. For fixed interest rate loans, this is the yield to maturity of the loan. For variable interest rate loans, this is the interest rate until the date at which the interest rate will be revised as stipulated in the contract. The average interest rate on a loan in our sample is 8.12% or 812 basis points (we employ basis points throughout the paper). The loan rate varies widely, not only nationally (the standard deviation is 236 basis points), but also at the branch level (the average standard deviation at the branch level is still 217 basis points). Loan fees are not included in our data set. Loan fees are rarely charged to single-person businesses and are set by the bank's national headquarters.

The median loan size is BEF 300,000 (USD 7,500), but varies between BEF 5,000 (USD 125) and BEF 80,000,000 (USD 2,000,000). We assume in our empirical analysis that loan rate and size are determined jointly. The variable *collateral* indicates whether or not the loan is collateralized. Approximately 26% of the loans are collateralized. We assume, as in Berger and Udell (1995) and in Elsas and Krahnen (1998), among others, that collateral and interest rate conditions are determined sequentially, with the collateral decision preceding the interest rate determination. However, we investigate alternative decision sequences with respect to loan size and collateral in various robustness checks.

Another loan contract characteristic is the *repayment duration of the loan*. For all loans to the firms, we know how soon the loans are repaid. This allows us to compute the exact repayment duration of a loan. We include the natural logarithm of (one plus) this variable in the regression analysis in order to proxy for the risk associated with the time until the loan is repaid. Four dummies capture the effect of the revisability of the loan, as some loan contracts allow resetting the loan rate at fixed dates, subject to contractual terms.

We also include dummies capturing the *loan purpose*. We have seven types of loans in our sample. While we cannot discern the relative importance of the types of loans, we include the seven loan purpose dummies in Table III for convenient reference. We further include a separate *rollover* dummy (also listed in the *loan purpose* category), which takes a value of 1 if the loan is given to prepay another loan, and is 0 otherwise.

The *firm characteristics* include proxies both for the size and legal form of the firm. A distinction can be made between single-person businesses (82.98% of the sample), small (15.99%), medium (0.89%), and large (0.14%) firms; and between sole proprietorships (82.22%), limited partnerships (11.97%), limited partnerships with equal sharing (1.18%), corporations (3.78%), and temporary arrangements (0.85%). In the regressions, we exclude the dummies for single-person businesses and sole proprietorships. We include 49 two-digit NACE code dummies to capture industry characteristics.

The *interest rate variables* are incorporated to control for the underlying cost of capital in the economy. The first is the interest rate on a Belgian government security with the same repayment duration as the loan granted to the firm. Second, we include a *term spread*, defined as the difference between the yield on a Belgian government bond with repayment duration of 5 years and the yield on a 3-month Treasury bill. Finally, we incorporate 2-year dummies for 1996 and 1997 (with 1995 as the base case) to control for business cycle effects.

III. Empirical Results

A. Control Variables

We analyze the determinants of the loan rate by regressing the loan interest rate on our distance, relationship, competition, and control variables, which include loan contract characteristics, loan purpose, firm characteristics, and interest rates. We use ordinary least squares estimation. We first analyze and discuss a specification containing only the relationship and control variables. Afterward, we add our competition and distance variables of interest, discuss and interpret the results, and perform supplementary robustness tests.

First, we regress the loan interest rate (in basis points) on the relationship characteristics and control variables. Most control coefficients remain virtually unaltered throughout the exercises in this paper. We therefore tabulate the estimated coefficients only once in Table IV. The loan contract characteristics include whether the loan is collateralized, its repayment duration, and the loan revisability options. When a loan is collateralized, the loan rate decreases by approximately 51 basis points. This result is in line with the sorting-by-private-information paradigm, which predicts that safer borrowers pledge more collateral (e.g., Besanko and Thakor (1987)). However, our finding that collateral is associated with safer borrowers is inconsistent with the empirical findings of Berger and Udell (1990) and Berger and Udell (1995), and with Elsas and Krahnen (1998) and Machauer and Weber (1998), who report a positive (though economically small) effect of collateralization on loan rates.

The coefficient of ln(1 + Repayment Duration of Loan) is significantly negative at the 1% level: An increase in duration from say, 5 to 6 years, reduces the loan rate by 14 basis points. However, Crabbe (1991) finds that an increase in duration from 5 to 6 years *increases* bond yield spreads by around 11 basis points. But the 72 corporate bonds in his sample have maturities longer than 7 years, while 88% of our 15,044 sample bank loans have maturities shorter than 7 years (Barclay and Smith (1995)).[9]

We also include four loan revisability dummies (but do not tabulate these coefficients to conserve space). However, we report the rejection (at the 1% significance level) of the hypothesis of the joint equality to zero of the coefficients of the four loan revisability dummies. The coefficient on the rollover dummy indicates that if a loan is given to prepay another loan, the loan rate increases by approximately 21 basis points. Term, bridge, and consumer credit loans carry a significantly lower loan rate (but we do not tabulate these coefficients to conserve space). However, again we report the rejection, at the 1% significance level, of the hypothesis of the joint equality to zero of the coefficients of the six loan purpose dummies.

Table IV also shows that small firms pay a higher interest rate, while medium and large firms pay a significantly lower interest rate than do single-person

[9] To replicate Crabbe's empirical model, we replace ln(1 + Repayment Duration of Loan) with a linear and quadratic term in repayment duration, and restrict the coefficient on the government security variable to be equal to 1. Sampling only loans with maturities longer than 7 years, we also find that an increase in duration *increases* bond yield spreads, although the effect is smaller (i.e., only three basis points going from 5 to 6 years). The estimated coefficients on the repayment duration variables for the full sample including all maturities suggest that repayment duration negatively affects spreads for loans with maturities shorter than 8 years. Alternatively, we replace ln(1 + Repayment Duration of Loan) by 20 repayment duration year dummies. The estimated coefficients from this exercise suggest local minima at 3 and 5 years. Hence, given the predominance of short loan maturities in the sample, we display the results from the a priori chosen and most parsimonious empirical model. We note, however, that the main results reported later remain virtually unaffected when any of these replacements and/or restrictions is imposed.

Table IV

Borrowing Costs, Firm, and Loan Characteristics

The table lists the coefficients from a regression with the *loan rate* until the next revision, in basis points, as the dependent variable. *Main bank* equals 1 if the bank considers itself as the main bank and 0 otherwise. *Duration of relationship* is the length of relationship with the current lender, in years. *Collateral* equals 1 if the loan is secured via collateral and 0 otherwise. *Repayment duration of loan* is in years. The *loan purpose* and *firm characteristics* variables are all dummies that equal 1 if the loan or firm has the featured characteristic and zero otherwise. *Government security* is the interest rate on a Belgian government security with equal repayment duration as loan to firm, in basis points. *Term spread* is the yield on a Belgian government bond of 5 years—yield on treasury bill with a maturity of 3 months, in basis points. The number of observations is 15,044. We employ ordinary least squares estimation.

Variable Categories	Independent Variables	
Relationship Variables	*Main Bank*	−40.7***
		(3.7)
	ln(1 + Duration of Relationship)	19.2***
		(2.3)
Loan Contract Characteristics	*Collateral*	−50.9***
		(8.3)
	ln(1 + Repayment Duration of Loan)	−92.5***
		(9.3)
	Included Dummies	*4 Loan Revisability****
Loan Purpose	Rollover	21.3***
		(7.3)
	Included Dummies	*6 Loan Purpose****
Firm Characteristics	Small Firm	44.0**
		(19.2)
	Medium Firm	−99.5***
		(26.2)
	Large Firm	−170.2***
		(51.4)
	Limited Partnership	−30.2
		(18.7)
	Limited Partnership w/ES	−46.3*
		(24.7)
	Corporation	−116.2***
		(21.1)
	Temporary arrangements	−35.1
		(24.2)
	Included Dummies	*8 Postal Area****
		*49 Industry****
Interest Rate Variables	Government Security	0.5***
		(0.1)
	Term Spread	0.4***
		(0.1)
	Included Dummies	*2 Years****
	Intercept	589.6***
		(122.9)
	Adjusted R^2	0.222

*, **, and *** indicate significance at the 10%, 5%, and 1% level, two-tailed.

businesses (the base case). This nonmonotonicity is due to differences in legal exposure. Almost all single-person businesses are sole proprietors, and owners thus face unlimited liability for their business debts. On the other hand, all small firms are partnerships, corporations, or temporary arrangements; their owners for the most part face only limited liability. Diversification and reputation effects (due to increased firm size) eventually overwhelm the impact of limited liability, however, and lower the loan rate for the average medium and large firms. Corporations and limited partnerships with equal sharing pay a significantly lower interest rate than do sole proprietorships, possibly reflecting both the effects of limited liability and increased firm size. While few individual coefficients on either the eight postal area or the 49 industry dummies are significant, both sets of coefficients are highly significant as a group.

Finally, a significant fraction of the variation in the loan rate is explained by economy-wide factors. The change in the loan rate due to a basis point change in the interest rate on a government security with the same repayment duration equals 0.5. This coefficient suggests sluggishness in loan rate adjustments, possibly due to the implicit interest rate insurance offered by banks (e.g., Berlin and Mester (1998)), credit rationing (e.g., Fried and Howitt (1980), Berger and Udell (1992)), or the downward drift in Belgian interest rates during our sample period. This decrease in interest rates is actually reflected in our sample loan rates, as the (nontabulated) coefficients on the 2-year dummies indicate that the average 1995 (1996) loan rate is a significant 127 (18) basis points above the average 1997 loan rate, ceteris paribus. A basis point parallel shift of the term spread implies a positive 0.4 basis point shift in the loan rate. The size of the coefficient on the government security variable found by Petersen and Rajan (1994) is around 0.3^{***}, whereas the coefficient for the term spread is negative and insignificant.[10]

B. Relationship Characteristics

The impact of the bank–firm relationship is captured in two complementary ways. Our first indicator of relationship strength, *main bank*, measures the *scope* of the bank–firm relationship. The loan rate decreases with the scope of the relationship. The results show that a firm pays 41 basis points fewer when the scope of a relationship is sufficiently broad (*main bank* = 1).

The second indicator is the duration of the relationship between the lending bank and the borrower. We take the log of (one plus) the duration of the relationship, as we expect the marginal impact on the loan rate to decrease with

[10] We restrict the coefficient on the government security variable to be equal to 1 to estimate the impact of the independent variables on the spread rather than on the loan rate. The main results are unaffected. We further replace both interest rate variables (and the 2-year dummies) by weekly time effects. While the time effects are significant as a group, the coefficients (in all main models we report) are otherwise virtually unaffected. We focus on specifications incorporating the interest rates, as this type of specification is widely used in the literature.

the duration of the financial relationship. Table IV shows that the loan rate increases with the duration of the relationship (see also Degryse and Van Cayseele (2000)). For example, an increase in duration from the median (7.5 years) to the median + standard deviation (13 years) increases the loan rate by 10 basis points.

C. Competition

Table V incorporates our measures of banking competition. In Model I, the coefficient on ln(1 + Number of Competitors) is not significantly different from zero. Hence, when competition is measured by the number of bank branches present in the same postal zone as the borrower, neither the effects of induced competition nor adverse selection effects seem to dominate. We add the number of bank branches of competitors in adjacent postal zones to this variable. The coefficient on the adjusted variable is not significant either, and we do not report the results.

In Model II, we replace the number of competitors by a more commonly used measure of competition, the Herfindahl—Hirschman Index (HHI). We resort to using the number of bank branches of each bank in the postal zone to construct market shares. In effect, we assume that coordination occurs between branches of the same bank, while our previous measure of competition assumed branch independence. The resulting coefficient on the HHI equals a significant, but small, 35.3^{**}. This estimate implies that an increase of 0.1 in the HHI, say from a competitive (HHI < 0.1) to a highly concentrated (HHI > 0.18) market, would increase the loan rate by only 3.5 basis points. The coefficient on HHI in our regression model corresponds to the (mostly) positive coefficients reported in the literature (see Degryse and Ongena (2003)).

Next, we introduce postal zone effects to better control for the geographical variation in competition and firm characteristics. A Lagrange multiplier test indicates that the effects are significant. Using a Hausman (1978) test, we cannot reject orthogonality. In addition, our sample has been drawn from a large population. Hence, we report the coefficients for the random effects model in Model III (the results for the fixed effects model are very similar). The coefficients on all variables of interest are virtually unaffected.

We replace the postal zone effects by bank branch effects to capture branch-specific variation in competition (e.g., Barros (1999), Calem and Nakamura (1998)) and/or spatial variation. Again, random effects seem preferable and the estimated coefficients of the other variables remain similar. We choose not to report the results. Finally, in Model IV we introduce the *average real estate price* in each postal zone in 1995. The cost of bricks and mortar may affect the pricing of loans (the prices range from 0.35 to 7.84 million BEF). However, Model IV shows—surprisingly—that the average real estate price does not seem to have an effect on the loan rate, neither statistically nor economically. Adding the *change in average real estate price* in the preceding and/or following 5 years does not alter this result.

Table V

Borrowing Costs and the Role of Distance

The table lists the coefficients from regressions with the *loan rate* until the next revision, in basis points, as the dependent variable. *Distance to lender* is the shortest traveling time, in minutes. *Distance to closest competitors* is the shortest traveling time to the closest quartile competitor in the borrower's postal zone, in minutes. *Main bank* equals 1 if the bank considers itself as the main bank and zero otherwise. *Duration of relationship* is the length of relationship with the current lender, in years. *Number of competitors* is the number of branches (minus the lender's) in the borrower's postal zone. *Herfindahl–Hirschman Index* is the summed squares of bank market shares, by number of branches, in each postal zone. *Average real estate price* is recorded per postal zone in 1995, in millions of BEF. *Urban* equals 1 if the firm is located in an area with more than 250,000 inhabitants and zero otherwise. The number of observations is 15,044. We employ ordinary least squares estimation.

	Models						
Independent Variables	I	II	III	IV	V	VI	VII
Distance							
ln(1 + Distance to Lender)	−4.3*	−5.4**	−10.3***	−5.4**	−8.3***	−14.2***	−12.8**
	(2.5)	(2.5)	(2.7)	(2.5)	(2.2)	(5.5)	(5.5)
ln(1 + Distance to Closest Competitors)	16.1***	16.6***	18.5***	16.7***	8.3***	14.2***	12.8**
	(3.8)	(3.6)	(4.0)	(3.6)	(2.2)	(5.5)	(5.5)
Relationship Variables							
Main bank	−40.9***	−41.1***	−53.0***	−41.1***	−41.0***	−44.4***	−44.9***
	(3.7)	(12.7)	(3.8)	(3.7)	(3.7)	(3.9)	(3.9)
ln(1 + Duration of Relationship)	18.8***	18.8***	23.9***	18.9***	18.6***	18.4***	18.7***
	(2.3)	(2.3)	(2.4)	(2.3)	(2.3)	(2.5)	(2.5)
Main bank × ln(1 + Distance to Lender)						11.1**	11.1**
						(4.6)	(4.6)
Main bank × ln(1 + Distance to Closest Competitors)						−11.1**	−11.1**
						(4.6)	(4.6)
ln(1 + Duration of Relationship) × ln(1 + Distance to Lender)						−0.1	−0.0
						(2.7)	(2.7)
ln(1 + Duration of Relationship) × ln(1 + Distance to Closest Competitors)						0.1	0.0
						(2.7)	(2.7)

Competition							
ln(1 + Number of Competitors)	−0.4						
	(2.6)						
Herfindahl—Hirschman Index		35.3**		34.4**	37.6**	36.5**	45.3***
		(15.2)		(15.3)	(15.2)	(15.2)	(15.3)
Postal zone random effects			Yes[b]				
Firm location							
Average real estate price[a]				−1.1			
				(2.2)			
Urban							14.6
							(24.8)
Urban × ln(1 + Distance to Lender)							−10.5
							(7.3)
Urban × ln(1 + Distance to Closest Competitors)							23.8
							(15.0)
Loan contract characteristics (including four loan revisability dummies), Loan purpose firm characteristics (including 8 postal area and 49 industry dummies), Interest rate variables (including 2-year dummies), and intercept	Yes	Yes	Yes[c]	Yes	Yes	Yes	Yes
Equality restriction(s), *F*-statistic					8.645	3.597	3.231
Adjusted R^2	0.227	0.223	0.143[d]	0.223	0.222	0.222	0.224

*, **, and *** indicate significance at the 10%, 5%, and 1% level, two-tailed.
[a]In millions of BEF.
[b]Lagrange multiplier test of effects versus no effects = 390.1***, and Hausman (1978) test of fixed versus random effects = 35.0.
[c]Excluding postal area and industry dummies.
[d]Corresponding fixed effects model statistic.

D. Distance

We now turn to the coefficients on the distance variables. We take for each of our distance measures the log of (one plus) the distance, as we conjecture the marginal impact on the loan rate to decrease with distance. We will use a robustness exercise to investigate the impact of this choice of functional form. The negative and significant coefficients on ln(1 + Distance to Lender) in Models I–IV suggest that borrowers located farther away from the lender pay a lower loan rate at the lending bank. These results are consistent with spatial price discrimination. In addition, the lender's market power increases with the distance between the borrower and the closest competitors, as indicated by the positive and significant coefficient on the variable ln(1 + Distance to Closest Competitors). Our proxy for the distance between the borrower and the closest competitor may identify strategic behavior between banks that our other competition variables did not (or only partly) pick up. These results thus reject uniform pricing and monitoring cost theories without discriminatory pricing.

The price discrimination models based on linear transportation costs and/or monitoring costs discussed in Section I further provide precise theoretical predictions concerning the sum of the coefficients on both distance measures (this prediction is not present in the asymmetric information models we discussed). In particular, a marginal shift in the location of the borrower implies that the sum of the coefficients on both distance measures should equal zero. We therefore restrict the sum of the coefficients on both distance measures to equal zero in Model II (these coefficients are mostly easily interpretable). We report the results in Model V. The F-statistic equals 8.6; hence, we cannot reject the equality restriction.

Both distance effects are not only statistically but also economically relevant. An increase of one standard deviation in the distance between borrower and lender (i.e., the traveling time increasing from 0 to 7.3 minutes), decreases the loan rate by 18 basis points in Model V. An increase of one standard deviation in the distance between borrower and the closest competitors (from 0 to 2.3 minutes) increases the loan rate by about 10 basis points.

For the median loan of BEF 300,000 (USD 7,500), annual outlays for the borrower decrease by BEF 72 (USD 1.8) per extra minute of traveling time to the lender (averaged over the 0–1 standard deviation interval). Belgian entrepreneurs and (bank) managers made around BEF 20 per minute in 1995, while the operating costs for a car (gas, maintenance, and tires) may have amounted to around BEF 3 per minute of driving. According to a linear transportation cost model, thus, the median borrower is expected to make one-and-a-half additional round trips to his bank branch as a direct result of the new loan. Alternatively, according to a linear monitoring cost model, loan officers are expected to make three round trip visits to their median borrowers. Hence, we find our spatial discrimination estimates economically interesting on the margin, but also reasonable.

On the basis of the estimates, we can also assess the magnitude of possible bank rents. Borrowers located very close to the lender will be charged 14 basis points more, on average, than borrowers located right between the lender and the quartile closest competitor (Model V estimates). Hence, location rents extracted from the closest borrowers are around 4% (and can be as high as 9%) of the bank's marginal cost of funding (we take it to be the interest rate on a Belgian government security with equal repayment duration). Location rents extracted from the average borrower amount to around 0.5% of this marginal cost.

To put these location rents in perspective, note that the loan rate increases by 62 basis points over 26 years (the period that the longest observed relationship lasts). This maximum increase implies annualized information rents of less than 7% of the marginal cost of funding. Information rents extracted from the average borrower amount to 1.5% of the marginal cost.

E. Transportation Costs or Asymmetric Information?

As argued in Section I, distance may also affect the quantity and quality of information that banks and borrowers have about each other. To disentangle whether the effects of distance on the loan rate hinge on transportation costs or on informational asymmetries, we start by interacting our two distance measures with the bank–firm relationship variables in Model VI. The results are very interesting. The distance coefficients now capture the impact of distance for transactional borrowers (*main bank* = 0 and *duration of relationship* = 0). The restricted coefficients from this regression (which equal $\pm 14.2^{***}$) suggest that (according to a linear transportation model) a transactional borrower in our sample expects to visit his branch two-and-a-half times per year as a result of a new BEF 300,000 (USD 7,500) loan—one time more than the median borrower in Model V. Again, we would argue that the number of imputed visits is quite reasonable.

Main bank—relationship customers, on the other hand, seem shielded from discriminatory loan pricing. Indeed, we cannot reject the joint equality to zero of the sum of the coefficients on the distance measures and the respective interaction terms with the *main bank* variable ($F = 0.156$). The lender probably knows its main bank borrowers better than it knows its other borrowers. At the same time, the main bank borrowers themselves may be less informed about alternative banks, their products, and prices.

How then to interpret our results? The uninformed lender in Hauswald and Marquez (2003) charges a higher loan rate to remote borrowers in order to compensate for the adverse selection problem, which intensifies in the vicinity of an informed lender. The informed lender accordingly extracts a higher loan rate from less distant borrowers. However, our results so far show a loan rate charged to relationship borrowers that is essentially unaffected by the lender–borrower distance, and a loan rate to transactional borrowers that actually decreases with the lender–borrower distance (this result is independent of the equality restriction, which cannot be rejected in the first place).

It is possible that no bank in the vicinity of a firm is informed. In other words, the loans we classify as transactional are of this type in general. The lending bank is uninformed about the borrower, but can infer that no alternative lender in the vicinity of the borrower is informed, either. In that case, there is obviously no adverse selection issue. However, this interpretation seems at odds with our finding that the transactional borrowers are on average more than 5 years older than the main bank borrowers (we collect *age* for 2,655 borrowing firms). The age differential suggests that transactional borrowers may be switching banks, which makes it less likely that other lenders are uninformed. In addition, the positive coefficient of the duration of the relationship variable suggests that lenders do become more informed about their borrowers. Admittedly, the other banks may have lent on the basis of distance or may not have lent at all. And even if these other banks were relationship lenders, the information they had collected over time may have become stale. While in all these cases, the banks in the vicinity of the transactional borrower are not that well-informed either, we suspect that they are at least on average more informed than the current lender. It is just that the magnitude of the adverse selection problem in our data set does not increase discernibly with physical distance.

What about the differential information that borrowers (but not lenders) have as a driver of our results? Since nonmain bank borrowers in our sample possibly patronized other banks before turning to the currently observed lender, they may have been initially less informed about the lending conditions that the observed lender was willing to provide. The more distant, the less informed they might have been. It is possible that these transactional firms become more informed and interested in a particular term loan or line of credit by learning about the advertisements of lower loan rates by the observed lender (Bester and Petrakis (1995)). The offered rate could then reasonably be expected to decrease with distance, commensurate with the informational asymmetry. However, a critical problem with this interpretation is that nonmain bank customers actually pay a higher loan rate in our sample. The latter result is not at all compatible with the nonmain bank borrowers becoming more informed in a location-*cum*-information model. Indeed, more informed borrowers are expected to be more price-sensitive, not less. Alternatively, the negative sign on the *main bank* variable could be a reflection of cross-subsidization.

To conclude, we think a more mundane but possibly more coherent explanation for our findings is that the borrowers are exposed to price discrimination based on transportation costs. However, the effects are somewhat obfuscated for main bank borrowers, simply because of the possibilities for cross-subsidization between banking products. We now critically investigate the transportation cost story further.

F. Firm Location, Loan Characteristics, and Distance

Both MapBlast.com and Mappoint account for road categorization when calculating traveling times. Traffic congestion, however, is not taken into account. We introduce a dummy variable *urban* and interaction terms for our two distance measures. *Urban* equals 1 when the borrower is located in an area with more than 250,000 inhabitants, and is 0 otherwise. The coefficients on the interaction terms in Model VII indicate that urban borrowers experience discrimination twice as harshly, possibly suggesting that traffic congestion increases traveling times in urban areas (the other coefficients are broadly unaffected). In addition, rural borrowers pay on average 35 basis points less than urban dwellers.[11]

Next, we split the sample by relative distance, that is, by whether or not the borrower is closer to the lender or closer to the quartile closest competitor. The characteristics of the firms borrowing from closer or more distant lenders do not differ substantially (see Degryse and Ongena (2003)). These findings cast further doubt on a lender information interpretation of the distance coefficients, as we argue in the next section. Even more striking is the observation that distant borrowers obtain larger- or longer-term loans at a lower rate on a collateralized or transactional basis. These observed differences in loan characteristics are, we contend, fully reflective of the fixed-cost nature of transportation costs, on the basis of which the lender price discriminates.

Start with *loan size*, loan size is actually exogenous in most location models. By introducing *loan size*, we assume a sequential decision process (first loan size followed by the loan rate). We focus on the equivalent of a stripped-down version of earlier models in the first column of Table VI, as its parsimony is needed in subsequent exercises. The coefficient on *loan size* equals -22.6^{**}. The coefficient indicates that an increase in loan size from the median (BEF 0.30 million, USD 7,500) to the mean (BEF 0.88 million, USD 22,000) amount decreases the interest rate by 13 basis points. The distance coefficients remain virtually unaltered, and again, we cannot reject the equality restriction involving these coefficients.

Next, we recognize the interdependence between loan size, rate, and distance. Loan size and rate may be determined jointly. In addition, the impact of distance on the loan rate may decrease with loan size, due to the fixed-cost character of the incurred transportation costs. We opt for stratifying by loan size, with cutoffs at BEF 0.2 and 2 million (USD 5,000 and 50,000), and report the results

[11] The latter result raises the troubling possibility that farms (located in rural areas) and manufacturing companies (located on the outskirts of towns) pay a lower loan rate than service-type companies (located downtown close to bank branches)—not because of location, but because of, say, the tangibility of their assets. The firm variables employed so far, including the 49 industry dummies, may not fully absorb such differences in firm characteristics across location, resulting in a spuriously estimated effect of distance on the loan rates. We therefore also split the sample by sector. We identify 247 agricultural, fishing, and mining (AFM) firms, 900 manufacturing firms, and 13,897 service firms. The average AFM firm in the sample is indeed located around 10% farther from the lending branch and closest competitor than the average manufacturing firm (for details, see Degryse and Ongena (2003)). On the other hand, manufacturing and service firms do not differ statistically in their location vis-à-vis the lending or the closest competitor's bank branch. We also rerun the main regressions split along sector. The distance coefficients for the three sectors are surprisingly similar in magnitude, although fewer observations in the AFM and manufacturing sectors prevent most coefficients from being statistically significant. Hence, differences in firm characteristics (such as asset tangibility) that may be correlated with location seemingly do not drive our results. We use augmented samples later in the paper to control even better for firm heterogeneity.

Table VI

Loan Size, Duration, and Collateral

The table lists the coefficients from regressions with the *loan rate* until the next revision, in basis points, as the dependent variable. *Distance to lender* is the shortest traveling time, in minutes. *Distance to closest competitors* is the shortest traveling time to the closest quartile competitor in the borrower's postal zone, in minutes. *Main bank* equals one if the bank considers itself as the main bank and zero otherwise. *Duration of relationship* is the length of relationship with the current lender, in years. *Herfindahl–Hirschman Index* is the summed squares of bank market shares, by number of branches, in each postal zone. *Loan size* is in millions of BEF. We employ ordinary least squares estimation.

		By Loan Size (LS), in millions of BEF			By Duration of Loan (DL), in years		Collateral	
Independent Variables	Incl. Loan Size	LS ≤ 0.2	0.2 < LS ≤ 2	2 < LS	DL < 0.55	0.55 ≤ DL	No	Yes
ln(1 + Distance to Lender)	−13.6***	−15.0***	−4.0*	−0.7	−21.0***	−6.3**	−12.9***	−2.3
	(2.4)	(4.1)	(2.1)	(2.3)	(4.1)	(2.8)	(2.9)	(2.0)
ln(1 + Distance to Closest Competitors)	13.6***	15.0***	4.0*	0.7	21.0***	6.3**	12.9***	2.3
	(2.4)	(4.1)	(2.1)	(2.3)	(4.1)	(2.8)	(2.9)	(2.0)
Main bank	−43.0***	−32.9***	8.3**	−6.6*	−53.1***	−35.3***	−45.6***	−7.6**
	(3.9)	(6.4)	(3.5)	(4.0)	(6.5)	(4.5)	(4.7)	(3.2)
ln(1 + Duration of Relationship)	29.3***	26.0***	14.4***	10.7***	36.9***	24.7***	29.9***	1.8
	(2.4)	(4.4)	(2.0)	(2.1)	(4.3)	(2.6)	(3.0)	(1.7)
Herfindahl–Hirschman Index	10.3	32.0	14.0	38.3***	19.3	1.6	−11.0	37.0***
	(16.0)	(29.8)	(13.6)	(14.3)	(27.8)	(17.9)	(19.5)	(12.9)
Loan size	−22.6***				−56.6***	−11.4***	−140.6***	−4.7***
	(1.1)				(2.6)	(1.1)	(3.5)	(0.5)
Interest rate variables (including 2-year dummies) and intercept	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	15,044	5,850	7,344	1,850	6,698	8,346	11,073	3,971
Equality restriction, F	0.115	3.268	4.616	1.717	0.491	0.411	0.091	1.733
Adjusted R^2	0.084	0.011	0.136	0.665	0.089	0.085	0.175	0.447

*, **, and *** indicate significance at the 10%, 5%, and 1% level, two-tailed.

in Table VI. The noticeable increase in adjusted R^2 across size categories may reflect the greater role played by observable, hard information in the pricing of larger loans. The distance coefficients decrease by loan size, but remain significant for the two categories containing the smallest- and medium-sized loans. We can also not reject the equality restriction of the distance coefficients in either of the size categories. In addition, although the coefficients decrease, the outlays per minute of extra travel time are strikingly similar. For the median loan sizes in each group (i.e., BEF 109,000, BEF 500,001, and BEF 3,105,000), a minute of extra travel time costs BEF 47, 58, and 63, respectively. We find this equality in imputed traveling costs very suggestive of price discrimination on the basis of transportation costs. Though currently not theoretically modeled, the deterioration of information quality across distance would, we conjecture, give rise to loan rate schedules in distance that are independent of loan size. Obviously, that is not what we find.

We also split the sample at the median *repayment duration of the loan* (0.55 years) and tabulate the results in Table VI. The distance coefficients for the group of loans with a duration shorter than 0.55 equal $\pm 21.0^{***}$; the coefficients for the longer-term loans equal $\pm 6.3^{**}$. As the median duration in the short-term group is 0.4 and in the long-term group is 2.4 years, the size of the coefficients again implies a strikingly similar fixed transportation cost per loan of equal duration.

Next, we drop the *collateral* dummy and then study separately the sets of contracts with and without collateral. Dropping *collateral* hardly affects our main results, and we choose not to tabulate the results. The sample split results are in the last two columns of Table VI. Distance continues to play a large role in the pricing of the 11,073 contracts without collateral. The distance coefficients equal $\pm 12.9^{***}$, respectively. On the other hand, the distance coefficients for the 3,971 collateralized contracts drop to ± 2.3, with a standard deviation of 2.0 no longer significant at conventional levels. However, we also cannot reject the equality restriction of the two distance coefficients. Though borrowers with or without collateral are equally likely to be main bank customers, posting collateral softens spatial price discrimination. However, posting collateral also substantially weakens the impact of the *duration of the relationship*, *loan size*, and *main bank* on the loan rate. This finding suggests that collateralization blurs the informativeness of the loan rate in general.

In the first two columns in Table VII we further distinguish by *loan type* between lines of credit and term loans. Berger and Udell (1995) and Harhoff and Körting (1998), for example, argue that lines of credit tend to be relationship-driven and based on the overall creditworthiness of the firm. However, more than 90% of the 3,678 loans in our sample that embed a revolving option are actually collateralized, and none involve the upfront or backend fees and compensating balances often observed in the United States (Saunders and Cornett (2002, p. 329)). In addition, revolving loans are on average more than seven times larger than nonrevolving loans. Nevertheless, the results again confirm that spatial price discrimination mainly affects the "transactional" loans. Unreported sample split exercises suggest that also uncollateralized or

Table VII

Loan Type/Purpose, Firm Type, and Relative Distance

The table lists the coefficients from regressions with the *loan rate* until the next revision, in basis points, as the dependent variable. *Distance to lender* is the shortest traveling time, in minutes. *Distance to closest competitors* is the shortest traveling time to the closest quartile competitor in the borrower's postal zone, in minutes. *Main bank* equals one if the bank considers itself as the main bank and zero otherwise. *Duration of relationship* is the length of relationship with the current lender, in years. *Herfindahl–Hirschman Index* is the summed squares of bank market shares, by number of branches, in each postal zone. *Loan size* is in millions of BEF. We employ ordinary least squares estimation.

	Loan Type		Loan Purpose		Firm Type		Relative Distance	
Independent Variables	Lines of Credit	Term	Capital Expenditures	Noncapital Expenditures	SPB & SP [a]	Other	Lender = Closest	Lender ≠ Closest
ln(1 + Distance to Lender)	3.7	−10.5***	−0.2	−16.0***	−11.2***	−19.1***	−14.7**	−12.3***
	(2.5)	(2.7)	(1.7)	(2.9)	(2.6)	(5.8)	(7.2)	(3.9)
ln(1 + Distance to Closest Competitors)	−3.7	10.5***	0.2	16.0***	11.2***	19.1***	14.7**	12.3***
	(2.5)	(2.7)	(1.7)	(2.9)	(2.6)	(5.8)	(7.2)	(3.9)
Main bank	3.1	−34.3***	−5.0*	−50.4***	−51.3***	25.9**	−53.3***	−34.9***
	(4.0)	(4.4)	(2.9)	(4.7)	(4.2)	(10.2)	(5.9)	(5.2)
ln(1 + Duration of Relationship)	9.3***	23.1***	3.6**	33.4***	25.1***	24.4***	25.5***	31.6***
	(3.5)	(2.8)	(1.5)	(3.0)	(2.6)	(6.5)	(3.7)	(3.1)
Herfindahl–Hirschman Index	22.6	−13.8	30.1**	−5.9	10.0	−10.0	−5.2	11.2
	(16.5)	(18.0)	(11.8)	(19.4)	(17.4)	(38.2)	(42.3)	(17.4)
Loan size	−5.8***	−224.5***	−3.8***	−73.3***	−36.6***	−11.0***	−33.9***	−18.6***
	(0.6)	(4.1)	(0.4)	(2.5)	(1.8)	(1.5)	(2.2)	(1.3)
Interest rate variables (including 2-year dummies) and intercept	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	3,678	11,366	3,490	11,554	12,360	2,684	6,341	8,703
Equality restriction, F	0.173	1.798	3.453	1.861	0.411	0.999	0.004	0.039
Adjusted R^2	0.357	0.248	0.563	0.120	0.093	0.100	0.100	0.075

*, **, and *** indicate significance at the 10%, 5%, and 1% level, two-tailed.

[a] Single-person businesses operating as sole proprietorships.

small- and medium-sized (<2 million BEF) lines of credit are not affected by spatial price discrimination.

Finally, we break up the sample by *loan purpose* and obtain 3,490 capital expenditure and 11,554 noncapital expenditure loans (mortgage, term, and securitizable term loans are classified as capital expenditure loans). All capital expenditure loans are revolving loans, and most are collateralized. Capital expenditure loans are on average more than seven times larger than the other loans. Not surprisingly, the coefficients (listed in the next two columns in Table VII) are very similar to the lines of credit coefficients just reported. Spatial price discrimination seemingly affects only the "noncapital expenditure loans" category. However, unreported exercises show that the transactional loans (*main bank* = 0 and *duration of relationship* = 0) among the 1,773 small- and medium-sized (<2 million BEF) capital expenditure loans are subject to statistically significant and economically relevant spatial price discrimination: The coefficients on the distance variables equal $\pm 9.3^*$. This is not the case for the transactional uncollateralized capital expenditure loans. If anything, the coefficients on the distance variables for the 187 uncollateralized capital expenditure loans are actually the opposite of the full sample results.

G. Firm Characteristics and Distance

We remain concerned that firm characteristics may drive both loan rate and distance, and thus spuriously affect our results. The bank may ration credit to more distant borrowers unless they are assessed to be of impeccable quality. Problematic for the econometrician is that the bank may determine the quality of the firm by combining both observable and (for us) unobservable firm characteristics. The lower loan rate for the more distant borrowers in the specifications we report so far would then simply be the result of an omitted variable problem.

We address this critical issue first by altering the degree of firm heterogeneity in the sample, and second by investigating an augmented sample for which we obtain more firm characteristics. We start by restricting the sample to single-person businesses that are also sole proprietorships. We are left with 12,360 observations, and report the results in Table VII. The coefficients on all measures of interest (except *main bank*) remain largely unaltered.

Next, we drop 1,744 contracts located in 149 postal zones bordering other countries. Firms located in one of these postal zones may differ from interior firms in terms of specialization, customer base, and labor force. These firms also face additional constraints in finding another Belgian bank, or alternatively have the opportunity to employ a foreign bank located in an area adjacent to their postal zone (given the size of the firms in our sample and the exchange rate exposure involved, however, we consider the latter scenario to be rather unlikely). Dropping these contracts does not affect our results, and we choose not to report the almost identical coefficients.

Finally, the last two columns in Table VII split the sample by relative distance (i.e., by whether the lender or the quartile competitor is closest to the borrower).

We thus check for possible structural differences in the determination of the loan rate across the two groups of borrowers. All coefficients, except the coefficient on loan size, are remarkably similar across the two groups. Hence, at first sight the firms in both groups do not differ dramatically in (for us) unobservable characteristics.

To further investigate the issue of missing firm characteristics, we match loan contracts to BelFirst, a data set containing yearly balance and profit/loss statements of more than 250,000 Belgian corporations. Conservatively matching by tax identification numbers, we track 1,008 firms. Quite a few sole proprietorships are not listed in BelFirst. Nevertheless, the means of most loan and firm characteristics of the augmented sample (see Degryse and Ongena (2003)) are surprisingly similar to the means for the entire data set. Most importantly, the means of both distance measures and the loan rate are not significantly different between the full and the newly constructed augmented samples. The differences in the other variables constitute an additional robustness check on the empirical work we have reported so far.

We study accounting data from the year preceding the origination date of the loan contract. To evaluate firm risk and funding needs, we compare means of firm assets and the ratios of earnings, short-term debt, net trade credit, and intangible assets over assets between the two relative distance groups. More distant firms are somewhat larger, more intangible, and obtain larger- or longer-term loans than closer firms. Otherwise, more distant and closer firms are seemingly similar in profitability and debt structure. Loan size/assets does not significantly differ across groups. If anything, more distant firms seem less credit-constrained once they obtain a loan. We also track 936 firms through time, and use the earnings in 2 years/assets in 2 years (after the loan origination year) and assets in 2 years/assets as admittedly ad hoc measures of expected future profitability and growth. Distant firms outperform close firms on average, both in earnings and asset growth, but the differences are not significant and the measures are fraught with survivorship biases (we cannot establish for sure why BelFirst ceased reporting the records of some firms).

Next, we introduce age of the firm, which we collected separately, and the newly constructed accounting measures in a set of basic specifications. Despite the endogeneity issue, we also add earnings in 2 years/assets in 2 years and assets in 2 years/assets (details are in Degryse and Ongena (2003)). We find that smaller and more indebted firms and firms taking out smaller loans (either absolute or relative to its assets size) end up paying higher loan rates. The distance coefficients increase in absolute value to more than 20. But these coefficients are estimated less precisely and remain significant only at the 5% level in all but one model (the standard deviations on the coefficients increase to more than 10). Again, we cannot reject the equality restriction on our distance measures at the 1% level of significance.

To conclude, more distant firms are somewhat larger and take out loans that are significantly larger in absolute size, though not in relative size. Otherwise, distant and close firms do not differ significantly. Controlling for the additional firm characteristics does not affect the distance—loan rate correspondence. We contend that these empirical results are fully in line with price discrimination on the basis of transportation costs. Remember that our estimates of the distance coefficients by loan size imply almost the same imputed traveling cost per minute. These estimates and the results in this section indicate that borrowers because of the fixed-cost nature of traveling, consider driving to more distant lenders when seeking larger loans. On average, somewhat larger firms seek and obtain these larger amounts of funding.

H. Further Robustness Checks

Before concluding, we subject the main results reported in Table V to a battery of additional robustness checks. First, we revisit our a priori choices regarding our distance measures. We rerun all models employing traveling times in levels (rather than logs), we replace the ln(1 + Distance to Closest Competitors) (i.e., the 25 percentile measure) by the (possibly more noisy) ln(1 + Distance to the actual Closest Competitor), and we employ fastest driving distance in kilometers (rather than traveling time) in all specifications. Results are mostly unaffected.

We remain concerned that technological developments and/or the location of competitors determine the choice of lender, partly driving our results rather than spatial price discrimination. We add the starting year of the relationship (assuming technology progresses linearly through time) and the (national) number of branches to all models. The results for the distance coefficients of interest in all discussed models remain virtually unaltered. We also split the sample by contracting year on January 1, 1996,[12] and run parsimonious models including distance measures, relationship variables, and the concentration index using alternatively the 393 contracts signed in 1995 and the remaining 14,651 later contracts. Though estimated imprecisely in the first subsample, the coefficients on our distance measures actually increase in absolute value from $\pm 18.3^{*}$ in 1995 to $\pm 26.1^{***}$ in 1996–1997. Combining these results with our earlier discussion leads us to conclude that technological developments may not be a major issue when interpreting our results.

Finally, we return to the 612 contracts located in postal zones without any identified bank branches. We add these contracts to the sample, bringing the number of observations to 15,656. We calculate the distance to the lender for each of these additional contracts, but we set their distance to the closest competitors equal to zero. We add a dummy (which equals 1 for each of the 612 contracts, and zero otherwise) to account for the undetermined effect of distance, and rerun all models. The coefficient on the dummy in the postal zone

[12] We find justification for this date in the observation that the Belgian monopoly telecom Belgacom (partly privatized only 17 days earlier) drastically reorganized itself to better focus on its customers. While the costs of telephone calls did not drop substantially at once, this remarkable corporate refocusing may have raised expectations of lower communications costs in the near future.

effects model, for example, equals 39.5*** (with a standard deviation of 13.9). Hence, borrowers located in a postal zone without any competing bank pay on average 40 basis points more than borrowers located in contested postal zones. This coefficient is quite reasonable when interpreted within the confines of a linear transportation model. The average postal zone covers a square of 5 km $\times$ 5 km. For example, driving 5 km to get to the closest competitor (now located outside the postal zone) at 31 km/h (the average speed) would result in 10-minute traveling time. According to the estimates gleaned from the original effects model, a 10-minute distance increases the loan rate by 44 basis points.

IV. Conclusion

We study the effect on loan conditions of the geographical distance between firms and both the lending bank and all other banks in the vicinity of the firm. As far as we are aware, we report the first comprehensive evidence for spatial price discrimination in bank lending. Loan rates decrease with the distance between the firm and the lender and increase similarly with the distance between the firm and competing banks. Both effects are statistically significant and economically relevant. The results are robust to various changes in model specifications and variable definitions, and do not seem to be induced by the modest changes in lending technology we infer. The observed stability of the Belgian bank branch system during our sample period allows us to interpret the coefficients of the simple reduced-form specifications within the framework of static models explaining spatial price discrimination.

According to the theoretical predictions, loan rates may reflect both transportation costs and informational effects. We find that loan rates decrease more with lender–firm distance for transactional (single-product), short-term, uncollateralized, term (not line of credit), and noncapital expenditure loans. Spatial price discrimination relaxes as borrowers engage the lending bank more broadly, for a longer time period, postcollateral, obtain a line of credit, or use the loan for capital expenditure purposes.

Transportation costs provide a simple yet coherent explanation for the loan rate schedules we observe. Informational issues faced by the lender, on the other hand, do not play a prominent role in the pricing of loans according to the borrower's location. While we find no direct evidence that adverse selection increases with geographical distance, it is possible either that most borrowers we classify as transactional are unknown to all banks in the vicinity or that distances involved are just too small for informational asymmetries to become meaningful.

Loan officers seemingly price loans by location, although distance variables are not featured explicitly in the credit-scoring system described to us in interviews. However, the revealed autonomy granted to local loan officers in assessing and pricing local loan applications may be optimal (Stein (2002)). The acknowledged importance of qualitative soft factors in the decision process provides the loan officers with the necessary discretion. Such discretion is not unusual. Brunner, Krahnen, and Weber (2000), for example, provide preliminary empirical evidence (for Germany) of the importance of qualitative factors in setting loan rates through internal bank ratings. The loan officers employed at the bank we study may wield *soft* factors to practice a *hard*-edged discriminatory pricing policy based on location and the presence of alternative providers of financing in the vicinity of the firm.

While adverse selection does not increase with geographical distance, we confirm the previous evidence based on the current data set that loan rates increase with the duration of the bank–firm relationship. Hence, both branch location and information acquisition during a relationship may yield bank rents. Spatial price discrimination applied to borrowers located near the lending bank branch results in average location rents of around 4% of the bank's marginal cost of funding. Loan rate increases during the average bank–firm relationship point to annual information rents of somewhat less than 2% of the marginal cost.

To conclude, brick-and-mortar branching may remain vital in ensuring access to credit at reasonable rates, particularly for small firms and entrepreneurs. Belgium was clearly overbranched in the late 1990s. Hence, the opportunities for spatial price discrimination were rather limited. Nevertheless, distance still seemed to have played a visible role in the setting of loan rates. While technological developments in communication and travel may ultimately diminish the relevance of distance, we find only minor traces of such developments in our sample (which covers the 1975–1997 period). Consequently, presaging "the death of distance" remains somewhat premature in a European banking context.

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