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Banks and the Role of Lending Relationships: Evidence from the U.S. Experience

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Abstract

One characteristic which may distinguish banks from other financial institutions is the role of relationships between the bank and its borrowers. These firm-lender relationships can help resolve market failures and thus provide a role for banks. This paper describes the theoretical role of lending relationships in financial markets. Relationships can generate useful information as well as be used to constrain borrowers. Empirically, relationships appear to have the greatest effect on the provision of credit opposed to the price at which firms are able to borrow. Finally the paper examines current changes in financial markets and their impact on the durability of lending relationships as well as their continued role in modern financial markets.

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I. Introduction.

A basic purpose of financial markets is to transfer capital from investors to firms and entrepreneurs with profitable investment opportunities and in turn distribute risk efficiently across investors. In the absence of market frictions, the structure of financial markets does not fundamentally change this process. The relevance of financial markets and financial institutions occurs when they arise to help solve some of the frictions that we find in real markets.

Banks serve multiple purposes. They pool assets thus lowering transactions costs. They transform short term liquid investments such as deposits into long term illiquid assets such as loans (Diamond and Rajan, 1998). They also economize on collecting and processing the information necessary to make investment and lending decisions. This is the paper's focus. It is well known from the theoretical literature that if borrowers know more about their abilities and intentions, capital markets can break down. There may be no price for capital (interest rate) which will allow lenders to make a profit (Stiglitz and Weiss, 1981). These cases are most likely to occur when the information available about borrowers is limited and expensive to acquire. This is one place where the services of banks may be of great value.

Banks may be more efficient at collecting information due to simple economies of scale. They can collect information once for hundreds of borrowers – thus reducing the aggregate cost of collecting information. If this information is durable (can be used as an input to the lending decision over multiple periods) and not easily replicated by competitors, theory suggests that a firm with close ties to financial institutions should have a lower cost of capital and greater availability of funds relative to a firm without such ties (Diamond, 1984, Haubrich, 1989, and Diamond, 1991). The idea that banks can provide a service in the form of a lending relationship arises out of the value that

firms place on these relationships.

This paper examines the role of firm-creditor relationships in resolving the informational problem inherent in lending. The next section discusses the theoretical motivations for believing that lending relationships have value. If by building a relationship banks can learn the quality of borrowers, they may be able to profitability lend, where less informed capital providers may not. Using a sample of borrowing by small U.S. firms, we measure the effect of building a relationship with one's lender on the price of capital and availability of capital. Surprisingly, we find that controlling for characteristics of the firm and lenders, building a relationship with a lender has only a small effect on the cost of capital facing these firms. Instead, relationships appear to be valuable not because they provide small firms with cheaper capital, but because they give these firms access to more capital. We find that the role relationships play in providing capital to small firms depends critically on the competitiveness of the capital markets. Although, in general, competition leads to greater output and lower prices, we find that in the presence of other market imperfections, this is not always true. The final section of the paper examines two current trends which are altering the structure of the U.S. banking market. The paper discusses how these trends -- consolidation in the banking market and the growing use of information technology -- are effecting the strength of lending relations and their role in providing capital for small firms.

II. Value of Lending Relations.

A. Theoretical Sources of Value.

If lending relationships are a valuable asset for the bank — and for the borrower – from where does the value come? This is important for several reasons. First, if we want to understand why relationships are valuable, and thus have some guidance of what to look for in the data, we need

to think about why they are valuable. This is the academic question. It is also a relevant question for practitioners. Some financial lenders view them selves as relationship based, opposed to transaction based. If this is true, it is important to know the source of their competitive advantage. Why do relationships make them a lower cost or higher value lender than their competitors.

1. Information from relations.

In a simple market, price will adjust to equate supply and demand for a good. Thus in the loan (capital) market, the interest rate should adjust to equate the demand for capital with the supply of capital. If firms ever found themselves desiring more capital than lenders were willing to supply at the current price, then the interest rate would rise until the excess demand for capital was driven to zero. Of course, riskier firms would be required to pay higher rates on their capital. This simple model works as long as lenders know as much about the borrower's type and investment opportunities as the borrower. If the lender does not, then increases in the interest rate may not clear the market. Higher interest rates will tend to drive away safer borrowers (the adverse selection problem) or encourage firms who do borrow to invest in riskier projects (the moral hazard problem). Thus the higher interest rate may no longer cover the bank's expected losses and the bank may optimally choose not to lend (Stiglitz and Weiss, 1981). Firms will thus fine themselves credit constrained – having more profitable investment than they are able to fund.

One market solution to this problem has been the use of financial intermediaries to produce and use information in the loan origination process. Remember, if the information asymmetry between borrower and lender (the borrower knows more than the lender about the their own quality) can be resolved, then the market can once again clear. Firms with viable investment projects will be able to raise external capital.

This information production can arise from multiple sources. The role of credit reporting agencies in aggregating information from multiple sources into easy to use indexes is part of this process. However, not all information can be collected from arms length information agencies. One of the advantages of relationships is they may allow the lender to collect information about a borrower which is not easily reproduced by other financial institutions. This can give the lender a competitive advantage. Banks can learn about a firm both by observing it over time as well as over products. The bank can observe the firm's repayment history as well as other information about the firm and manager which the bank obtains through the loan officer. History with the bank raises the banks expectation that the borrower is a good credit risk. (Diamond, 1991). In addition to interaction over time, relationships can be built through interaction over multiple products. Banks do more than just lend money. They may manage the firm's cash account, factor its sales, and service its lock box. These additional services provide by the bank can give the bank an additional perspective on the current financial strength of the borrower and potentially an early indicator if the borrower experiences financial distress.

2. Control.

The second problem with arms length debt markets is borrowers may take actions after capital is lent, which transfers value from fixed claim holders to equity holders. The superior information which banks can secure may dampen this problem. They can avoid loans to firms which they consider more able or more willing to undertake such transfers. Bond covenants are a second means to reduce this problem. If contracts could be written, actions which transfer wealth away from debt holders could be prohibited. In general, this isn't perfect. The contracts would have to specify not only that the risk adjusted return of investment projects must be positive (i.e. they are positive

NPV), but also specify the distribution of the returns. Banks, however, may have more control over borrowers. The threat of cutting off future funds may constrain the types of actions that firms take. This of course is only viable if the bank has some market power. In a perfectly competitive market, other lenders would step in and lend if lending was a profitable endeavor. We return to the importance of the capital market competition below.

B. The Empirical Value of Lending Relations.

Lending relationships should be most valuable where the information about a firm and its potential investment opportunities are most uncertain. This is especially true of small firms. They tend to be young and thus have little track record. They are often in new industries or markets, and thus firms against which they can be compared are also less common. Empirical research on lending relationships has thus focused on small firms. However, even for large and publicly traded firms, for whom access to capital markets should be less costly and lending relationship potentially less valuable, lending relationship appear to have value.

In a clever use of stock price data, Slovin, Sushka, and Polonchek (1993) examined the stock price response of firms which had publicly disclosed lending relationships with Continental Illinois Bank when the bank announced its insolvency. The borrower's equity value fell by 4.2% on the announcement and then rebounded by 2% when the FDIC announced its rescue of Continental. The announcement effect was significant only when Continental was the direct underwriter or the manager of the syndicated loan (the keeper of the relationship). The stock price change was larger, the larger the lending amount (relative to firm size) and was smaller if the borrower had publicly documented relationships with other banks. If lending relationships are so important to publicly traded firms, the expected value should be even higher for small firms even if we can't directly

measure the value. We now turn to empirical evidence of how relationships help small firms.

1. Lending relations and the price of capital.

To measure the role lending relationships have on small firms, we examined the lending patterns to a sample of small U.S. firms as a function of the existence and strength of their lending relationships. An obvious challenge is devising meaningful measure of lending relationships. The data for this work is based on a sample of small firms (less than 500 employees which was collected by the U.S. Small Business Administration and Board of Governors of the Federal Reserve System. For a more detailed description of the data see Petersen and Rajan (1994). Banks are the predominant source of debt capital for these firms even when we include loans from owners and family (see Petersen and Rajan, 1994, Table II).

We estimate the cost of capital for small firms by regressing the interest rate paid on their most recent loan on firm and loan characteristics. This allows us to explain why some firms pay more than others. Not surprisingly, the cost of capital does vary across firms. Larger firms and older firms tend to be more secure and have higher probabilities of survival. Accordingly, they pay lower rates when they borrow. Controlling for other determinants of price, we are next interested in whether firms which have build relationships with their lenders are rewarded with less expensive capital.

We used two measures of relationship in the data. We used the length of the relationship between the firm and the lender. This variable captures the idea that over time as the bank does business with the borrower, they will learn about the borrower's type. Of course, all market participants can learn about the firm's type by observing that it survives. The length of the lending relationship – opposed to the age of the firm – captures the private information which the lender

acquires as part of its relationship with the firm. To capture the idea that lenders learn more about a borrower if they do more than just lend to the borrower, we also examined whether the bank provided services to the firm. We then examined the cross sectional variation in the cost of credit to these small firms as a function of whether they had lending relationships.

The evidence that relationship are valuable – in the sense they lower a firm's borrowing costs – is weak. Longer relationships have no effect on the firm's borrowing rate once we include the firm's age and other characteristics of the borrower and the loan. It is true that over time lenders learned about a firm. Younger firms borrow at rates higher than older borrowers. However, an old firm with a short lending relationship borrows no more cheaply than an old firm with a long lending relationship. We find similar results when we examine the services that borrowers secure from their banks. The loan rate at which they borrow is independent of the whether the bank provides only capital or capital and additional financial services (Petersen and Rajan, 1994).

These empirical results seem to imply that relationship are not important. This would be true if all relevant information about the firm is public or easily verifiable. If all potential lenders can evaluate a the firm as accurately as the relationship lender, then there is no value to developing a lending relationship. If this is true, our results are what one would expect. An alternative explanation is relationship affect small firm's access to credit, i.e. relationships work through a quantity, not a price dimension. Lenders may develop information about a borrower in the process of lending and building a relationship with the firm. If this information is private, then lenders will not be compelled by market competition to pass their lower cost along to the borrower. Lenders may instead choose to lend additional capital to firms which they now view as safer and thus more profitable. Small firms with significant growth opportunities may find this trade off acceptable. For a firm with many

profitable investment opportunities, the access to capital may be significantly more valuable than a decrease in the price of capital.

2. Lending relations and access to capital.

If relationships are valuable to small firms and they do not lower the cost of financing, then they may increase the availability of external capital. Measuring the quantity of capital offered to a firm, however, is empirically difficult. One obvious suggestion is to examine the fraction of the firm which is financed by external capital or the fraction of the firm that is financed by debt. Since this variable is endogenous – it is determined by both supply and demand considerations – the empirical results can be misleading. Firms with little external borrowing may be very constrained (many good projects but they are unable to borrow) or very unconstrained (they have run out of good projects and thus do not need any external capital). Instead, we need a variable which measures the firm's demand for capital in excess of that supplied by financial lenders (banks). This is a measure of how capital constrained the firm is. To measure the short fall between the firm's demand for capital and the supply which is available from external sources, we propose a novel measure (Petersen and Rajan, 1994). We examine the firm's use of expensive trade credit as a measure of whether the firm is constrained in the amount of capital they can secure from their financial lenders.

Trade credit is a short term loan from the firm's suppliers. In the U.S., firms which pay their trade credit prior to the due date often receive a discount (Petersen and Rajan, 1997). The cost of not taking the early payment discount – and thus borrowing from your suppliers for an additional period – is very expensive. For example, in the retail industry payment is due 30 days after delivery. If customers pay after only 10 days, they will receive a 2 percent discount. This implies that the

annualized cost of the additional ten days is 44.6 percent.[1] In addition, firms do not always pay by the due date. Late payments are associated with both explicit and implicit penalties. Our data set contains the fraction of the early payment discounts taken by each firm and the fraction of trade credits paid late. We use these two variables as indicators that the firm is credit constrained by financial lenders (banks) and thus resorts to more expensive sources of credit.

To measure the effect of relationships on the use of expensive trade credit we regress the percent of trade credit paid late (or the percent of early discounts taken) against firm characteristics and our lending relationship variables. Before turning to the role of relationships on capital availability, we first need to verify that our measures of credit rationing are accurate. We do this by examining the coefficient on firm characteristics which theory predicts are correlated with whether a firm is credit rationed. Larger and older firms take more early payment discounts than small and young firms (Petersen and Rajan, 1994). We find that older firms also pay fewer of their trade credit payments late. These are the firms we expect to be the least credit rationed.

Controlling for characteristics of the firm, the effect of building a relation with a lender has a very large effect on these small firm's access to capital. Firms with longer relationships are less credit constrained. In fact, the coefficient on the length of the lending relationship is even larger than the coefficient on the age of the firm, although they are close in size. Thus firms which are building relationships find their credit constraints are shrinking more than twice as fast as those that are not. Firms whose lenders are more informed are also less capital constrained. We find that firms which purchase other financial services from their lender are significantly less constrained when compared

[1] By taking the early payment discount, the firm is borrowing at 2/98 or 2.04 percent per 20 day period. Since there are 365/20 or 18.25 such periods in a year, this is equivalent to an annual rate of 44.6 percent ($[1+2/98]^{(365/20)} - 1$).

to those firms which do not. As firms increase the fraction of their debt they borrow from a lender who provides them with financial services, they pay less of their trade credit late. This effect becomes stronger as the firm purchases additional informational services from their lender.

In a potentially surprising discovery, we found that credit availability for firms in more geographically concentrated banking markets is significantly higher. A firm in the most concentrated area reduces late payments by almost five percentage points when compared to a firm in the most competitive area. Concentration of the local financial market, however, has a small and statistically insignificant effect on the price of credit. We explore the logic behind this result below.

C. The Value of Lending Relations and the Role of Competition.

1. The theory.

When evaluating loan applications, lenders should consider both the current loan plus the stream of future profits the firm may generate. When the credit market is competitive, the lender cannot expect to share in the future surplus of the firm. The lender is constrained to break even each period. If they charged a rate above the competitive one, they would have no business. Since uncertainty about a firm's prospects is high when the firm is young and/or distressed, creditors in a competitive market may be forced to charge a high interest rate to cover expected losses from default. This can be extremely distortionary to the firm's incentives and thus can result in the firm not receiving credit at all. A monopolistic creditor, on the other hand, shares in the future surplus generated by the firm through the future rents the lender is able to extract. The monopolistic lender can therefore charge below market rates in early periods. This limits the distortion in the firm's investment decision and thus can makes lending possible where it would not be feasible in more

competitive markets.[2] To make up for initial losses, given the lender has market power, they can charge high rates when the firm is older, larger, and more profitable. This means lenders in concentrated capital markets should be more willing to offer credit to small and young firms than a similarly placed lender in a competitive market.

Arms length pricing doesn't allow cross period subsidies. Whereas a long term lending relationship, enforced by market power, has more flexibility in pricing. The general point that multi-period state contingent contracts allow for more efficient contracting than single or multi period fixed payoff contracts has been made before (Townsend, 1982 and Gertler, 1992). In this context relationships are valuable. The lender is willing to help the firm in its early years by lending capital at below competitive rates in the expectation of recovering this loss in the later years of the relationship. Credit market competition imposes constraints on firms and lenders ability to intertemporally share surplus. This makes lending relationships less valuable since small and young firms can not expect to get help when they most need it. Although the model we describe demonstrates a benefit of concentrated credit markets – they make lending relationships more durable and thus more valuable – there are the usual costs which arise from monopolistic markets. A policy decision would have to weigh the relative benefits and costs.

2. Evidence from the Japanese financial transformation.

[2] High promised payments will create an incentive for equity owners to choose different projects. The high promised payment can make a high risk negative NPV project look preferable to a low risk positive NPV project. An all equity firm would always choose the positive NPV project, the levered firm may not. Lenders realizing the distortion in the investment decision created by leverage may choose not to lend at any interest rate (Stiglitz and Weiss, 1981). Relationships, by giving lenders a stake in the future of the firm, can resolve this problem. The relationship is economically equivalent to an implicit equity stake in the firm and thus helps resolve the investment distortion created by debt.

Evidence consistent with our model is difficult to find in practice. One example comes from the transformation of the Japanese economy in the eighties. The Japanese financial system was arguably cartelized at the beginning of this decade. The main banks were the major source of external capital for most large firms. Over the decade, however, the access of firms to forms of outside capital besides banks grew dramatically. The lending and financing markets became more competitive. The greater competition shifted the source of financing for Japanese firms away from the banks and toward the public debt markets (Hoshi, Kashyap and Scharfstein, 1990). The strongest firms financially were the first to reduce their bank borrowing and instead issue public debt. Since the cross subsidization we describe above can only benefit the young and small firms if the older and more mature firms are taxed, the exit of the financially strong firms from the bank sector must contributes to the decline in the value of lending relationships. Periods of increased competition are often accompanied by other changes which may make relationships less valuable. It is thus difficult to isolate the effect of competition on lending relationships. To address this concern, we turn to data on the borrowing of small firms in the U.S.

3. Evidence from the U.S. loan market for small firms.

To estimate the importance of competition on the value of lending relationship we examine the role of the relationship between banks and small firms across local lending markets in the U.S. The spatial distribution of banks in the local market provides cross sectional variation in the competitiveness of each local market. Banks that are physically closer to firms have lower costs of monitoring and transacting with the firm. These costs may be especially significant because the firms in our sample are small. If other banks are relatively far, close banks have considerable market power. The search costs to a firm of finding a replacement lender who has the ability to deal with

its specific needs are likely to be high when the local market has few lenders. In the empirical results below, we use the concentration of lenders in the local market as a measure of the lender's market power and use this variation to examine the importance credit market competition on the value of lending relationships.

The empirical results are consistent with lending relationships being stronger and more credit being available to the youngest firms in markets which are less competitive. For the youngest half of our sample (firms less than ten years old), sixty-five percent of the firms in the most concentrated market have institutional debt compared to only fifty-five percent of firms in the most competitive market.[3] The difference across markets is even more striking if we examine the very young firms. Sixty-five percent of the firms who are four years old or less have institutional finance in the most concentrated credit market. Whereas in the most competitive market, only forty eight percent of the youngest firms have credit from institutional sources (usually banks).

As mentioned above, the use of a firm's debt to asset ratio can be a misleading measure of its access to external capital. Thus we also used the firm's borrowing through expensive trade credit to measure whether firms in concentrated capital markets are less capital constrained than otherwise identical firms in competitive capital markets. Only 19 percent of firms in the concentrated market take fewer than 10 percent of offered discounts compared to 33 percent of firms in the most competitive market. Conversely, over 59 percent of firms in the most concentrated market take more than 90 percent of offered discounts compared to 50 percent of firms in the most competitive market. These results are simple averages. However, even after we control for other determinants of a firm's

[3] The most competitive markets are those local regions (standard metropolitan statistical areas (SMSA) or counties) with a Herfindahl index for the deposit market above 0.18. The most concentrated markets are those local markets that have a Herfindahl index below 0.10.

access to capital, firms in the most concentrated market take 17 percentage points more trade credit discounts than do firms in the most competitive credit markets (Petersen and Rajan, 1995). Remember, firms with access to relatively inexpensive institutional finance (bank debt) are expected to take more of the early payment trade credit discounts and not pay their trade credit debt back late. Thus credit market competition is correlated with the ability of small firms to access the capital markets.

The lack of competition in the credit market is a negative for the older and more established firms. If our theory is correct, these firms are being over charged to cover the subsidies to the youngest firms. We see their reaction in the data. Although among the youngest firms, firms are more likely to have institutional financing if they are in the concentrated capital market, this difference disappears as the firms age and has disappeared among our sample of firms over ten years older. More interestingly, for the oldest firms in our sample, the fraction of their capital which comes from external debt is smaller for the firms in the most concentrated capital markets (35 percent verus 43 percent in the most competitive market). It is for these firms that market concentration is most costly. If, as we predict, they are being over charged, they have an incentive to shift their financing to internal sources. This is exactly what we see.

Simple micro economics predicts that the average loan rate charged in concentrated capital markets will exceed that charged in competitive markets. Although our model has the same prediction for the oldest firms in our sample, the prediction for the younger firms is different. If lenders in concentrated capital markets are subsidizing younger firms and taxing older firms (in the sense of the loan rate they charge), then we should see that the cost of borrowing in a concentrated capital market should be less for the youngest firms in our sample. To examine this question, we

return to our sample of small firms in the U.S. We estimate the relationship between the loan rate a firm pays and it age. Only this time we allow the coefficient on age and the intercept to differ between concentrated and competitive capital markets. This allows us to see how the cost of funds evolves differentially in each market.

Consistent with the notion that survival is a signal about the true quality of the borrower (Diamond, 1989), the loan rate drops as the firm's age. However, the rate at which the loan rate drops with age differs significantly across the markets. The coefficient on age is over four times larger in the most competitive markets (Herfindahl index<0.10) than in the most concentrated markets (Herfindahl index>0.18). As a firm ages from brand new to the median age of ten years, its interest rate drops by 167 basis points in a competitive market. The interest rate drops only 36 basis points for firms in the most concentrated markets (see Figure I). If the relationship for the competitive market is taken as a measure of how banks costs (default risk) changes with firm ages, then the deviation of the two lines is a measure of the cross subsidization taking place in the concentrated markets.

Our results also show that the interest rates for the youngest firms are lower (by about 130 basis point) in the concentrated market relative to the competitive market. This is not necessarily an implication of the theory. The theory suggests that lower quality firms will obtain financing in a concentrated market where they would not in a competitive market. The average loan rate in the concentrated credit market will tend to be lower due to cross subsidization discussed here and higher due to the typical monopoly mark up. The theory does not unambiguously specify the sign of the intercept.

III. Changes in Financial Markets and their Relevance to Lending Relationships.

The discussion so far has focused on the role of relationships in determining the price and availability of capital to young, small, and growing firms. The evidence implies that relationships are an important solution to the problem of credit rationing which small firms face. Significant changes in how financial markets are organization continues in the U.S. These changes mirror the changes seen in other parts of the world in character if not also in their magnitude. Thus this § of the paper discusses two related trends which may impact the role of lending relationships in financial markets and the access of small firms to capital.

A. Consolidation in the Banking Market.

1. Changing number of banks in the U.S.

The number of banks in the U.S. has declined by almost 30% in the last decade (Berger, Demsetz, and Strahan, 1999). The gross number has been even greater as a significant number of banks have been started. A large number of U.S. banks have disappeared through mergers or acquisitions (Berger, Saunders, Scalise, and Udell, 1997). Similar trends have occurred in Asia and Europe (Sapienza, 1998). Since the decline in banks has been concentrated among small banks, this has raised the concern that access of small firms to credit may be restricted. Small firms rely on banks for a large fraction of their external capital (Petersen and Rajan, 1994). In addition, small banks make proportionally more loans to small firms (Peek and Rosengren, 1997, and Strahan and Weston, 1996). Since this trend implies that small banks are disappearing, the impact on access to capital by small firms may be enormous.

2. Theoretical effects.

Theoretically, bank mergers do not have to affect the ability or willingness of banks to lend

to small firms. There are two reasons, however, to believe they may. First, lending relationship are an intangible asset, and as such their value may be lost in a merger. This is an empirical question. The evidence in Slovin, Sushka, and Polonchek (1993) discussed above does not directly examine this issue but is suggestive. When Continental Illinois was facing the prospect of bankruptcy and its customers the loss of their relationship, this expected loss appeared in the customers stock price. This raises the possibility that the value of the relationship may also be lost when banks are taken over.

The other reason that acquisitions, especially of small banks by larger banks, may effect small firm lending depends upon the difference between small and large banks and the motivation for the merger. Small banks may be better than large banks at closely monitoring small firms. If small firm lending is based on soft information which is not easily quantified, then the lending process to small firms may depend more upon the autonomy and judgement of the loan officer. The fact that the length and strength of a bank/borrower lending relationship, which may serve as a proxy for this soft information, affects the quantity of credit offered, but not the price of credit, is consistent with this intuition (Petersen and Rajan, 1994).

To the extent there are economy's of scale, larger banks may be able to process transactions more efficiently. When it comes to lending to small firms, however, they may be at a disadvantage. The large bank's size may actually be a problem. In large banks, monitoring and control of loan officers may be more difficult. They are further from the top management of the bank and the banks owners. Thus lending criteria may be specified in more quantitative terms leaving less discretion for

the loan officer.[4] This may be required to take advantage of the economies of scale which motivated the merger in the first place. If the loan officer's soft information is the key to small business lending, then large banks may not be able to replicate the methods of small banks (Jayarantne and Wolken, 1999).

3. Empirical evidence.

Although sensitive to the way in which it is measured, several studies find that bank mergers are correlated with a decline in lending to small firms. Examination of bank level data finds that following mergers the amount of small firm lending declines (Berger, Saunders, Scalise, and Udell, 1997; Peek and Rosengren, 1997). The exception to this result is when the two merging banks are both small (Strahan and Weston, 1996). Examination of the loans of individual firms (Sapienza, 1998) produces similar findings. For example, banks in markets where there have been mergers are more likely to turn down a small business loan application than banks in markets with no mergers. The probability of being denied credit is higher for firms where their bank was a target or acquirer in the 36 months surrounding the loan application (15.5%) than for firms where their bank was in a market (MSA) with no merger activity (9.8%).

To interpret these results, however, we need to identify why the supply of bank loans to small firms declined. Historically regulations have restricted consolidation in the banking industry – especially across state lines. In industries with over capacity, due to changing regulation or other exogenous shocks, mergers have often been the tool by which capacity has shrunk. The same may be true in the banking market. If some banks are making negative NPV loans, then an acquirer can

[4] Cole, Goldberg, and White (1997) found that when considering loan approvals large banks were more likely to rely on financial ratios while small banks are more likely to rely on a history of lending to the borrower.

profitably purchase the bank, quit making such loans, and create value. In such a case, we should see a drop in lending associated with mergers. This reduction, although causing dislocation for the small firms involved, is allocating capital to higher value uses.

To know whether the reduction in lending associated with mergers is on balance constructive or destructive, we would need to examine the future borrowing of the firms which are cut off by their initial bank. If larger banks are no longer able to service small firms, for example due to their new organizational form, the loans they were making may still be profitable to other lenders. Berger, Saunders, Scalise, and Udell find that a large fraction, although not all, of the reduction in credit that firms suffer when their bank is acquired is replaced by other banks. In addition, the large number of new (and usually small) banks which are started may arise to supply this under served market. Like small banks, new banks, also tend to lend more to small firms (Berger, Demsetz, and Strahan, 1999). Finally, when researchers examine a firm's use of expensive trade credit, as a measure of whether the small firm is credit rationed, they also find little net effect due to the disappearance of small banks.

B. Growing Use of Information Technology.

The other significant trend which has been sweeping over financial markets is the growing importance and declining cost of information technology. The ability of lenders to collect, process, and use quantitative data in their lending decisions has risen dramatically over the last few decades. The impact on small firm lending and the role of relationships, however, is more ambiguous. In addition, there is little empirical work thus far to guide our intuition. Thus my comments are my guess of what the effects will be.

The advantage of information technology is that it lowers costs. This may be more important

for small firms as the fixed cost of making a loan (and processing a decision) is more relevant for small loans. Thus to the extent that the information technology allows lenders to lower their costs, they may be able to lend to some firms which were too expensive – because they were too small – prior to the use of this technology. The use of information technology has ballooned in the consumer credit market. Due to the lower costs, access of individuals to credit has greatly expanded through both mortgage and credit card borrowing. In both cases, the lending decision has been highly automated. This is possible when borrowers are easily comparable on the basis of hard (quantitative) information.

Some information is easy to code and process. These include measures that are numbers or are easily translated into numbers (profits, industry, and whether the borrower has defaulted in the last ten years). Other information is soft. By this I mean it is difficult to capture in numeric measures. It is difficult to transmit such information without context. Information technology lowers the cost of processing hard information. It does not lower the cost – and may raise the relative cost – of processing soft information. Think back to our discussion of lending relationship. By interacting with a borrower over time and over products, the bank learns about the firm. This information, however, may not be easily quantifiable and thus may not fit neatly into more quantified loan approval processes. This suggests that the use of information technology will lower the cost of capital for small and informationally transparent firms, but could well raise the cost (and restrict) the availability of capital to small and informationally opaque firms.

III. Conclusions.

The theoretical literature contains many explanations of why a small and young firm may gain by building a relationship with a lender. To the extent that relationships can partially solve the

market failures (information asymmetries) which cause capital markets not to function, they can increase value. From the perspective of society, they can be extremely valuable since because they help allocate capital to the small firms with profitable investment opportunities.

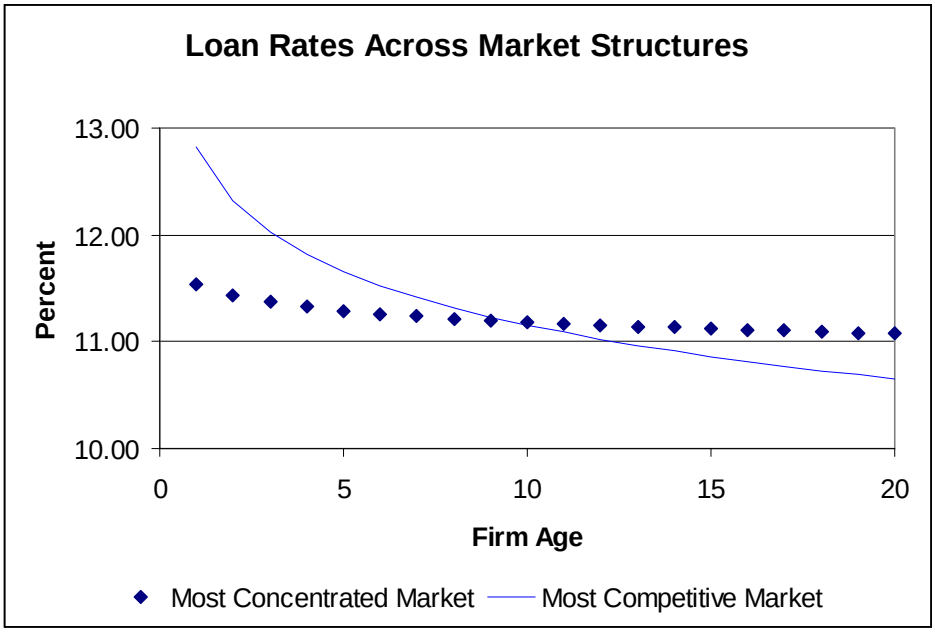
Empirical evidence that relationships matter has been difficult to establish as relationships are hard to measure. Relationships tend to arise and have value when little is known about the firm. Quantitative measures of financial strength are most uninformative about the firms for whom lending relationships should be most valuable. In the work discussed here, we find evidence that lending relationships are valuable and that they relax the credit constraints faced by small firms. Interestingly, stronger relationships – measured either by the length or by the breadth of the relationship – are not associated with cheaper capital for firms. Instead, the benefit of building a relationship with a lender is greater access to capital. The firms in our sample which have invested in building a relationship with a financial lender are significantly less credit constrained. Thus we would expect the investment decisions to be less distorted by a shortage of capital.

We also find evidence that the competitiveness of the financial market is an important determinant of the strength and therefore value of lending relationships. In more concentrated capital markets, there is less competitive pressure which can threaten relationships. Relationships are built on the premise that one side of the relationship invests in the other side in the early years, with the expectation that this investment will be repaid in the later years. The more competitive the markets, the less likely the initial investment will be repaid. This implies that the incentive for lenders to invest in such relationships is smaller and we expect relationships in these markets to be weaker. We find evidence consistent with this. In markets which are less competitive, we find the youngest firms – who should be the most credit constrained in the absence of a relationship – have significantly

greater access to capital.

The role of relationships depends upon the economic environment in which the firms and the banks operate. Two trends are currently transforming financial lending in the U.S. as well as in the rest of the world. The U.S. banking market is experiencing an unprecedented level of consolidation. The number of banks disappearing through mergers is significant. In addition, since the banks that are disappearing are more likely to be small banks which lend to small firms, there is the potential for a significant reduction in credit available to small firms. At the same time, banks have been able to alter the way they process information through the growing use of information technology. This allows them to process information more cheaply, and thus can expand their ability to offer credit – especially to very small firms. The type of information, however, which can be processed is hard information. This is not the information that we think of as being generated by a relationship. In fact, relationships are probably most valuable because they generate soft information which is not easily quantified. computerized. Both trends are new and thus their full impact on small firm's access to capital is yet to be determined.

Figure I:



The loan rates are based on estimates from Petersen and Rajan (1995). All variables, except the firm's age and the market type (most competitive versus most concentrated) were set equal to the sample means.

References

Berger, Allen, Rebecca Demsetz, and Philip Strahan, 1999, “The Consolidation of the Financial Services Industry: Cause, Consequences, and Implications for the Future” Journal of Banking and Finance 23.

Berger, Allen, Anthony Saunders, Joseph Scalise, and Gregory Udell, 1997, “The Effect of Bank Mergers and Acquisition on Small Business Lending, Federal Reserve Board.

Cole, Rebel, Lawrence Goldberg and Lawrence White, 1997, “Cookie-Cutter versus Character: The Micro Structure of Small Business Lending by Large and Small Banks” New York University working paper.

Diamond, Douglas, 1984, "Financial Intermediation and Delegated Monitoring," *Review of Economic Studies* LI, 393-414.

Diamond, Douglas, 1989, "Reputation Acquisition in Debt Markets," *Journal of Political Economy*, XCVII, 828-861.

Diamond, Douglas, 1991, “Debt Maturity Structure and Liquidity Risk," *Quarterly Journal of Economics*, CVI (1991), 709-738.

Diamond, Douglas, and Raghuram Rajan, 1998, “Liquidity risk, liquidity creation and financial fragility: A Theory of Banking” University of Chicago working paper.

Gertler, Mark, "Financial Capacity and Output Fluctuations in an Economy with Multi-Period Financial Relationships," *Review of Economic Studies*, LIX (1992), 455-472.

Haubrich, Joseph, 1989, Financial intermediation, delegated monitoring, and long-term relationships, *Journal of Banking and Finance* 13, 9-20.

Hoshi, Takeo, Anil Kashyap, and David Scharfstein, 1990, "Bank Monitoring and Investment: Evidence from the Changing Structure of Japanese Corporate Banking Relationships," in R. Glenn Hubbard, ed., *Asymmetric Information, Corporate Finance and Investment*, (Chicago, IL: University of Chicago Press).

Jayarantne, Jith and John Wolken, 1999, “Banking Consolidation and Small Firm Finance: Discussion of ‘How Important are Small Banks to Small Business Lending? New Evidence from a Survey of Small Firms” *Journal of Banking and Finance* 23.

Peek, Joseph, and Eric Rosengren, 1997, “Bank Consolidation and Small Business Lending: Its Not Just Bank Size that Matters,” *Journal of Banking and Finance forthcoming*

Petersen, Mitchell A and Raghuram G. Rajan, 1994, "The Benefits of Lending Relationships: Evidence from Small Business Data," *Journal of Finance* 49, 3-37.

Petersen, Mitchell A and Raghuram G. Rajan, 1995, "The Effect of Credit Market Competition on Firm-Creditor Relationships," *Quarterly Journal of Economics* 110, 407-443.

Petersen, Mitchell A and Raghuram G. Rajan, 1997, "Trade Credit: Theories and Evidence," *Review of Financial Studies* 10, 661-691.

Slovin, Myron, Marie Sushka, and John Polonchek, 1993, "The Value of Bank Durability: Borrowers as Bank Stakeholders" Journal of Finance 48, 247-266.

Sapienza, Paola, 1998, "The Effects of Banking Mergers on Loan Contracts", Northwestern working paper.

Strahan, Philip, and James Weston, 1996, "Small Business Lending and Bank Consolidation: Is here Cause for Concern?" *Current Issues in Economics and Finance*, Federal Reserve Bank of New York.

Stiglitz, Joseph and Andrew Weiss, 1981, Credit rationing in markets with imperfect information, *American Economic Review* 71, 393-410.

Townsend, Robert, "Optimal Multiperiod Contracts and the Gain from Enduring Relationships," *Journal of Political Economy*, XC (1982), 1166-1186.