Distance and Competition

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We study the effect on loan conditions for Belgian small firms of the geographical distance between firms, the lending bank, and att other banks in the vicinity: We find that, in line with predictions emanating from theory modeling spatial price discrimination, borrowing costs decrease in the distance between the firm and the lending bank. We identify banking competition and pricing strategies in *our analysis by including competition measures 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. We further document that the distance between the Belgian firms and the bank in our study did not increase substantially over the period 1975-1997,*

Introduction

We study the effect on loan conditions of the geographical distance between firms, the lending bank, and all other banks in the vicinity, controlling for relevant relationship, loan, bank branch, firm, and regional characteristics. For our study, **we** employ a unique data set containing detailed loan contract information (including firm and lender identities and addresses) from more than 15,000 bank loans to (predominantly) Belgian small firms as well as information on competing bank branches in the vicinity of the firm.

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II. Data and Event Study Methodology

Loan Contracts

We extend a data set detailed in Degrysc and Van Cayseele (1998) and employed by Degryse and Van Cayseele (2000). The original data set consists of 17,776 loans given to independents (or single-person businesses), and small, medium, and large-sized firms by an important Belgian bank which operates all over Belgium. Around 80% of the firms are single-person businesses (sole proprietorships). Some borrowers take several loans from this bank; the data set covers loans granted to 13,104 borrowers - implying that the average borrower maintained 1.36 loans at that bank. The sample commences with all existing loans at the bank as of August 10, 1997 that were initiated after January 1st, 1995.

The authors are affiliated with **K.U. Leuven** and Tilburg University respectively. In the interests of **brevity and** simplicity, this working paper reports only some of the details o) the research findings. A more comprehensive paper containing more details of the data, methodology, **variables,** and **results,** as well as **additional references** is available as a CentER **and** CES Working Fapei. Degryse received financial support tram the Fund for Scientific Research-Flanders (FWO) and the **TMR-Network** on the Industrial Organization of Banking and Financial Markets. **Ongena benefited** from **financial** support from the **Netherlands** Organization for Scientific Research (NWO).

For each borrower we calculate the distance to both the lending bank and the branches of all other, competing banks located in the same postal zone as the borrower. As of December 31st, 1994, we identify 7,477 branches, operated by 145 different banks and located in 837 different postal zones. Each postal zone covers on average 25 sq. km, and contains approximately nine bank branches. Not surprisingly borrowers are often located in more densely banked areas, with on average more than 17 bank branches per postal zone, resulting in around 250,000 possible borrowers - bank branch pairs.

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. We provide concrete statistics on this issue when we discuss the results. Address recording errors, incomplete map coverage, and changes in street names (we have 1995 addresses but the software is using up-to-date maps) cut in our sample. Table 1 provides summary statistics for the remaining 15,044 contracts. It shows the definition, mean, median, minimum, maximum, and standard deviation of selected variables.

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 kilometers (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 US firms covered by the 1993 National Survey of Small Business Finance (NSSBF) is more than double, *i.e.* 4 miles. However, the median firm in the NSSBF employs 2 to 4 employees, while the median firm in our sample is a sole proprietorship. In addition, costs of driving may differ substantially between Belgium and the U.S., 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 with the other distance statistics Petersen and Rajan (2002) report. For example, the average (75 percentile) borrower - bank distance in our sample is around 3 (3.5) miles, while the same borrower in Petersen and Rajan (2002) communicates across 42.5 (14) miles with her bank, or across a whopping 252 (255) miles with 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 has more than doubled between the mid-70s and the early-90s 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) in 1975 to 5.2 (8.86) minutes in 1997.

Most of the modest increase in traveling time in our sample seems to occur during the early-90s. This increase may be partly driven by the changes in the number of bank branches because of regulatory driven de-specialization of financial intermediation and resulting consolidation.

Distance to Closest Competitor

We now turn to our other main variable of interest, distance to the closest competitors. The median (average) borrower in our sample is 3 minutes and 15 (50) seconds from the 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 measure as our metric of competitor proximity for obvious measurement reasons. In addition, bank branches may not be entirely homogeneous in their product offerings. In that case, we also conjecture our 25% measure to be more highly correlated with the distance to the closest, 'truly' competing bank branch than the minimum distance 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. A majority of the borrowers though doesn't seem overly constrained by geographical proximity. Hence, our statistics suggest that, while distance is important, information, reputation, and other bank characteristics may also determine the choice of lender and the resulting loan conditions.

Other Variables

The rest of the variables are also discussed at length in Degryse and Van Cayseele (2000) and in our working paper, so we abridge the write-up here. We include *relationship characteristics*, *competition variables*, interest *rate* variables, and *firm characteristics*. The loan contract characteristic we want to explain is the Interest Rate on the loan until the next revision. The average interest rate

on a loan in our sample is 8.12% or 812 basis points (we will employ basis points throughout the paper to facilitate the tabulation and interpretation of the results). Other loan characteristics are whether or not the loan is collateralized, the repayment duration of the loan, and dummies capturing the type of loan the firm is taking.

III. Empirical Results

Regression Analysis

This section provides the empirical results of the determinants of the loan rate (see Table 2). 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, firm characteristics, and interest rates). We use the ordinary least squares estimation technique. We focus on the distance variables. The other coefficients remain virtually unaltered, both as a departure from Degryse and Van Cayseele (2000); hence we therefore neither discuss, nor tabulate the estimated coefficients in this version of our working paper.

Distance

We take the log of both disunce measures, ln(Distance to Closest Competitors) and ln(Distance to Lender), as we conjecture the marginal impact on the loan rate to decrease (in absolute value) in distance. The positive and significant coefficients on ln(Distance to Closest Competitors) in Models 1 and II suggest that borrowers located farther away from competing bank branches face a higher loan rate at the lending bank. These results are consistent with price discrimination resulting from transportation costs, monitoring costs, as well as asymmetric information. Moreover, our proxy for the distance between the borrower and the closest competitor may identify strategic behavior between banks, which our other competition variables did not (or only partly) pick up. Indeed, even after controlling for the number of competitors, branch concentration, postal zone and bank branch effects, the lending bank seems to enjoy substantial market power that increases in the distance to the closest competitors. In addition, this market power decreases in the distance between the borrower and the lender itself, as indicated by the negative and significant coefficient on the variable ln(Distance to Lender).

Both distance effects are not only statistically but also economically relevant. Using the estimates of Model II, for example, 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 12 basis points. 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 20 basis points.

IV. Conclusion

We directly study the effect on loan conditions of the geographical distance between firms, the lending bank,[1] and all other banks in the vicinity of the firm. We report, as far as we are aware, the first comprehensive evidence of the occurrence of spatial pricing in bank lending. Loan, rates decrease in the distance between the firm and tne lender and increase similarly in the distance between the firm and competing banks. Both effects are statistically significant and economically relevant. The results seem not 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.

If banks persist in pricing loans by location, brick-and-mortar branching may remain vital in ensuring access to credit at reasonable rates, in particular for small firms and entrepreneurs. 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 envelops the 1975-1997 period). The latter result suggests that presaging 'the Death of Distance* remains somewhat premature in a European banking context.

Table 1: Data Description

Variables	Definition	Mean	Med.	Win	Max	St.dev.
Distance						
Distance to Lender	Shortest traveling time, In minutes	6.90	4.29	8.00	51.00	7.20
Distance to Closes! Competitors	Shortest traveling Bme to me closest quartHe competitor in the borrower's postal zone, in minutes	3.83	427	0.00	24.00	2.36
Loan Rate						
Loan Rale	Interest rate on loan until next revision, in basis points	612	782	200	2,200	296

Table 2: Borrowing Costs and the Role of Distance

Independent Variables	I	II
ln(Distance to Lender)	-4-3''	-6.4''
	(2.5)	(2.5)
ln(Distance to Closest Competitors)	16.1*''	16.6''*
	(3X1	(3.6)
Relationship characteristics, Competition, Loan Contract* and Finn Characteristics[b], Interest Rate Variables[c], and Intercept	Yes	Yes
Adjusted R^2	*03XJ*	0.223

Notes. The dependent vanable is the Loan Rale untd next revision, in basis points. The number of observations is 15,044. We employ ordinary least squares estimation, '.''. and — = significant at 10%, 5% and 1% level, (wo-IMed. ln(.) aw the natural tog of one Wis Ihe respective vanaWes. Including: * (our loan reviaatHMy dummias, [b] eight postal area and 49 industry dummies, [c] two year BummteS-

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