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Does Distance Still Matter? The Information Revolution in Small Business Lending

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ABSTRACT

The distance between small firms and their lenders is increasing, and they are communicating in more impersonal ways. After documenting these systematic changes, we demonstrate they do not arise from small firms locating differently, consolidation in the banking industry, or biases in the sample. Instead, improvements in lender productivity appear to explain our findings. We also find distant firms no longer have to be the highest quality credits, indicating they have greater access to credit. The evidence indicates there has been substantial development of the financial sector, even in areas such as small business lending.

SMALL BUSINESS LENDING HAS HISTORICALLY been very costly, because of the paucity of information about small firms and the high costs of the personnel required to obtain even that information. Information about small businesses is thought to be "soft," and has to be collected by lenders over time through relationships with firms (see Berger and Udell (1995), Petersen and Rajan (1994)).[1] If these descriptions of small businesses are accurate, they have a number of implications.

First, if a lender has to have direct contact with the small business to collect information about it, it has to have a local presence. If, in addition,

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[1] By soft information, we mean something similar to what is termed "tacit" information (see Polanyi (1958))—information that is hard to communicate to others, let alone capture in written documents. For example, the lending officer, through prior dealings with the firm manager, may learn to tell from the latter's behavior when a loan request is justified and when it is not (Uzzi (1999)).

much of this information is soft and difficult to communicate, the decision to offer credit has to be made very close to where the information is gathered. Typically, this would increase the cost of having large scale, geographically spread-out lending operations, implying strong diseconomies of scale in lending to small businesses. Concerns may then be raised when banks merge and centralize operations, for that would imply a fall-off of credit to small businesses (see Berger et al. (1998), Strahan and Weston (1998), and Berger and DeYoung (2000)). Moreover, if lenders have to be local, then the concentration of lenders in the local geographic area is the measure antitrust authorities should be concerned about in making decisions about which mergers to allow. Finally, if lending markets are local, small firms are much more likely to be affected by changes in the financial health of their local lenders. Local economic shocks could persist for a long time because they will be amplified by the demise of local financial institutions, and outside institutions cannot step in to take their place. This implies a greater need for regulators to be vigilant and responsive to local shocks, and not to just focus on aggregate economy-wide ones.

In this paper, we document two facts: First, the physical distance between small firms and their lenders has grown steadily in the United States over the period 1973 to 1993. Second, not only are borrowers growing physically more distant from lenders with whom they start a relationship, they are also communicating less and less in person. This effect is not just concentrated in recent years, a period of significant structural and technological change; it shows up as a steady trend throughout our sample. Conversations with industry experts and evidence in recent studies suggest that, if anything, the trend has accelerated since 1993.

The finding that the physical distance between small firms and their lenders has increased and that their interaction has become more impersonal is, to the best of our knowledge, new. What explains it? Perhaps all that is going on is that lenders have merged and closed branches. With fewer lending offices around, it is obvious that borrowers will have to go further to get to a lender. This explanation is easily ruled out. Much of the consolidation among lenders began in the mid-1980s, but our trend exists even earlier. Moreover, the number of branches for the most important type of lender to small firms, banks, actually grew over the period of our analysis. Another possibility is that credit standards have become more lax, so that lenders are willing to provide credit to more distant borrowers without conducting the appropriate due diligence or monitoring. If this were the case, we should see a corresponding increase in lender loan losses over time. We do not see such a trend in the data. Finally, we explore whether the nature of firms had changed over time. Perhaps firms had increasingly located in rural areas far from any lenders. We show changes in firm characteristics do not explain our findings of increasing distance and less personal interaction.

We suggest a different explanation. Increases in labor productivity, as measured by the increase in loans per bank employee or total regional output per bank employee, empirically account for the trend in distance. This ex-

planation suggests that increasing capital intensity of lending due to the greater usage of tools such as computers and communication equipment has altered the way loans are made, which, in turn, could account for the growing distance.

The channel through which these changes in technology affect small business lending is, however, not obvious. These tools do not make soft information about the borrower easier to collect at a distance. Soft information is, by definition, hard to put down on paper or store electronically (see, e.g., Stein (2002), Uzzi (2000)). Instead, we believe more hard information about the borrower, such as whether he is current on his trade credit payments and to whom he has applied for credit, is now available even to lenders at a distance. As a result, even if lenders do not have the rich soft information they obtained from infrequent, but close, contact with the borrower, they now have far more timely hard information about their creditworthiness. This enables them to lend at a distance knowing they can intervene quickly and foreclose or refuse loan renewal if conditions deteriorate. Thus, new technology permits more, and different, information to be gathered, stored, and distributed. It changes the nature of lending from an emphasis on strict ex ante screening and costly ex post monitoring, to frequent ex post monitoring and quick intervention.

If our conjecture is true, it suggests a final test. The kind of firms that could borrow at a distance in the past must have been of unimpeachable quality since the technology enabling early intervention simply did not exist, and the costs of physical monitoring were prohibitive. However, firms that borrow at the same distance in more recent years can be of lower credit quality because early intervention technology allows lenders to make loans to them with less fear of great loss. We therefore examine whether the distance firms are from their lender is a good predictor of credit quality, and whether distance has become a less useful predictor of credit quality over time. The evidence is consistent with both predictions.

We surmise therefore that technology is slowly breaking the tyranny of distance, at least in small business lending. The implications are then far reaching. Our findings suggest an explanation for why banks have been restructuring and consolidating recently, not simply because of deregulation or overcapacity in banking, but because technological change has eased the ability to lend at a distance and reduced the need for the decisions to be made where the information is collected. Our findings also suggests that the natural credit market faced by small firms may be growing steadily in size, and this should be taken into account by antitrust authorities. Finally, our findings suggest an explanation for the willingness of state legislators to open their states to more bank competition, especially in deposit taking (Kroszner and Strahan (1999)). With rents whittled away by more distant lenders who took away business even without having local branches, the need to maintain restrictions on branching in the local area became moot. This is consistent with the view that financial liberalization is often spurred by outside competition driving down incumbents' rents, which reduces in-

cumbents' incentives to defend archaic regulations protecting those rents (Rajan and Zingales (2000)).

The rest of the paper is organized as follows. We document the growing distance between borrowers and lenders in Section I. In Section II, we examine plausible, but relatively mechanical, explanations of the changes we document. In Section III, we outline an explanation based on the changing availability of information and its effect on lending practice. We examine evidence that such changes may, in fact, be occurring. We conclude in Section IV.

I. Changes in the Small Business Lending Market: Empirical Evidence

A. Data Description

Our data sample is drawn from the 1993 National Survey of Small Business Finance (NSSBF). This is a stratified random sample of small firms that was collected by the Board of Governors of the Federal Reserve System and the Small Business Administration. In addition to financial information about the firm (balance sheet and income statement information), the data set contains a thorough documentation of the firm's relationship with financial institutions. To be in the sample, the firm must be a for-profit firm with fewer than 500 employees. Consequently, the firms in our sample are small. The firms have a mean 1992 sales revenue of $3.6M (median $400,000) and a mean book value of assets of $1.7M (median $153,000). The Federal Reserve also conducted a 1988 version of the survey. Many of the variables we need are not in the 1988 sample, but whenever possible, we supplement the 1993 data with data from the 1988 survey.

Firms in the survey were asked for an exhaustive list of the financial institutions with whom they have a business relationship. The relationship can be a credit relationship (they borrow from the institution), a service relationship (they purchase financial services from the institution), or a deposit relationship (they have a checking or savings account with the institution). From this information, we can build a picture of how the lending relationship or environment for small firms has changed over time. For each institution with whom the firm has a relationship, the firm is asked how long they have been doing business with the institution. From this, we calculate the calendar year in which the business relationship between the firm and the lender began.

To examine the change in the small business lending market, we focus on two measures of how close firms are to their lenders. The firms are asked how far the lending institution is from the firm. This is the distance measured in miles from the main office of the firm to the office or branch of the lender that the firm uses most frequently. We also know the predominant way in which the firm and the lender conduct business (in person, by phone, or by mail). These variables will be the focus of our analysis.

Table I

Firm's Lending Relationship

The table is based on data from the 1993 National Survey of Small Business Finance. Each observation represents a firm/lender/loan type pair. Firms that borrow from multiple lenders or that borrow from a given lender but through multiple loan types (e.g., a line of credit and a mortgage) will generate multiple observations. The sample contains 5,981 pairs, which were begun between 1973 and 1993. Panel A contains the distance between a firm and its lender classified by lender type and the year the relationship began. The first entry in each cell is the mean distance, the second entry is the median distance, and the third entry is the 75th percentile. The far right column contains the sample average by lender types, and the bottom row contains the sample average by decade. Distance is measured from the main office of the firm to the office or branch of the lender which the firm uses most frequently and is reported in miles. Banks include commercial banks, savings banks, and credit unions. Nonbanks include finance companies, insurance companies, brokerage firms, leasing companies, mortgage banks, and venture capitalists. Panel B contains data on the predominant method of communication between the firm and its lender. The communication can be in person (1), by phone (2) or by mail (3). The first number is the fraction of firm–lender pairs that communicate predominantly in person. The second number is the average value of the method of communication variable. Higher values are associated with less personal communication.

	Year Lending Relationship Began			
Lender type	1973–1979	1980–1989	1990–1993	Total
Panel A: Distance to a Firm's Lender by Lender Type and Time				
Banks	15.8	34.0	67.8	42.5
	2.0	4.0	5.0	4.0
	6.0	12.0	20.0	14.0
Nonbanks	235.9	222.1	280.5	251.6
	15.5	42.0	54.0	45.0
	71.0	215.5	332.0	255.0
Nonfinancial firms	117.3	165.9	209.2	182.5
	17.5	29.0	32.0	30.5
	60.0	141.5	235.0	164.0
Total	51.2	92.6	161.3	114.7
	3.0	7.0	15.0	9.0
	10.0	33.0	91.5	42.0
Panel B: Method of Communication to a Firm's Lender by Lender Type and Time				
Banks	0.77	0.67	0.54	0.64
	1.3	1.5	1.7	1.5
Nonbanks	0.27	0.12	0.09	0.11
	2.2	2.5	2.6	2.6
Nonfinancial firms	0.35	0.20	0.18	0.20
	2.2	2.4	2.4	2.4
Total	0.68	0.49	0.34	0.46
	1.5	1.8	2.1	1.9

From the 1993 National Survey of Small Business Finance, we generate a data set of lender–borrower pairs. The firms in our data set may borrow from multiple lenders or they may borrow from a given lender in multiple ways (a line of credit and a mortgage). Since the type of loan and the lender

Table II

Determinants of Distance to the Firm's Lenders

The table contains regressions where the dependent variable is the log of one plus the distance to the firm's lender. The sample includes only relationships beginning since 1973. Dummy variables are included for whether the lender is a bank or a nonfinancial firm. The missing category is nonbank financial lenders. Each observation represents a firm–lender pair. Firms that borrow from multiple lenders or that borrow from a given lender but through multiple loan types (e.g., a line of credit and a mortgage) will generate multiple observations. The data are taken from the 1993 National Survey of Small Business Finance only in column I. We include data from the 1988 National Survey of Small Business Finance in the remaining columns. The models are described as follows: I. Basic regression model. II. Expanded sample. Sample includes observations from the 1993 and the 1988 National Survey of Small Business Finance. III. Expanded sample. These estimates are based on a weighted least squares, where the population weights from the surveys are used. IV. Expanded sample. Sample includes only observations for firms where the first reported lending relationship is within five years of the firm's birth. V. Expanded sample. Lines of credit: The regression includes both a dummy variable for whether the loan is a line of credit and an interaction between the line of credit dummy and the year the relationship started. This allows the slope on year to vary by whether the loan is a line of credit or not.

	Models				
Independent Variables	I	II	III	IV	V
Firm's age	0.001	0.003[10]	−0.001	−0.005	0.002[10]
	(0.002)	(0.001)	(0.002)	(0.004)	(0.001)
Year relation started	0.034[1]	0.038[1]	0.033[1]	0.045[1]	0.041[1]
	(0.005)	(0.004)	(0.004)	(0.005)	(0.005)
Lender is bank	−1.173[1]	−1.176[1]	−1.310[1]	−1.190[1]	−1.192[1]
	(0.062)	(0.050)	(0.047)	(0.061)	(0.050)
Lender is a nonfinancial firm	−0.369[1]	−0.357[1]	−0.493[1]	−0.421[1]	−0.347[1]
	(0.097)	(0.077)	(0.073)	(0.090)	(0.077)
Lender provides a checking account	−1.062[1]	−0.990[1]	−1.057[1]	−1.031[1]	−1.043[1]
	(0.060)	(0.047)	(0.043)	(0.057)	(0.048)
Lender is firm's first lender	−0.163[1]	−0.203[1]	−0.198[1]	−0.190[1]	−0.200[1]
	(0.049)	(0.039)	(0.038)	(0.054)	(0.039)
Loan is collateralized	0.081	0.132[1]	0.041	0.081	0.256[1]
	(0.062)	(0.049)	(0.045)	(0.058)	(0.054)
Observation from 1993 sample		−0.097[5]	0.018	−0.044	−0.123[1]
		(0.039)	(0.037)	(0.046)	(0.040)
LOC					0.369[1]
					(0.098)
LOC * year relation started					−0.011
					(0.007)
R^2	0.308	0.296	0.335	0.307	0.298
Number of observations	5,981	9,385	9,385	6,681	9,385

[10], [5], [1] Significance at the 10%, 5%, and 1% levels, respectively.

may affect the nature of the relationship (physical distance and method of communication), we generate a data set where each observation represents a lender–borrower–loan type pair. There are, on average, just over two lender–borrower pairs per firm.

B. Distance from Lender

The mean distance between a firm and its lender is 115 miles, the median distance is 9 miles (see Table I, Panel A). These numbers have increased over time. The distance between small firms and their lenders has grown from an average of 51 miles for lending relationships that began in the 1970s to 161 miles for relationships that began in the 1990s, an increase of over 200 percent. A similar pattern can be seen in the medians and 75th percentiles and across different kinds of lenders (see Table I).[2]

The distance to a firm's lender is, not surprisingly, a skewed distribution. Moreover, from an economic perspective, there is a large difference between a firm being 5 miles from its lender rather than 100 miles from its lender, while there is probably little difference between it being 1,005 miles instead of 1,100 miles from its lender. Both the skewness and the likely nonlinearity of the economic impact of distance suggests using the log of one plus the distance between a firm and its lending institution as our favored measure of distance. Taking logs, the distribution moves closer to a symmetric distribution. The mean of log distance is 2.6, the median is 2.3.

The increase in distance reported in Table I does not control for any changes in the firms or markets over time. To estimate the growth in distance between small firms and their lender controlling for other factors which affect distance, we regress the log of one plus the distance in miles on the characteristics of the borrower, the lender, and the loan. The results are reported in Table II. The coefficient on the year the relationship started measures changes in distance independent of these controls. We find that the distance between the firm and its lenders has grown at 3.4 percent per year ($t = 7.4$). Thus, holding the controls constant, a firm that began borrowing from its lender in 1993 is 34 percent further away from the lender than an otherwise identical firm that first borrowed from its lender in 1983 (Table II, column I). This is the paper's central finding.

C. Alternative Explanations for Expanding Distance

The fact that the distance between firms and their lenders is increasing may have some obvious explanations. At the very least, we want to control for other factors that influence distance to verify that they are not responsible for our finding that the distance between firms and lenders is growing.

C.1. Changing Distribution of Lenders

We begin with the characteristics of the lender. The external sources of funds in our sample can be divided into banks (69 percent of external debt), nonbank financial lenders (25 percent), and nonfinancial lenders such as

[2] The 1993 survey oversamples large firms. So, we also calculate mean distance, weighting each observation by its weight in the population. In this case, distance rises from 30 miles for relationships that started in the 1970s to 145 miles for relationships that started in the 1990s.

suppliers (5 percent).[3] We want to add controls for the type of lender because their function may affect their distance. One of the primary functions of banks is their role as a monitor (see Diamond (1984), Fama (1985), James (1987)). This role includes an initial evaluation of the borrower's type as well as continuous monitoring of the actions of the borrower. Moreover, banks are intimately involved in processing transactions. These roles may explain the closeness of banks that we find in Table I.

The identity of the firm's lender strongly correlates with how far away the lender is. Nonbanks are significantly further from the firm than banks—117 percent further on average (see Table II, column I). If physical monitoring is more difficult across greater distances and, therefore, less likely to be done by nonbanks, then this is consistent with banks being more active physical monitors. We will argue in the conclusion that this may also reflect comparative advantage in relationships that require close, personal ties.

The frequency with which a firm has to transact with a lender can also determine how close that lender is. Banks that provide their borrowers with a checking account are significantly closer. Based on the results in Table II column I, the distance doubles with each step as a firm moves from a bank where it has a checking account to a bank without a checking account and, finally, to a nonbank.[4] We surmise this is because checking accounts presumably imply more frequent transactions, and the need to visit the lender on a more frequent basis to deposit or withdraw cash may necessitate the lender being closer.

The importance of controlling for the lender type and checking account can be seen by comparing the estimated growth in distance reported in Table II to the univariate growth in distance. The annual growth in distance more than doubles from 3.4 percent per year to 8.9 percent per year when we exclude all controls from the regression (t = 17.8; regression not reported). This implies that, over time, new lending relationships are moving from

[3] The lenders in our sample can be classified into five basic categories—two internal and three external sources. Internal sources include loans from the owners (16 percent of debt) and loans from family and friends (6 percent of debt). Government loans comprise a very small fraction of the firms' borrowing (less than 1 percent). Although this is external debt, we do not include it in the following analysis as we want to focus on the firm's development of relationships with private, for-profit lenders. The remaining 78 percent of debt comes from external sources (banks, nonbank financial lenders, and nonfinancial lenders). Banks include depository institutions such as commercial banks, savings banks, and credit unions. Nonbanks include finance companies, insurance companies, brokerage firms, leasing companies, mortgage banks, and venture capitalists. Less than half a percent of the firm's debt is from venture capitalists.

[4] In our sample, over 99 percent of checking accounts are provided by banks. The few nonbank providers of "checking accounts" are almost exclusively brokerage firms. We also examined the effect on distance of other services the firm may obtain from the lender. Firms that obtain additional financial services are further from their lenders on average. The magnitude of the effect depends upon the type of service the lender provides: Transaction services (making change, processing credit cards, and executing wire transfers) are 11 percent further away (t = 1.7), cash management services are 43 percent further away (t = 5.3), and credit-related services (such as bankers acceptance and sales financing) are 26 percent further away (t = 3.1).

lenders that are close (banks with checking accounts) to lenders that are more distant (nonbanks without checking accounts). However, controlling for lender type, we find that both banks and nonbanks are becoming more distant from their borrowers.[5]

C.2. Sample Selection Biases

The data set we use is a synthetic panel. Data on the year a firm began a relationship with a given lender helps us describe a firm's borrowing patterns over time. However, the data set is conditioned on the firm existing in 1993. Firms that do not survive will obviously not be included in our sample. If this selection mechanism is correlated with distance, then our estimated coefficient will be biased. In addition to requiring that the firm survives, observations appear in our sample only if the firm–lender pair also survives. If the type of firm–lender pairs that drop out is correlated with distance, our coefficient estimates will again be biased.

We first describe some of the possible selection processes that must be at work for a survival bias to generate our results and then examine the empirical evidence to determine their validity. We examine firm survival first. The literature on relationship lending suggests that close lenders are good at looking into informationally opaque firms and determining their true quality. They may also be more willing and able to bail out their good borrowers when they experience temporary financial difficulties. If lenders are further from firms, bailouts may become more costly and less common. If firms whose lenders are further away are less likely to be rescued, they will be less likely to survive. This would imply that surviving firms will be closer on average than the full sample of firms that begin relationships with lenders. This may be a problem for our results since a firm that starts a relation in 1991 need survive only 2 years to be in our sample, while a firm that begins a relation in 1981 must survive 12 years. Thus, sample selection could induce a positive coefficient on the calendar time variable even if there is no change in the initial distribution of how far firms are from their lenders.[6]

To test for the importance of this sample selection bias, we supplemented our 1993 sample with data from the 1988 NSSBF. This allows us to directly examine how firm survival affects our estimates. In the expanded data set, we can examine two firms that both began borrowing from their first lender in 1985, for example, when they were both five years old. The one from the 1993 sample had to survive eight years to be included in the sample while the one in the 1988 sample needed to survive only three years to be included in the sample. If the selection mechanism we described is working, we will see that, controlling for the year the relationship started, observations in

[5] When we estimate different year slopes for banks and nonbanks, we find that distance is growing slightly faster for nonbanks than banks (4.2 percent versus 3.0 percent per year), but the difference is not statistically significant ($\rho = 0.28$; regression not reported).

[6] If instead, firms that start closer to their lenders are riskier and are more likely to die, then the coefficient on the calendar year variable is understated and firms are moving away from their lenders faster than our estimates suggest.

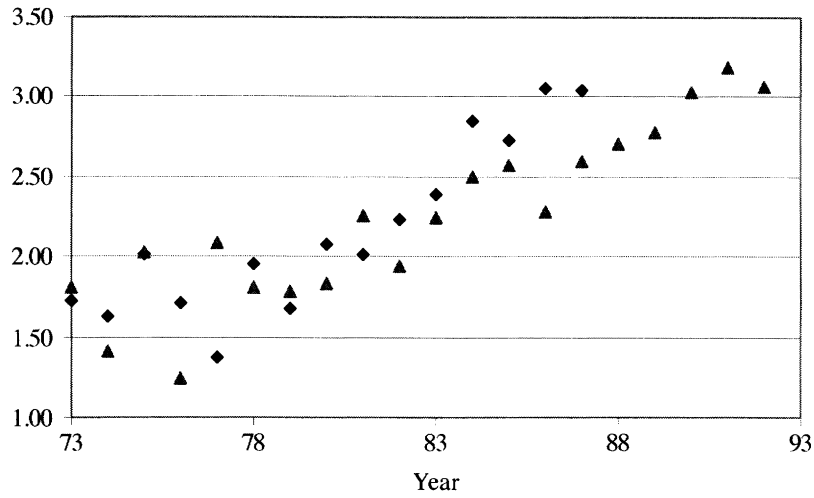

Figure 1. Changes in the average distance to lender over time by sample. The figure graphs the unconditional average log distance between a firm and its lender against the year the relationship began. Data from the 1993 National Survey of Small Business Finance is graphed as triangles, while data from the 1988 survey is graphed as diamonds.

the 1993 sample are closer as they have had to survive longer to remain in the sample. The results are displayed in column II of Table II. Firms in the 1993 sample are 10 percent closer and the coefficient is statistically significant ($t = 2.5$). This is consistent with the sample selection hypothesis, but also with any other difference between the two samples.

The sampling design of the 1993 sample was slightly different from that of the 1988 sample, as large firms were oversampled. To correct for this, the survey provides the weights each observation in the survey should have in the true population. To test the robustness of our findings, we reestimated the regression in column II of Table II using the population weights from the two samples (see Table II, column III). The coefficient on the year the relationship started shrinks slightly to 3.3 percent per year ($t = 8.8$). Interestingly, the coefficient on the indicator for the 1993 sample turns positive and insignificant ($\beta = 0.017$, $t = 0.4$), suggesting that differences in the sample surveys, rather than sample selection, were responsible for the negative coefficient in column II. We also allow different slopes and different intercepts for both samples. It turns out that the rate of growth in distance is not statistically different across samples.

Finally, if sample selection is truly responsible for our results, once we control for it, the coefficient on calendar year should fall. Instead, it rises slightly to 3.8 percent per year. Our initial estimate was biased downward. The lack of significant sample selection is also apparent when we graph the raw data (see Figure 1). The upward slope in distance is apparent in both the 1988 and the 1993 sample, and there is not a large systematic difference between the two samples relative to the change in distance over time.

As firms in our sample age and grow, they become better known. This might expand the geographic market in which they can borrow. We see evidence of this in Table II. If we measured firm age as of the date the relationship with the institution began, we find that firms do move away from their lenders as the firm ages. The magnitude of this effect, however, is tiny (see Table II, column I). However, distance to a lender increases as the firm expands its circle of lenders. A firm's first lender is about 16 percent closer than its subsequent lenders (see Table II, column I).[7]

The fact that firms move from close to more distant lenders as they age will create a second selection bias if the firms drop their original lenders as they age.[8] However, once we include the firm's age in the regression, the firm's age and not calendar year should measure this effect. That the coefficient on firm age is small and the coefficient on calendar year is still important after including firm age suggests this source of bias is not significant.

We can also directly test the importance of this bias. First relationships are likely to start soon after a firm is founded. So if we include only firms whose first relationship begins soon after the firm was born, we will have a sample that is less sensitive to the alleged selection bias. When we cut the sample down to firms whose first observed lending relationship starts during their first five years of life, the coefficient on calendar year rises, rather than falls. Even for the firms where we are least likely to miss the first lending relationship, the distance between firms and their lenders is growing at 4.5 percent per year (Table II, column IV).

C.3. Changing Distribution of Loan Types

A third possible explanation of increasing distance is a change in the way in which firms borrow. The firms in our sample borrow through lines of credit, leases, motor vehicle loans, mortgages, equipment loans, and other loans. The distribution of loan types changes over time (Cole, Wolken, and Woodburn (1996)). If borrowing patterns have changed from loans that require proximity and personal monitoring to those that do not, this may generate our result. However, even when we include controls for loan type and whether the loan is collateralized, the coefficient on year barely changes ($\beta = 0.033$; regression not reported).

Some economists have argued that lines of credit are unique in that they are more relationship based, and, as such, these lenders may be less likely to move away from their borrowers (Berger and Udell (1995)). Consistent

[7] We also tried including a variable which takes the value 1 for the firm's first lender, 2 for its second, and so forth, as well as the dummy for the firm's first lender. Based on these results, as the firm moves from its first to second lender, distance increases 29 percent, while each incremental lender is an additional 10 percent further away ($t = 6.2$; regression not reported). The coefficient on calendar year rises to 3.9 percent.

[8] We define the firm's first lender as the lender with whom the firm has been conducting business the longest. If the firm began its relationship with multiple institutions in that year, we classify all such lenders as the "first" lender. Financial institutions with which the firm has no interaction at the time of the survey (no credit, deposit, or service relationship) would not appear in our sample, although they may have been the firm's first lender.

with this intuition, lines of credit are 82 percent closer than other loans as long as we do not control for any other factors. However, once we control for other factors, lines of credit are actually slightly further away (see Table II, column V). If we allow the intercept and the coefficient on the year a relationship started to vary between lines of credit and other loans, we find that lines of credit are about 37 percent further away at the beginning of our sample. This gap has been shrinking as lines of credit have been moving away more slowly than other loans (3.0 percent per year compared to 4.1 percent per year). Although lines of credit are moving away more slowly than other loans, the difference in rates is neither large nor statistically significant.

To test the robustness of our finding that distance between firms and lenders is growing, we estimated separate regressions for each type of loan in the sample. Lenders are becoming more distant from borrowers regardless of loan type, and the rate of increase ranges from 2.8 percent to 5.5 percent per year (see Table III).

C.4. Firm Characteristics and Informational Transparency

As a final control, we include firm characteristics in our regressions. Different firms have varying potential for moral hazard and thus a different need to be monitored. They also have different degrees of informational transparency. If the distribution of firms has changed over time from informationally opaque to informationally transparent, this could generate our result. By controlling for firm characteristics, we can verify this is not driving our finding. In addition, by determining which firm characteristics are correlated with distance, we can get a sense of what might make a firm more informationally transparent and thus able to borrow at a greater distance.

We examine firm characteristics in two steps. First, we include controls for the firm's industry and for the firm itself. Including controls for the firm's industry (two-digit SIC) does increase the explanatory power of the model ($F(58,5916) = 3.0$, $p < 0.01$), but it does not change the coefficient on the year the relationship started (see Table IV, column I). We also exploit the panel structure of our data by including a control for each firm. This dramatically raises the explanatory power of the model (the R^2 rises from 0.308 to 0.711). This implies that firm characteristics are an important determinant of distance, and we return to this below. Adding firm controls to the regression, however, raises the coefficient on the year the relationship began from 3.4 percent per year to 4.0 percent per year (compare Table II, column I, to Table IV, column II). In addition to a fixed-effects estimation, we also estimate the growth in distance based on between firm variation (variables are defined as the mean for each firm). The estimated coefficient on the year the relationship started is essentially the same (see Table IV, column III).

The next step is to include characteristics of the firm that may be correlated with distance. We examine both the density of firms as well as vari-

Table III

Determinants of Distance to the Firm's Lenders by Loan Type

The table contains regressions where the dependent variable is the log of one plus the distance to the firm's lender. A separate regression was run for each of the six loan types in the sample: lines of credit (column I), leases (column II), mortgages (column III), motor vehicle loans (column IV), equipment loans (column V), and other loans (column VI). The sample includes only relationships beginning since 1973. Dummy variables are included for whether the lender is a bank or a nonfinancial firm. The missing category is nonbank financial lenders. Each observation represents a firm–lender pair. Firms that borrow from multiple lenders or that borrow from a given lender but through multiple loan types (e.g., a line of credit and a mortgage) will generate multiple observations. The data are taken from the 1988 and 1993 National Survey of Small Business Finance.

Independent Variables	I	II	III	IV	V	VI
Firm's age	0.001	0.005	0.011[5]	−0.005	0.002	0.007
	(0.002)	(0.004)	(0.005)	(0.003)	(0.004)	(0.005)
Year relation started	0.028[1]	0.055[1]	0.042[1]	0.035[1]	0.035[1]	0.037[10]
	(0.009)	(0.015)	(0.011)	(0.008)	(0.011)	(0.019)
Lender is bank	−1.410[1]	−0.870[1]	−1.472[1]	−0.954[1]	−1.083[1]	−1.210[1]
	(0.132)	(0.189)	(0.182)	(0.079)	(0.138)	(0.202)
Lender is a nonfinancial firm	−0.250	−0.491[1]	−0.548	−0.055	−0.763[1]	−0.661[5]
	(0.242)	(0.172)	(0.369)	(0.198)	(0.149)	(0.261)
Lender provides a checking account	−1.019[1]	−1.238[1]	−0.662[1]	−0.910[1]	−1.538[1]	−1.371[1]
	(0.088)	(0.245)	(0.115)	(0.088)	(0.133)	(0.147)
Lender is firm's first lender	−0.175[5]	−0.240[5]	−0.385[1]	−0.080	−0.213[5]	−0.182
	(0.070)	(0.117)	(0.125)	(0.071)	(0.101)	(0.145)
Loan is collateralized	0.248					−0.015
	(0.139)					(0.300)
Year relation started if loan is collateralized	0.005					0.018
	(0.011)					(0.024)
Observation from 1993 sample	−0.154[5]	−0.210	−0.257[5]	−0.187[1]	−0.035	0.040
	(0.068)	(0.138)	(0.113)	(0.073)	(0.105)	(0.144)
R^2	0.233	0.138	0.211	0.246	0.349	0.311
Number of observations	2,559	1,329	976	2,309	1,481	731
Median distance	5.0	41.0	6.0	11.0	11.0	6.0

[10], [5], [1] Significance at the 10%, 5%, and 1% levels, respectively.

ables that measure their transparency. If the location of firms is moving over time from urban areas to rural areas, where distances are greater, this could explain our finding. This is not the case. First, the fixed-effects estimates imply that distance is growing even for the same firm, so shifting location cannot be the whole story. In addition, we know whether the firm is in a Standard Metropolitan Statistical Area (urban) or not (rural). Rural firms are 13 percent further from their lenders (see Table IV, column IV), but this control does not change the rate at which firms are moving away from their lenders. We also estimate the growth in distance separately for firms located in rural or urban areas. The coefficient is not statistically different across the two samples (regression not reported).

Informational transparency, or the ability to evaluate the firm's credit quality at low cost at a distance, should allow the average distance between

Table IV

Determinants of Distance to the Firm's Lenders: Measuring the Informational Transparency of Firms

The table contains regressions where the dependent variable is the log of one plus the distance to the firm's lender. The sample includes only relationships beginning since 1973. Each observation represents a firm–lender pair. Firms that borrow from multiple lenders or that borrow from a given lender but through multiple loan types (e.g., a line of credit and a mortgage) will generate multiple observations. The data are taken from the 1993 National Survey of Small Business Finance, except for column V, which also includes data from the 1988 National Survey of Small Business Finance. Models are described as follows: I. Industry controls. The regression includes dummy variables to control for differences across the 59 two-digit industries in the sample. II. Within estimates. A dummy variable is included for every firm. Thus, the coefficients are estimates based on variation from firm specific means. The R^2 includes the explanatory power of the firm effects. Without including the explanatory power of the firm effects, the R^2 would be 0.307. III. Between estimates. The coefficients are estimated based on variation between firm specific means. Each observation represents the mean value for a given firm. Thus, the sample size is reduced to the number of unique firms in our sample. IV. Firm-specific variables. This model includes additional controls for firm-specific characteristics. V. Expanded sample. This model includes data from both the 1988 and 1993 National Survey of Small Business Finance. Only variables that are available in both surveys are included in the regression. VI. Firm-specific variables. This model also includes the log of the firm's total assets.

	Models					
Independent Variables	I	II	III	IV	V	VI
Firm's age	0.001		0.000	0.000	0.002	−0.000
	(0.002)		(0.002)	(0.002)	(0.001)	(0.002)
Year relation started	0.033[1]	0.040[1]	0.035[1]	0.037[1]	0.040[1]	0.042[1]
	(0.005)	(0.011)	(0.006)	(0.005)	(0.004)	(0.005)
Lender is bank	−1.164[1]	−1.121[1]	−1.102[1]	−1.152[1]	−1.163[1]	−1.140[1]
	(0.062)	(0.085)	(0.089)	(0.062)	(0.050)	(0.062)
Lender is a nonfinancial firm	−0.329[1]	−0.124	−0.472[1]	−0.373[1]	−0.354[1]	−0.356[1]
	(0.096)	(0.132)	(0.139)	(0.096)	(0.077)	(0.096)
Lender provides a checking account	−1.079[1]	−1.063[1]	−1.116[1]	−1.106[1]	−1.017[1]	−1.137[1]
	(0.059)	(0.083)	(0.081)	(0.060)	(0.047)	(0.060)
Lender is firm's first lender	−0.143[1]	−0.026	−0.258[1]	−0.133[1]	−0.166[1]	−0.095[10]
	(0.048)	(0.077)	(0.085)	(0.049)	(0.039)	(0.049)
Loan is collateralized	0.028	0.011	0.022	0.059	0.118[5]	0.037
	(0.062)	(0.088)	(0.081)	(0.062)	(0.049)	(0.062)
Firm had records for filling out survey				0.091[5]	0.131[1]	0.054[5]
				(0.042)	(0.034)	(0.043)

Firm has credit card				0.003		−0.000
				(0.043)		(0.042)
Ownership share of largest owner (%)				−0.255[1]		−0.151[10]
				(0.076)		(0.076)
Corporation (1 = yes)				0.066	0.195[1]	−0.006
				(0.052)	(0.038)	(0.054)
Franchise (1 = yes)				0.290[1]		0.242[1]
				(0.091)		(0.091)
Owner managed				−0.044	−0.076[10]	−0.008
				(0.050)	(0.044)	(0.051)
Owner's age when relation began				0.000		0.000
				(0.003)		(0.003)
Owner's experience when relation began				−0.003		−0.006
				(0.003)		(0.003)
Sales area regional (1 = yes)				0.073		0.040
				(0.047)		(0.047)
Sales area national (1 = yes)				0.359[1]		0.292[1]
				(0.060)		(0.061)
Firm in MSA (1 = yes)				−0.127[5]	−0.126[1]	−0.137[5]
				(0.056)	(0.042)	(0.055)
Herfindahl Index > 1,800				0.046	0.036	0.045
				(0.045)	(0.037)	(0.045)
Observation from 1993 sample					−0.080[10]	
					(0.041)	
Log(firm assets)						0.069[1]
						(0.013)
Industry controls F-statistics (p-value)	2.993					
	(0.000)					
Firm controls F-statistics (p-value)		1.502				
		(0.000)				
R^2	0.327	0.711	0.297	0.318	0.301	0.319
Number of observations	5,981	5,981	2,878	5,974	9,378	5,974

[10], [5], [1] Significance at the 10%, 5%, and 1% levels, respectively.

firms and lenders to increase. We measure information transparency four ways. First, we identify firms that have a business credit card. Since these are usually granted based on a credit report, this implies the external credit market knows a sufficient amount about the firm to grant it credit based on information in computer files. Thirty-two percent of the firms in the sample have a business credit card. The NSSBF survey also asks whether the person answering the income statement and balance sheet questions had records such as tax forms and/or financial statements to help in answering these questions. The existence of such records suggests greater transparency to outside investors. We also include an indicator of whether the firm is a franchise. A franchise is likely to have a more systematized reporting structure in order to measure franchise fees. The final measures of record keeping we use are from the governance structure of the firm. We use the fraction of the equity owned by the largest shareholder as an (inverse) measure of shareholder dispersion. The more dispersed the shareholders, the greater the need for the firm to systematize its reporting function and make information easily accessible to outside investors (alternatively, the firm attracts dispersed shareholders only when reporting is systematic).

The expanded regressions with the additional firm characteristics are reported in Table IV, column IV. These results are based on the 1993 sample, since many of these variables are only available in this sample.[9] The presence of a credit card has no effect on the distance to the firm's lenders. This may be because credit cards are freely available, or because they depend on the personal history of the owner rather than that of the business. However, the remaining firm characteristics are important. Firms that have financial records detailing their financials do borrow further from their lenders. The difference is nine percent and is statistically significant (see Table IV, column IV). Firms that are franchises, and are thus expected to be more transparent, borrow 29 percent further away ($t = 3.2$). The ownership structure has a large and statistically significant impact on distance. Expanding the largest shareholder's stake from zero (a completely diffuse ownership structure) to 100 percent lowers the distance to a firm's lender by 26 percent ($t = 3.4$).

We examine the characteristics of the manager to determine whether older and more experienced managers borrow from institutions that are further from the firm. Both the age and years of business experience of the current manager are measured in the year the relationship started. Neither variable has a significant effect on the distance between borrower and lender. Whether the firm is managed by a nonowner does not appear to matter.[10]

[9] We also estimated the model on the expanded sample (1988 and 1993 surveys), including only those firm characteristics which exist in both surveys. The results are reported in column V of Table IV.

[10] Since we only have a measure of firm size in the year of the survey, and thus the variable is likely to be endogenous, we exclude it from most of our specifications. However, as a robustness check, we included the log of firm size (see Table IV, column VI). As expected, larger firms are more likely to borrow from more distant lenders. However, the inclusion of firm size does not change the coefficient on year significantly.

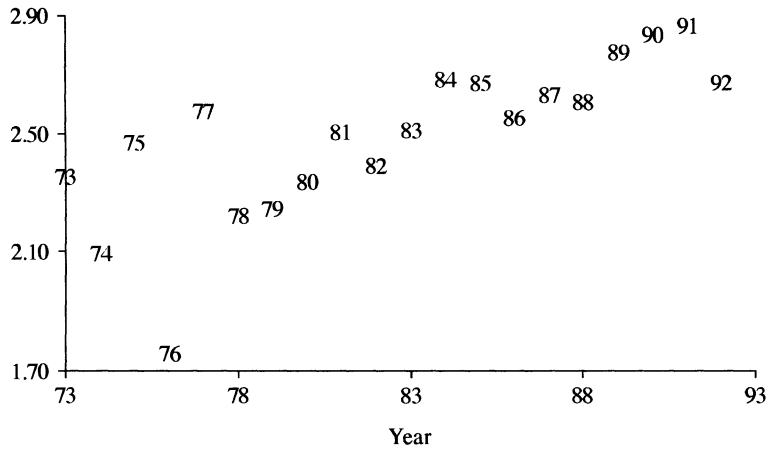

Figure 2. Changes in the estimated distance to lender over time. Estimated log distance between a firm and its lender across time is based on the estimates from Table IV (column IV). All variables except the year in which the relationship began are set equal to the sample mean. In the regression, the year variable is replaced by a set of year dummy variables. This allows the functional form of the relationship between distance and year to have any shape.

The final set of firm characteristics we examine is the sales region of the firm. The larger the firm's sales region, the more likely distant lenders will know about the firm. In the survey, the firms are asked if their sales region is local, regional, or national. As the firm's sales region expands, so does the distance between the firm's headquarters and its lender. Most of the increase, however, occurs when the firm shifts from a regional sales region to a national sales region. The distance to the lender increases by an additional 29 percent in this case ($t = 4.9$).

It is useful to check that, after the inclusion of all these other variables, observations from no single year drive the results. So, in Figure 2, we graph distance against the year the relationship started (where distance is predicted using the estimates from Table IV, column I, after replacing the "year relationship started" variable with year dummies and setting all explanatory variables to their sample mean). While the estimates in early years are quite variable, there is clearly a discernible trend.

D. Method of Communicating with Lender

To make sure our conjecture that lending is becoming more impersonal is correct, we replicate our results by examining the most frequent method by which the firm and the lender conduct business at the time of the survey. Firms can conduct business with their lender in person (46 percent of the firm–lender pairs), by phone (19 percent), or by mail (35 percent; see Table I, Panel B). Based on the simple means, we find that 68 percent of relationships started in 1973 to 1979 are still conducted in person today, while only

34 percent of relationships started in 1990 to 1993 are conducted in person today. Controlling for firm and lender characteristics reveals the same trend. The probability that a firm will communicate with its lender in person drops from 59 percent for relationships that started in 1973 to 36 percent for relationships that started in 1993 (see Table V, column I and Figure 3). All other variables are set equal to their sample means, when probabilities are calculated. The coefficient on the year the relationship started is also statistically significant ($t = 7.3$).

Although the shift from communicating in person to communicating by the mail is related to the shift to more distant lenders, the two effects are distinct. To demonstrate this, we include the distance to a firm's lender as an explanatory variable. As expected, firms whose lenders are further away are less likely to communicate in person (see Table V, column II), because distance raises the cost of personal communication. Raising the log distance from the 25th percentile to the 75th percentile lowers the probability of communicating in person from 58 percent to 30 percent ($t = 23.3$). Including distance in our model reduces the coefficient on calendar year from 0.046 to 0.031. The fact that the coefficient on the year the relationship started is still positive and statistically significant ($t = 4.6$) implies that the systematic change in how firms communicate with their lenders is more than just the effect of increased physical distance. Holding the distance to a firm's lender constant, there has still been a change in the way firms communicate, away from face-to-face communication and toward communication by phone or through the mail. The probability of communicating in person now drops from 52 percent for a relationship started in 1973 to 37 percent for a relationship started in 1993. The decline is 66 percent of our estimate when distance is not included and is still quite large.

There may not be much of a difference between communicating with a lender by phone or by mail. Both are impersonal. Therefore, in column III, we also try a specification where the method used to communicate is coded one if it is in person, and zero otherwise. The fit of this binomial specification in column III is higher than the fit for the multinomial specification in column I and, therefore, we will use this specification in what follows.

As with the distance regressions, we have included firm and lender characteristics as controls. Many of the results are similar to those obtained earlier. Consistent with bank lending being more relationship based and thus more reliant on information obtained through personal contact, borrowers deal more with their banks in person, even after correcting for the existence of a checking account, or even the distance the bank is from the borrower.

Firms we expect to be more informationally transparent are more likely to use arm's length communication (phone and mail). The probability of communicating in person drops for firms that used records to answer the financial statement questions in the survey, have credit cards, have diffuse ownership structures, and have a national sales region. The last finding is particularly interesting. It suggests that firms with a national reach do not borrow from lenders remote from the head office simply because the firm

Table V

Determinants of the Method Used to Communicate with Lender: In Person, by Phone, or by Mail

The table contains estimates from an ordered logit model. The dependent variable denotes the predominant method for communicating with the lender. The sample includes only relationships beginning since 1973. Each observation represents a firm-lender pair. Firms that borrow from multiple lenders or that borrow from a given lender but through multiple loan types (e.g., a line of credit and a mortgage) will generate multiple observations. The data are taken from the 1993 National Survey of Small Business Finance. Models are described as follows: I. The dependent variable is coded one if in person, two if by phone, and three if by mail. Estimation is multinomial ordered logit. II. The log of one plus distance (the dependent variable in Table II) is added as an explanatory variable to the specification in column I. Estimation is multinomial ordered logit. III. The dependent variable is coded zero if in person and one otherwise. Estimation is logit.

	Models		
Independent Variables	I	II	III
Firm's age	0.005[5]	0.005[5]	0.006[5]
	(0.002)	(0.002)	(0.003)
Year relation started	0.046[1]	0.031[1]	0.043[1]
	(0.007)	(0.007)	(0.007)
Lender is bank	−1.226[1]	−0.875[1]	−1.583[1]
	(0.079)	(0.083)	(0.099)
Lender is a nonfinancial firm	−0.432[1]	−0.303[5]	−0.624[1]
	(0.122)	(0.126)	(0.161)
Lender provides a checking account	−1.637[1]	−1.243[1]	−1.403[1]
	(0.077)	(0.081)	(0.082)
Lender is firm's first lender	−0.215[1]	−0.189[1]	−0.290[1]
	(0.064)	(0.066)	(0.075)
Loan is collateralized	0.306[1]	0.312[1]	0.279[1]
	(0.087)	(0.091)	(0.094)
Firm had records for filling out survey	0.088	0.051	0.116[10]
	(0.057)	(0.059)	(0.066)
Firm has credit card	0.048	0.032	0.128[10]
	(0.057)	(0.059)	(0.067)
Ownership share of largest owner (%)	−0.214[5]	−0.107	−0.507[1]
	(0.101)	(0.105)	(0.119)
Corporation (1 = yes)	0.093	0.078	0.172[5]
	(0.072)	(0.075)	(0.082)
Franchise (1 = yes)	−0.028	−0.187	0.076
	(0.120)	(0.127)	(0.142)
Owner managed	−0.017	0.006	−0.134[10]
	(0.067)	(0.069)	(0.079)
Owner's age when relation began	0.004	0.005	0.006
	(0.004)	(0.004)	(0.004)
Owner's experience when relation began	−0.003	−0.003	−0.005
	(0.004)	(0.004)	(0.004)
Sales area regional (1 = yes)	−0.024	−0.062	0.089
	(0.064)	(0.066)	(0.073)
Sales area national (1 = yes)	0.382[1]	0.202[5]	0.740[1]
	(0.079)	(0.082)	(0.094)
Firm in MSA (1 = yes)	0.302[1]	0.441[1]	0.317[1]
	(0.076)	(0.080)	(0.086)
Herfindahl index > 1,800	−0.076	−0.097	−0.162[5]
	(0.060)	(0.062)	(0.070)
Log(1 + distance from lender)		0.436[1]	
		(0.019)	
Pseudo R^2	0.216	0.265	0.284
Number of observations	5,945	5,945	5,945

[10], [5], [1] Significance at the 10%, 5%, and 1% levels, respectively.

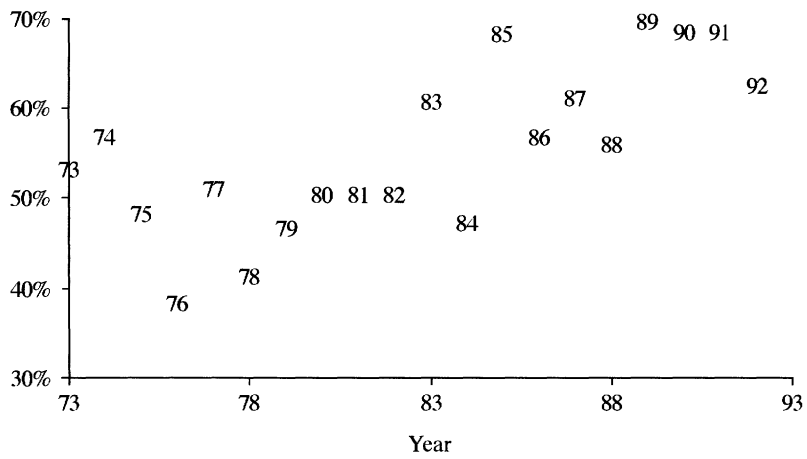

Figure 3. Changes in the estimated method of communicating with lender over time. The estimated probability of using nonpersonal communication (phone or mail) as the most frequent method of communicating with a lender as a function of the year the lending relationship started is graphed. The alternative method of communication is in person. The probability is calculated for a new firm that was both borrowing and had a checking account from a bank. The probabilities are based on the multinomial logit model (see Table V, column III), except the year the relationship started variable was replaced with a series of year dummy variables.

has local branches near the lender. In fact, lenders do indeed appear far from such firms because the method of communication is by phone or mail (see Table V). A national sales region seems to expand the pool of lenders the firm can borrow from because the firm has a national image and is thus more transparent.

Firms are more likely to use personal communication with their first lender and then move away from personal communication with later lenders. Thus, as firms become better known, they rely less on personal communication. Such firms are more likely to have a documented track record, just the type of hard information which makes personal communication less necessary. Unlike our distance regressions, we find an independent role for firm age. Firms that are older when they begin a relationship with a lender are less likely to communicate in person, although the magnitude of the effect is small. A firm that is five years old when it begins borrowing from its lender is one percent less likely to communicate in person than a start-up. Another difference in coefficients from the distance regression is the coefficient for the MSA indicator. Firms in urban areas are more likely to use arm's length methods of communication, even though we saw earlier that they were physically closer. This may reflect different social mores and is worthy of deeper study.

II. Possible Causes of the Changes in the Lending Environment

By including a time trend, we have been able to characterize the changing environment in which small firms and their lenders operate. We have not

directly identified the source of this change, however, other than by showing it is not simply a change in firm, loan, or lender characteristics, nor is it because of sample selection. In this section, we explore several changes in the small business lending environment that may explain our results.

A. Bank Consolidation

One of the major trends in banking has been the consolidation of the industry. The number of banks in the United States has declined by about 30 percent in the last decade (Berger, Demsetz, and Strahan, (1999)). Much of this decline has been in the form of mergers (Rhoades (1996), Berger et al. (1997)). The existence of fewer banks could explain the trend we find toward greater distance between firms and their lenders.

To control for differences in bank density across regions and across time, we include a measure of bank density in our model. We do not know the exact location of each firm. We only know in which of nine census regions the firm resides. Thus, our bank density variable (log of banks per 1,000 square miles) varies across time (the year a relationship started) and area (the nine census regions). We also calculate branch density (log of branches per 1,000 square miles), since it is the number of physical locations that most directly affects where and how firms build their lending relationships.

Bank density is correlated with the average distance between firm and lender (see Table VI, column I). Every 10 percent increase in the density of banks lowers the average distance by 0.8 percent ($t = 3.7$).[11] The effect of bank density on the method of communication is similar (see Table VII, column I). The coefficient on branch density is smaller economically and less statistically significant (see Table VI, column II). Each 10 percent increase in branch density lowers distance by 0.4 percent. Based on the magnitude of these coefficients, changes in bank or branch density do not explain the growing distance between firms and their lenders. The increase in distance attributable to the change in density over the sample period is only 4 percent, a small fraction of the actual increase. Moreover, the coefficient estimate on the year the relationship started does not change significantly.

Although there has been a significant loss of banks, the effect on the distance from lender and method of communication has been minimal. A simple explanation of this finding can be found in Figure 4. The decline in banks has been dramatic, but only starts in the mid-1980s. The effects we document begin much earlier (see Figures 1–3). This is one reason the inclusion of bank density does not change the coefficient on calendar year. More importantly, the number of branches, the physical locations that firms use to conduct their business, and the primary determinant of distance has not fallen (see Figure 4). The number of bank branches has risen about four percent per year. Much of the growth in the last decade has come from

[11] The dependent variable in these regressions is the distance between the firm and its lender, which may or may not be a bank. To check the robustness of our results, we reestimated the regression in column I of Table VI using only firm–bank pairs. The coefficient on bank density shrinks slightly in magnitude from -0.084 to -0.076 (regression not reported).

Table VI

Determinants of Distance to the Firm's Lenders: Includes Changes in the Lending Environment

The table contains regressions where the dependent variable is the log of one plus the distance to the firm's lender. The regression contains all the variables from Table IV, although only a subset is reported. In most cases, the variables in the table vary across both time and census region. The sample includes only relationships beginning since 1973. Each observation represents a firm–lender pair. Firms that borrow from multiple lenders or that borrow from a given lender but through multiple loan types (e.g., a line of credit and a mortgage) will generate multiple observations. The data are taken from the 1993 National Survey of Small Business Finance. Column V is based only on observations where the lender is a bank.

	Models						
Independent Variables	I	II	III	IV	V	VI	VII
Log(banks/1,000 square miles)	−0.084[1]						
	(0.023)						
Log(branches/1,000 square miles)		−0.037[10]		−0.008	−0.004	−0.018	−0.007
		(0.020)		(0.027)	(0.031)	(0.031)	(0.027)
Loan losses/total loans (%)			−0.004				
			(0.044)				
Log(bank employees/real loans)				−0.165	−0.155		−0.189
				(0.125)	(0.133)		(0.131)
Log(bank employees/real GDP)				−0.474[1]	−0.483[5]		−0.504[1]
				(0.181)	(0.201)		(0.185)
Log(bank employees/real loans) (based on national numbers)							0.215
							(0.472)
Log(bank employees/real GDP) (based on national numbers)							0.605
							(0.885)
Log(bank employees)						−0.531[5]	
						(0.276)	
Log(real GDP)						0.457[1]	
						(0.183)	
Log(real loans)						0.116	
						(0.144)	
Year relation started	0.036[1]	0.038[1]	0.037[1]	0.014	0.003	0.016	0.043
	(0.005)	(0.005)	(0.006)	(0.011)	(0.012)	(0.011)	(0.037)
R^2	0.320	0.318	0.318	0.314	0.166	0.314	0.314
Number of observations	5,974	5,974	5,974	5,662	3,542	5,974	5,662

[10], [5], [1] Significance at the 10%, 5%, and 1% levels, respectively.

Table VII

Determinants of the Method Used to Communicate with Lender: Includes Changes in the Lending Environment

Estimates are from a logit model. The dependent variable denotes the predominant method for communicating with the lender (zero if in person and one if by phone or by mail). The models contain the variables from Table V, although only a subset is reported. Each observation represents a firm–lender pair. Firms that borrow from multiple lenders or that borrow from a given lender but through multiple loan types (e.g., line of credit and mortgage) will generate multiple observations. The data are taken from the 1993 National Survey of Small Business Finance. Column V is based only on observations where the lender is a bank.

	Models						
Independent Variables	I	II	III	IV	V	VI	VII
Log(banks/1,000 square miles)	−0.100[1]						
	(0.036)						
Log(branches/1,000 square miles)		0.007		0.037	0.052	−0.001	0.035
		(0.031)		(0.042)	(0.049)	(0.048)	(0.043)
Loan losses/total loans			−0.038				
			(0.059)				
Log(bank employees/real loans)				−0.641[1]	−0.536[5]		−0.681[1]
				(0.196)	(0.225)		(0.203)
Log(bank employees/real GDP)				−0.913[1]	−0.857[1]		−0.928[1]
				(0.284)	(0.332)		(0.285)
Log(bank employees/real loans) (based on national numbers)							0.456
							(0.866)
Log(bank employees/real GDP) (based on national numbers)							0.394
							(2.287)
Log(bank employees)						−1.130[1]	
						(0.432)	
Log(real GDP)						0.843[1]	
						(0.245)	
Log(real loans)						0.453[5]	
						(0.225)	
Year relation started	0.042[1]	0.043[1]	0.049[1]	−0.002	−0.002	0.008	0.037
	(0.007)	(0.007)	(0.008)	(0.017)	(0.019)	(0.018)	(0.140)
R^2	0.285	0.284	0.216	0.289	0.143	0.289	0.289
Number of observations	5,945	5,945	5,945	5,633	3,517	5,633	5,633

[5] and [1] Significance at the 5% and 1% levels, respectively.

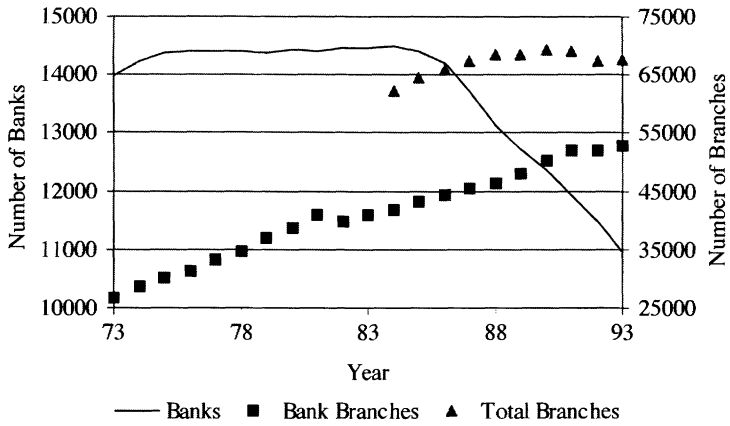

Figure 4. Number of banks and bank branches. The number of banks and bank branches is taken from the Federal Deposit Insurance Corporation (FDIC) web site. The number of banks is graphed along the left axis as a line and is stable until 1984 when it begins to decline. The number of branches is graphed along the right axis. The graph contains both the number of bank branches and the number of bank plus S&L (total) branches. The data on S&L branches is available only since 1984.

banks acquiring savings and loans. Thus, counting both sources, the total number of branches has remained static since the mid-1980s (see Figure 4 and Berger et al. (1999)). Finally, recall that we even find the distance between nonbanks and their borrowers is increasing. Since it is not clear that nonbanks are consolidating to the same extent as banks, we have to find a better explanation.

B. Changes in the Deposit Market

Another possible explanation has to do with the removal of intrastate and interstate branching restrictions over the 1970s and 1980s (see, e.g., Kroszner and Strahan (1999)), which permitted greater competition from more distant banks in local deposit markets. Most firms use deposit accounts, and if they have had greater freedom to deposit in more distant banks over time, they may have naturally proceeded to also borrow from them. If there are natural synergies for the firm between deposits and borrowing (see Nakamura (1989), Mester, Nakamura, and Renault (1998)), then we may be seeing the consequences of liberalization of the deposit market rather than any change in lending. However, this explanation is not fully consistent with the evidence. First, deposit market deregulation really took off in the 1980s, even though the trend we have noted in the growing distance between borrowers and lenders existed earlier. Second, the distance between firms and where they deposit has been growing only at about 40 percent of the rate at which the distance between firms and their lenders has been growing. To document this, we constructed a

data set that mirrors our borrower–lender pairs data set. In the new data set, each observation represents a firm–checking account provider pair. When we run a regression with log of one plus the distance to the branch where the firm has a checking account as the dependent variable and the calendar year in which the relationship started as an explanatory variable, we find that firms are also moving away from their checking accounts providers, but at a much slower rate than from their lenders. The rate of movement is only 1.4 percent per year (t = 4.0) versus 3.4 percent per year.

It should not come as a surprise that the growing distance in deposit markets is insufficient to explain the growing distance in the loan market. After all, the distance between firms and nonbank lenders has also been growing, and these lenders typically do not offer deposit accounts. Thus, it is unlikely that the increasing ability to deposit at a distance explains why firms borrow increasingly at a distance. In fact, the causality could well go in the opposite direction.

C. Changes in Credit Quality

Another possibility is that lenders have simply thrown caution to the winds and have reduced their credit standards and monitoring. A loan can easily be made at a distance if the lender is less concerned about recovery. To test this idea, we include loan losses expressed as a percent of total loans in the regression. In both the distance and the method of communication models, loan losses have little explanatory power and are statistically insignificant (see Tables VI and VII, column III). Loan losses have risen and fallen over the business cycle, but there has not been a secular increase in loan losses over our sample period that would explain the changes in the lending market which we document. We now offer a hypothesis about the causes of the phenomenon we have found.

III. Greater Use of Information Technology and the Declining Importance of Distance

Unlike large firms, the information available about small and private firms has historically been limited and difficult to access. With the exception of some high growth industries, which are a very small portion of our sample, analysts do not follow these firms. Since small firms do not raise capital in public markets, they are not required to disclose much information. The firm's lenders clearly know about the firms, but these lenders are few in number and did not readily share information in the past. Since information about the firm was not compiled, stored, and distributed by a central bureau, but instead resided in the minds of the firm's lenders, much of it tended to be soft, whether the firm's managers were of good character and reliable, for example, rather than hard information specifying when and to whom it had, or had not, made payments in the past.

A. Growing Use of Information Technology

The use of information and communications technology, by which we mean everything from hardware like computers and phones to software like credit scoring and client profitability programs, has transformed the financial sector over the last three decades (Mishkin and Strahan, (1999)). Three aspects are particularly significant to us. First, the ability to collect, store, process, and communicate large amounts of information has expanded tremendously. Second, this has resulted in the expansion of the activities of infomediaries whose sole purpose is to make available this information to paying customers. Third, the availability of hard, processed information lends itself to cost-effective credit appraisal and monitoring techniques that do not require close and personal contact. Since the first aspect is fairly uncontroversial, let us examine the latter two in more detail.

A.1. Expansion of the Activities of Infomediaries

Technological change has resulted in the expansion of the activities of infomediaries such as rating agencies and credit bureaus. For example, Dun and Bradstreet (D&B) collects information about firms from millions of on-site and telephone contacts with business owners and managers, as well as from government filings, the firm's banking and trade partners, and public news sources. Over our sample period (1973 to 1993), the number of firms on which D&B has records has grown 6.3 percent per year, a rate over two and a half times the real growth of the economy. Specialized infomediaries like D&B can save on duplication and amortize the costs of information collection over a larger number of customers than could lenders in the past. As a result, they can distribute more information than ever before to lenders and do so in a timely manner that does not depend upon geographic proximity.

A.2. More Efficient Appraisal and Monitoring

The increased availability of systematic reliable information has allowed loan officers to cut down on their own monitoring. While, undoubtedly, some soft information that is hard to collect and communicate is no longer captured when the loan officer ceases to make regular visits to the firm, it may be more than compensated by the sheer volume and timeliness of hard information that is now available. Moreover, because it is hard, the information can now be automatically processed, eliminating many tedious and costly transactions. For example, credit scoring, a process by which a loan applicant's credit history and characteristics are summarized in a credit score which forms the basis for loan approval, is increasingly used by large lenders such as Wells Fargo to make lending decisions even for small businesses (Mishkin and Strahan (1999), Berger and Udell (2000)). By using financial histories, credit reports, and scoring methods, lenders can dramatically lower the time their loan officers spend on a given application and thus the cost (Mester (1997), Padhi, Srinivasan, and Woosley (1999)).

Small firms gain substantially from reductions in the fixed costs of loan origination and information collection (Frame, Srinivasan, and Woosley (2001)). Firms in the survey were asked the total fee (not including interest) that they paid to obtain their loan. The level of the fee is uncorrelated with the size of the loan across the sample (correlation = 0.001). Thus, fees as a fraction of the loan size declined with the size of the loan. Given these costs are largely fixed, their reduction should produce the largest gain for the smallest firms. The average loan in the survey is approximately $18,000. Additionally, if transactions costs drop sufficiently, the number of lenders that are willing to lend may expand. This has the possibility of not only expanding the supply of finance to small firms, but also, to the extent that geographically larger markets are more competitive, reducing the cost of financing.

In addition, when information is timely, the lender can reduce the potential loss from borrower moral hazard. If a borrower, either because of incompetence or malevolence, takes improper actions, the lender can act quickly to stop further lending and demand repayment. By contrast, if the lender acquires information after a long lag, the borrower's assets may have deteriorated under poor management, and other lenders may have seized anything of value. Timely information reduces the costs of lending. Thus, the growing use of information technology could explain both the growth in lending at a distance, and the fact that credit losses have not increased as a result. Let us now explore ways of testing this hypothesis.

A.3. An Empirical Test

Our finding that the physical distance between lender and borrower has expanded and that the interaction between the two has become less personal is consistent with the intuition that information technology is replacing the traditional role of the loan officer. In this section, we see if our results can be explained by measures of information technology use.

The use of credit scoring models is an example of the classic substitution of capital for labor. Previously, loan officers would read the application material from the borrower, talk with the borrower, maybe interview references and then make a decision, a very labor intensive process, but the nature of the information upon which the decision was based demanded such time (Mester (1997)). Credit decisions based on credit reports (computerized data) and analytic decision rules (computerized logic), however, require less of the loan officer's time. It is not that personal intervention has been eliminated, it has just been focused on the most marginal decisions. Loan originations involve fewer people and more computers. While fully automated credit scoring has only recently been implemented by some lenders, the process of automating the lending and monitoring decision has been going on for some time.

To see if this explains our findings, we collected data on bank employment. The ideal measure is the number of loan originations per loan officer,

as this is a measure of labor productivity and should rise systematically as information technology supplements the efforts of the loan officers. In the absence of these data, the empirical challenge is to find the correct normalization. Bank employment has grown over the last two decades. However, when normalized by either total lending or the size of the local economy (measured in real dollars), bank employment is shrinking (see Figure 5).

To test the hypothesis that changes we find in the lending market are due to the greater use of information technology, we include in our regressions the log of bank employees in the region standardized by total real loan volume or by the size of the economy (total real regional output). The results are reported in Table VI, column IV. Fewer employees are associated with a greater distance between lender and borrower. However, only when we standardize number of employees by the total output is the coefficient statistically significant ($t = 2.6$). In this case, every 10 percent decrease in the number of employees to gross regional product raises the distance to a firm's lender by 4.7 percent. This explains a large fraction of the increase in distance over the last two decades. Based on the decline in employees between 1977 and 1993 and the coefficients on bank productivity, the predicted increase in distance is 58 percent of that implied by the coefficient on the year the relationship started in Table II. Consistent with this intuition, the coefficient on the year the relationship started drops significantly and is no longer statistically different from zero ($p = 0.20$, see Table VI, column IV). Increases in bank productivity correlate strongly with growing distance.[12]

The results for method of communication are qualitatively similar (see Table VII, column IV). As the number of employees standardized by real total loan volume or real gross regional product has declined, personal communication has decreased. Both measures of productivity are now statistically significant ($t = -3.3$ and -3.2). As with distance, these variables explain a large fraction of shift away from personal communication. The coefficient on year the relationship originated is no longer statistically significant ($p = 0.90$). The explanatory power of the time trend has been absorbed by the bank productivity measures.

Given the regression results and Figures 1–3, there may be concern that any trending variable will explain the shift in distance and method of communication that we document. This is not correct. The data are able to distinguish between a simple time trend (the year variable) and the standardized bank employees variable, with only the latter being statistically significant. However, to demonstrate our point more strongly, we ran an additional test. We created a new variable which is the log of bank employees standardized by total loans and by total output, not for the region in which the firm is located, but for the United States as a whole. This variable has time-series

[12] The dependent variable is the distance between a firm and its lender, which may or may not be a bank. To check the robustness of our results, we reran the regression on only firm–bank pairs and the results are qualitatively unchanged (see Table VI, compare columns IV and V).

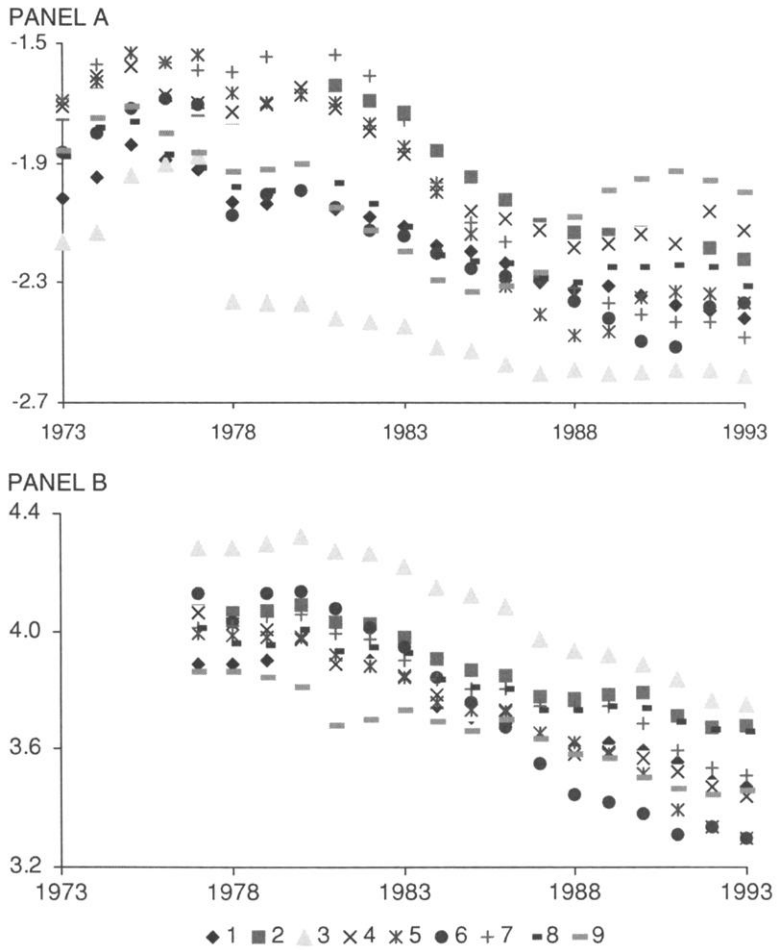

Figure 5. Total bank employment relative to total real bank lending and total bank employment relative to real gross region product. Panel A is the graph by census region (1–9) and year of the log of total bank employment divided by total real bank lending (in $1,000s) against time. Both numbers are from the Federal Deposit Insurance Corporation (FDIC). Regional numbers are the sum of the numbers for each state in the region. Panel B is the graph by census region and year of the log of total bank employment divided by real gross region product. Gross state product data is from the Bureau of Economic Analysis (BEA), Commerce Department. (The FDIC numbers are from http://www2.fdic.gov.hsob/ and the Commerce department numbers are from http://www.bea.doc.gov/bea/regional/gsp/gsplist.htm.) Gross state product is only available since 1977 and is reported in millions of dollars. Regional numbers are the sum of the numbers for each state in the region.

variation, but no cross regional variation, by construction. It is correlated with the region variable, but not perfectly ($\rho = 0.74$). When we include both the region-specific employee variables and the aggregate (U.S.) employee variables, the national variables are statistically insignificant both singly

and jointly (see Tables VI and VII, column VII). The distance between a firm and its lender is correlated with the use of more productive techniques by banks in the firm's region, but not with more productive techniques in the country at large.

B. Consequences of Growing Distance

We have argued that lenders may be willing to go further because they expect to get information for the purposes of monitoring and controlling firms more easily and quickly at a distance than in the past. Credit reports from centralized bureaus may be one source of this additional information. If new technologies permit better monitoring and control at a distance, we should see that the ability to borrow at a distance is no longer such a strong signal of the intrinsic credit quality of the firm. In the past, only those with unimpeachable credit histories could borrow at a distance because there was no way for a distant lender to anticipate when a weaker borrower would get into trouble, and it was very costly to resolve distress at a distance when the borrower was in trouble. More recently, however, lower quality borrowers should be able to get credit at the same distance because information costs are lower and timely intervention is now possible.

We have two immediate problems in implementing this test. First, we do not have a measure of the credit quality of the borrower when the relationship started. However, we do know the rate on the last loan the firm obtained, as well as whether the firm's last loan application was approved or rejected. This gives us two measures of recent credit quality. A second problem is that distance is, by itself, not a perfect measure of a firm's intrinsic ability to tap into a wider pool of lenders. Lenders can be at a distance because information about the firm's quality is widespread (i.e., it is informationally transparent). A firm can also be at a distance from its lenders simply because there are no nearby lenders (firms in rural areas are 13 percent further from their lenders, see Table IV). Thus, all components of actual distance need not convey information about credit quality. We can, however, extract the ability to borrow at a distance that is correlated with public information. This is distance predicted using the regression coefficients in Table IV and is a measure of the transparency of the firm.[13]

If firms with poorer credit histories can borrow at a distance now, while they could not in the past, predicted distance from lending relationships which were established in recent years should be a weaker signal of credit

[13] We use the coefficient estimates from Table IV, column IV, to predict distance and estimates from Table V, column III, to predict method of communication. We only use those variables which we think measure the firm's informational transparency in our predicted distance and method. These include whether the firm uses records, whether the firm has a business credit card, the ownership share of the largest shareholder, whether the firm is a corporation, whether the firm is a franchise, whether the firm is owner managed, the age and experience of the owner, and the sales region of the firm. We omitted variables such as lender type, as this is part of the firm's choice set and not a characteristic of the firm.

Table VIII

Determinants of Interest Rate on Firm's Most Recent Loan

The dependent variable is the rate on the most recent loan. The estimates in columns III and VI are identical to those in columns II and V, except the standard errors have been estimated by bootstrapping (1,000 repetitions). The models also include a dummy variable for whether the firm is a corporation, whether the loan is collateralized, and whether the firm or the firm's owner has had a delinquency in the last three years. The data are taken from the 1993 National Survey of Small Business Finance.

	Models					
Independent Variables	I	II	III	IV	V	VI
Maturity matched treasury rate	0.367[1]	0.367[1]	0.367[1]	0.369[1]	0.370[1]	0.370[1]
	(0.029)	(0.029)	(0.029)	(0.029)	(0.029)	(0.029)
Log(firm's assets)	−0.243[1]	−0.243[1]	−0.243[1]	−0.242[1]	−0.242[1]	−0.242[1]
	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	(0.022)
Outside debt/assets	−0.107	−0.107	−0.107	−0.104	−0.103	−0.104
	(0.067)	(0.067)	(0.080)	(0.067)	(0.067)	(0.079)
Log(1 + firm age)	−0.024	−0.032	−0.032	−0.015	−0.012	−0.012
	(0.044)	(0.048)	(0.049)	(0.044)	(0.047)	(0.050)
Loan has floating rate (1 = yes)	0.030	0.030	0.030	0.032	0.032	0.032
	(0.074)	(0.075)	(0.071)	(0.075)	(0.075)	(0.072)
Lender is a bank (1 = yes)	−0.565[1]	−0.567[1]	−0.567[1]	−0.557[1]	−0.556[1]	−0.556[1]
	(0.099)	(0.099)	(0.148)	(0.099)	(0.099)	(0.150)
Lender is nonfinancial firm	−0.460[5]	−0.459[5]	−0.459	−0.443[5]	−0.444[5]	−0.444
	(0.230)	(0.230)	(0.485)	(0.230)	(0.230)	(0.484)
Number of financial lenders	0.075[1]	0.076[1]	0.076[1]	0.073[1]	0.073[1]	0.073[1]
	(0.021)	(0.021)	(0.018)	(0.021)	(0.021)	(0.018)
Predicted distance from lender	−0.546[1]	−0.528[1]	−0.528[5]			
	(0.179)	(0.184)	(0.217)			
Predicted distance * year relation started		−0.001	−0.001			
		(0.004)	(0.003)			
Predicted method used to communicate with lender				−1.328[1]	−1.398[1]	−1.398[1]
				(0.418)	(0.542)	(0.546)
Predicted method * year relation started					0.005	0.005
					(0.024)	(0.021)
R^2	0.174	0.175	0.175	0.175	0.175	0.175
Number of observations	3,523	3,523	3,523	3,523	3,523	3,523

[5] and [1] Significance at the 5% and 1% levels, respectively.

quality than distance from relationships set up in the distant past. We examine the effect of predicted distance on the price and availability of credit in Tables VIII and IX, both by itself and when interacted with time. This allows us to see the effect on informational transparency on the cost and availability of finance and how this has changed over our sample period.

In Table VIII, we regress the rate a firm obtains on its most recent loan against predicted distance as well as other controls from Petersen and Rajan (1995). Predicted distance has a negative and significant effect on the rate (see column I). An increase in predicted distance of 50 percent lowers the cost of borrowing by 25 basis points. This is twice the effect of a 50 percent increase in the size of the firm. Thus, the ability to borrow at a distance,

Table IX

Probability of Loan Approval on Most Recent Loan

The table contains estimates from a logit model. The independent variable is one if the firm was approved for a loan and zero otherwise. The sample includes both those firms that applied for a loan as well as those firms that did not apply for a loan because they expected to be turned down. The last group is coded as being turned down for a loan. Only loans that were applied for (or considered) in the last three years are included. The estimates in columns III and VI are identical to those in columns II and V, but the standard errors have been estimated by bootstrapping (1,000 repetitions). The models also include a dummy variable for whether the firm is a corporation, whether the loan is collateralized, and whether the firm or the firm's owner has had a delinquency in the last three years. The data are taken from the 1993 National Survey of Small Business Finance.

	Models					
Independent Variables	I	II	III	IV	V	VI
Log(firm's assets)	0.350[1]	0.349[1]	0.349[1]	0.352[1]	0.349[1]	0.349[1]
	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)	(0.025)
Return on assets (profits/assets)	0.375[1]	0.386[1]	0.386[1]	0.382[1]	0.381[1]	0.381[1]
	(0.080)	(0.080)	(0.080)	(0.079)	(0.080)	(0.080)
Outside debt/assets	0.005	0.005	0.005	0.004	0.004	0.004
	(0.015)	(0.015)	(0.020)	(0.015)	(0.015)	(0.021)
Corporation (1 = yes)	−0.034	−0.028	−0.028	−0.037	−0.036	−0.036
	(0.104)	(0.104)	(0.115)	(0.105)	(0.105)	(0.111)
Firm age	0.008	0.008	0.008	0.007	0.007	0.007
	(0.006)	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)
Length of longest relationship	0.012	0.004	0.004	0.012	0.004	0.004
	(0.009)	(0.010)	(0.010)	(0.009)	(0.010)	(0.010)
Debt from financial service provider (%)	1.590[1]	1.563[1]	1.563[1]	1.584[1]	1.554[1]	1.554[1]
	(0.107)	(0.108)	(0.115)	(0.107)	(0.108)	(0.113)
Number of financial lenders	0.021	0.028	0.028	0.020	0.029	0.029
	(0.029)	(0.029)	(0.029)	(0.029)	(0.029)	(0.030)
Herfindahl index > 1,800	0.187[5]	0.184[5]	0.184[5]	0.191[5]	0.187[5]	0.187[5]
	(0.080)	(0.080)	(0.078)	(0.080)	(0.080)	(0.079)
Predicted distance from lender	0.680[1]	0.824[1]	0.824[1]			
	(0.257)	(0.269)	(0.297)			
Predicted distance * year relation started		−0.010[10]	−0.010[10]			
		(0.006)	(0.006)			
Predicted method used to communicate with lender				1.614[1]	2.927[1]	2.927[1]
				(0.638)	(0.928)	(0.967)
Predicted method * year relation started					−0.084[5]	−0.084[5]
					(0.024)	(0.043)
Pseudo R^2	0.172	0.173	0.173	0.172	0.173	0.173
Number of observations	4,548	4,548	4,548	4,548	4,548	4,548

[10], [5], [1] Significance at the 10%, 5%, and 1% levels, respectively.

predicted by measures of the firm's informational transparency, seems to be a good signal about the credit quality of the firm.

When we include an interaction between the year the relationship started and distance, however, the coefficient for the interaction is not significantly different from zero (see column II). Although predicted distance has a large effect on the cost of capital, this effect does not appear to have changed over

time. In column III, we estimate standard errors by bootstrapping, and this does not significantly change the statistical power of our results.[14] When we used predicted method of communication instead of predicted distance as a measure of transparency, we obtain exactly the same qualitative results. If a lender is willing to deal with the firm by mail or phone, the firm gets a lower rate on its most recent loan, but the coefficient on the interaction between predicted method and year is insignificant.

The absence of time effects may reflect the fact that the rate for small loans is often determined by standard boilerplates, based on standard information such as firm size and industry (Petersen and Rajan (1994)). This is especially likely when loans are made by branches of large banks (see Brickley, Linck, and Smith (2000), and Stein (2002)). Petersen and Rajan find that while the rate charged on a loan is not sensitive to measures of the information that is generated about a borrower (such as the duration of the relationship with the lender), the availability of credit is. So if information is more widely available over time, the reduced effectiveness of distance as a signal of credit quality over time will not be seen in the rate but in the availability of credit. As we will now argue, this is indeed the case.

A direct measure of whether credit is available for a firm is whether the firm's last application for a loan is approved. Of course, a loan can be approved only if it was applied for. The firm will apply for credit if it needs funds and it thinks approval is sufficiently likely, and not otherwise. However, those who need funds but do not apply because they think their application will be refused should also be thought of as rationed. Therefore, a firm is included in the regression below if it either applied for a loan, or needed financing but did not apply for a loan because it felt it would be denied. The dependent variable for the regressions reported in Table IX is whether a firm's loan application was approved. Firms whose loan application was approved are coded as one. Those who needed funds but did not apply are considered equivalent to those who needed funds and were rejected, and are coded as zero.

Together with controls for availability taken from Petersen and Rajan (1994), we include predicted distance as an explanatory variable in Table IX. Predicted distance is indeed a measure of intrinsic credit quality of the firm. Higher predicted distance is strongly positively correlated with greater availability of funding (column I). Increasing predicted distance from the 25th to the 75th percentile raises the probability a loan will be approved by 21 percentage points. Unlike the results for the interest rate (Table VIII), however, the inclusion of an interaction between the year the relationship was started

[14] The reported standard errors in column II are OLS standard errors. This is a problem since predicted distance and predicted distance interacted with the year the relationship started are predicted regressors. We estimated standard errors by bootstrapping the model. A sample with replacement was drawn. We then estimated the first stage, created the predicted distance variables given those estimates, and then estimated the second stage (the model in Table VIII, column II). This gave us a single estimate of the coefficients. This was done 1,000 times, and the standard error of this distribution of estimates is reported in column III.

and predicted distance has a statistically significant negative coefficient (column II) that persists even after we compute boot strapped standard errors (column III). This suggests that the distance at which a firm is able to borrow has become less significant in distinguishing its credit quality in recent times. The coefficient estimates imply that the role of predicted distance on the firm's access to capital is approximately 25 percent less in 1993 as compared with 1973. As before, the results are similar when we use predicted method of transacting instead of predicted distance.[15]

In summary, firms that are informationally more transparent (have greater predicted distance and lower probability of personal communication) face less credit rationing and are charged lower interest rates. However, the relation between predicted distance and credit availability is weakening over time. If predicted distance is no longer such a strong signal of credit quality, the implication is that riskier credits are being financed at a greater distance. Since loan losses have not steadily risen over this period and have no strong correlation with distance, we are left to conclude that a more distant and less creditworthy set of borrowers have become viable to lenders because improvements in technology allow cheaper screening, monitoring, and control, at a distance. Our results are consistent with the information and communications revolution making distance less important.

IV. Conclusion and Discussion

We have documented a trend in the distance between small firms and their lenders in the United States. Firms are choosing more distant lenders and are also communicating with them in more impersonal ways. The evidence suggests the trend correlates well with the increases in the productivity of lenders. One explanation for why financial institutions are doing more distant lending without making poorer decisions is that advances in computing and communications have increased the availability and timeliness of hard information, thus allowing for more impersonal and distant lending. Our finding that distant firms are no longer only the highest quality credits is consistent with this hypothesis. The important implication is that credit availability for small firms as well as the competition they face in the credit markets, has increased.

The paper makes a number of contributions. For one, it focuses on new metrics for informational closeness: physical distance and method of communication. Others have used distance as a proxy for informational asymmetry (e.g., see Coval and Moskowitz (1999), Garmaise and Moskowitz (1999), and Grinblatt and Keloharju (2001)). To the best of our knowledge, however, we have not seen this correlated with the nature of the institution or with

[15] It turns out that actual distance is, indeed, a noisy estimate of what we are trying to measure. When we reran the regressions in Tables VIII and IX using actual, rather than predicted distance, the coefficients on distance are an order of magnitude smaller than we report in Tables VIII and IX, and are only statistically significant in the approval regressions.

credit availability and price. We find that informationally opaque firms have closer lenders, and that banks are closer than other lenders (even correcting for the fact that banks offer transaction accounts). Also, correcting for distance and the existence of transaction accounts, bank transactions are more likely to be conducted in person than transactions with other lenders. All this suggests that banks are indeed closer, and their loans are more relationship based then nonbank lenders.

While banking theory has indeed suggested that bank loans are more likely to be relationship based (see Fama (1985) and Diamond and Rajan (2001)), the empirical literature has not found much difference between the stock price reactions to bank loan announcements and announcements of loans by nonbanks (see Billett, Flannery, and Garfinkel (1995)). Our paper, by contrast, suggests an extremely strong empirical difference between bank lending and nonbank lending. Perhaps our sample of small firms is more amenable to identifying these differences than the typical sample used in the past, which, because of the focus on publicly recorded loan announcements, is restricted to large firms. Perhaps, also, our measure of physical and personal distance may be more informative than stock price reactions to loan announcements, especially because there may be biases in which loans are announced. But there is also a chance that our findings are purely mechanical.

One possible argument is that since banks can offer checking accounts, they have a lower cost of maintaining a branch network (the fixed costs are amortized over both loans and checking accounts). Thus, for a given size of loan portfolio, a bank is likely to be able to access closer clients through its branch network than a similar sized nonbank. The closeness of banks may simply be because of their branch network, rather than any superiority in monitoring of the kind that requires physical proximity.[16] We do not, however, think this accounts for our results. The reason is that our comparison is not between the average distance of a bank's loan portfolio from the bank and the average distance of a nonbank's portfolio from the nonbank. Instead, it is the distance of a firm from its bank or nonbank lender. This distinction is important.

To see why, let us conduct two thought experiments. In the first, let there be a cost to a firm of going further away to borrow, but no cost differential between going to a bank branch and a nonbank if they are at the same distance. The firm would then pick the nearest lender, regardless of whether it is a bank branch or a nonbank. If firms, bank branches, and nonbanks are distributed randomly across the country, this would imply that firms would be *equally* close to bank branches and nonbanks. Of course, the fraction of loans firms have from bank branches and nonbanks would reflect their relative number in the population, but this would have no effect on the distance between a firm and a particular lender.

[16] While theory does suggest that banks' ability to offer deposits and their ability to make relationship-intensive loans are related (see Diamond and Rajan (2001)), the reasons are quite different from those suggested above.

In the second thought experiment, let there be no additional cost to the firm of going further away to borrow. In this case, the firm would simply pick at random from the population of bank branches and nonbanks. Again, assuming both types of institutions are placed randomly, there would be no difference in distance between a firm and a particular lender type.

Finally, perhaps banks are nearer only because the firm has deposits with them. We have shown that even banks where the firm does not have deposits are near. Perhaps the firm once had deposits with these banks and does not at the time of the survey. To check this, we examine the first relationship for young firms (those less than five years old). This is a subsample where deposit accounts are likely to be present if they existed at all, so "bank" is less likely to proxy for the former existence of deposit transactions. It turns out that firms which borrow from nonbanks are 124 percent further from their lender than firms which borrow from banks (using the specification in Table II, column I), approximately the same as in the overall sample (117 percent).

In sum, the difference in distance between banks and nonbanks is unlikely to be due to the bank's branching network. It must reflect a difference in comparative advantage. Perhaps the nonbank is better at monitoring loans at a distance; perhaps the bank is better at the kind of monitoring that requires a physical presence. We cannot discern what the source of comparative advantage is, only that it seems to exist. The evidence does seem suggestive that banks are physically close lenders because the nature of the lending functions they perform is different.

Our findings have policy implications. If information technology can increase the services provided to, and competition in, the sector that has historically been viewed as the most informationally sensitive and thus most local, that is, small business lending, then the relevant size of the market for antitrust policy will have to be revised upwards over time. Of course, antitrust authorities may have other markets than just small business lending in mind, and some of these markets, such as the market for transaction deposits, are growing more slowly (Woosley, King, and Padhi, (2000)). The growth in size of all these markets nevertheless implies that the regulatory authority monitoring stability in local markets should become less willing over time to intervene to bail out regional financial institutions since the services they provide can be provided from outside the region.

Our findings also have implications for other areas of research. The increased availability of finance to small firms could also have an influence on macroeconomic policy. For example, Gertler and Gilchrist (1994) suggest that small firms account for a disproportionate share of the manufacturing decline that follows monetary tightening. If the access of small firms to credit has improved, then it may well be that monetary policy will have much less effect than in the past.

There has been a debate about whether institutional lending, especially bank lending, is in secular decline because of the greater availability of information to arm's length financial markets today (see Boyd and Gertler

(1994) and Gorton and Rosen (1995) for two contrasting views). Our evidence suggests that institutional lending also seems to have benefitted from the greater availability of information. This greater availability of hard information has enabled institutions to lend to more distant clients whom they would have shunned in the past. Thus, instead of driving financial institutions such as banks out of the business, technological change may also create new sources of comparative advantage for some of them (Merton (1995)).

Finally, there is an ongoing debate about whether the effects of the improvements in information technology result in improvements in productivity (e.g., see Gordon (1999)). Our evidence, while not directly addressing this issue, suggests that at least in the financial sector, the nature of transactions is changing in a direction consistent with greater information availability and reduced costs of processing it. When combined with evidence that these changes are correlated with improvements in bank productivity, this should strengthen our belief that information technology does indeed increase productivity. More research is needed to put these conclusions on stronger ground.

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