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Abstract: In this study, we use firm-level data from the 1993 National Survey of Small Business Finances to test the hypothesis that banking consolidation has reduced the availability of credit to small businesses. We find that banks in markets where mergers have occurred are more likely than other banks to deny credit to small business loan applicants. However, this relationship disappears after we control for characteristics of the small business firm and its principal owner, the economic environment of the market where the firm is located, and the financial condition of the prospective lender. Moreover, we find that one set of banks, those in the process of acquiring other banks, are less likely to deny credit to small businesses. These results suggest that consolidation in the banking industry may have enhanced rather than restricted the availability of credit to small businesses. However, the data reflect credit availability during 1991-94, and may not be representative of subsequent credit conditions. Nor does the analysis rule out possible changes in the terms of credit available to small businesses.

Key words: acquisition, bank, credit, merger, relationship, small business, takeover
JEL Classification: G21, G34, E51

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I. Introduction

In recent years, the consolidation of the commercial banking industry has received much attention both from the popular press and from academics (see, e.g., Goldberg and White 1998; Peek and Rosengren 1998; Strahan and Weston 1998; Berger *et al*. 1997; Walraven 1997; Keeton 1996; Pilloff 1996; Houston and Ryngaert 1994; Schrantz 1993; Cornett and Tehranian 1992), as the number of banks has declined from 14,400 as of year-end 1980 to approximately 9,500 as of year-end 1997. Moreover, the actual consolidation that has occurred in the banking industry has been even greater because during this period an additional 5,000 banks were acquired and became subsidiaries of bank holding companies.

Some of the main benefits of consolidation include reduction of excess capacity, improved diversification, and the additional discipline brought to bear on bank managers at institutions that might be candidates for acquisition. Major potential costs of consolidation are reduced competition, especially in smaller markets, and the disruption of established commercial banking relationships between borrowers and the banks that are the targets of takeovers. This disruption is likely to be especially severe for small businesses because such firms rely primarily upon banks for their credit needs (Cole and Wolken 1995, Cole *et al.* 1996). Another potential problem associated with consolidation is the shortfall in small business lending that might arise if, as some critics of banking consolidation claim, large banks buy up smaller banks and use the newly acquired deposits as a source of funding for middle-market and larger loans originated by the main office of the merged entity. Not addressed by this claim is the possibility that small

business borrowers turned away by large acquirers can transfer their business to small banks or other lenders operating in the same market.

This study uses data from the 1993 National Survey of Small Business Finances (NSSBF) to investigate these issues by assessing whether banks involved in mergers or acquisitions were less likely to extend credit to small borrowers than banks not involved in takeover activities. Also, the model that we use considers the reaction of other banks in the same banking markets to any possible merger-related reduction in credit to small borrowers. Specifically, we test whether banks not involved in takeover activity, but that are located in markets where other banks are involved in mergers or acquisitions are more likely to extend credit to small business borrowers. Some analysts have claimed that such banks may step in to make up any shortfalls in small business credit availability attributable to takeover activities, and indeed, Berger *et al* (1997) found some evidence of this.

Although previous researchers have examined these issues, they have been forced to rely upon data reported by banks to banking regulators, all of which suffer from several well-known problems when used to assess the availability of credit to small businesses. For example, Strahan and Weston (1998) and Walraven (1997) use data from the mid-year Call Reports to examine whether banks involved in mergers devote more of less of their loan portfolios to small business loans than do other banks.[1] The major problem presented by these data is that the Call Report data are aggregated by bank rather than reported by individual loan, so that the unit of observation is the bank rather than the small business borrower. Berger *et al*. (1997) use data

[1] Beginning in 1993, the June Call Report contains for each bank information on the number and volume outstanding of loans made in each of three size categories: less than $100,000, $100,000 to $250,000, and $250,000 $1 million.

from the Survey of the Terms of Bank Lending (STBL), a survey conducted by the Federal Reserve Board, to analyze whether banks involved in mergers and acquisitions allocate more or less of their loan portfolios to small business borrowers.[2] Although using the STBL data brings the focus to individual loans, the STBL reports loans extended but not loans denied (a deficiency of the Call Report data as well). Thus, Berger *et al*. (1997) also are forced to use the bank rather than the small business borrower as their unit of observation.

Our approach should prove superior to previous research based upon either the Call Report or the STBL because the unit of observation is the small business loan application rather than either aggregate small business lending at a depository institutions or successful loan applications at a sample of banks. Because the 1993 NSSBF data are reported by small businesses, we can examine much more precisely the factors that affect whether a bank loan is extended to the firm, enabling us to test directly whether merger activity affects the likelihood that a bank will lend to small businesses.

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[2] The *Survey of Terms of Bank Lending* is a quarterly survey of banks that has been conducted since 1977. The survey panel includes approximately 50 banks with the largest volumes of commercial and industrial (C&I) loans and a stratified random sample of about 300 other banks. During one week of each quarter, the banks report the terms (both price and nonprice) of the C&I loans that they close each day.

II. Data

The data analyzed in this study are taken from the 1993 National Survey of Small Business Finances (1993 NSSBF), which was co-sponsored and co-funded by the Federal Reserve Board and the U.S. Small Business Administration. The firms surveyed constitute a nationally representative sample of small businesses operating in the United States as of year-end 1992, where a small business is defined as a non-financial, non-farm business employing fewer than 500 full-time equivalent employees. The sample was stratified by nine Census regions, urban or rural location, employment size, race, and ethnicity. Data from the 1993 NSSBF are broadly representative of approximately 5.0 million firms operating in the U.S. as of year-end 1992.

The 1993 NSSBF provides detailed information about each firm's most recent borrowing experience, including whether or not the firm applied for credit, the identity and characteristics of the potential lender to which the firm applied, what other financial services (if any) the firm obtained from that potential lender, whether the potential lender denied or extended credit to the firm, and, if the lender extended credit, the terms of the loan. The survey provides information on each firm's balance sheet, income statement, and credit history. The survey also collected other characteristics of the firm, including standard industrial classification, organizational form, and age; as well as demographic characteristics of each firm's primary owner, including age, education, experience, and credit history. [3]

In total, there are 4,637 firms in the 1993 NSSBF. Businesses located in urban areas account for 80 percent of respondents. Seven percent of the sample firms are organized as

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[3] For a detailed description of the 1993 NSSBF, see Cole and Wolken (1995). For a description of the 1987 NSSBF, which was used by Petersen and Rajan (1994) and Berger and Udell (1995), see Elliehausen and Wolken (1990).

partnerships, 61 percent as corporations, and 32 percent as proprietorships. Eighteen percent are owned by women and 22 percent are owned by minorities (African-Americans, Asians, and Hispanics). Sample firms are concentrated in the retail and wholesale industries (31 percent) and the business and professional services industries (29 percent). The median firm employs 5.5 employees, records $400,000 in annual sales, and has $136,000 in total assets.

We use information for each firm's most recent borrowing experience from the 1993 NSSBF to choose loan applications at commercial banks and to identify the commercial bank where the application was made. The 1993 NSSBF information indicates that 2,007 firms reported a most-recent-loan application. Of these, 1,598 reported that these applications were made at a commercial bank. However, the identity of the bank was not ascertainable for 79 of these applications, leaving a final sample of 1,519 observations of firm-bank pairs for our analysis.

We cross-reference this 1993 NSSBF information with bank-specific information from the Federal Reserve System's National Information Center (NIC) database that enables us for each firm-bank pair to determine whether the bank might have been involved in merger activity at the time of the loan application.[4] The exercise of labeling a bank as "involved in merger activity" is a bit arbitrary because the NIC database records the date of a merger as the day that the union is consummated legally. For some time before that date, an interval often spanning a number of months, both parties to the merger, officials at the acquiring and acquired institutions,

[4] To confirm the identity of a firm's source of financial services, the firm had to provide the source's name, city, state, and zip code. This information was cross-referenced with data the Federal Reserve Board's National Information Center to verify that the source identified by the firm indeed had an office located in the zip code provided by the firm.

and potential borrowers are aware that the merger is underway, and any of these parties may behave differently than economic agents dealing with a bank where no merger is underway.

As a result, we use five indicator variables to characterize the merger status of the bank: (1) *Acquirer Before Loan Application* indicates a bank that acquired another bank during the 18 months prior to the loan application, this is the period of adjustment that most researchers have considered when assessing the effects of mergers; (2) *Acquirer After Loan Application* indicates a bank that acquired another bank during the 18 months subsequent to the loan application, this indicator spans the time after a merger has been announced, or possibly is in the works, and the date that it legally is completed; (3) *Target Before Loan Application* indicates a bank that was acquired by another bank during the 18 months prior to the loan application; (4) *Target After Loan Application* indicates a bank that was acquired by another bank during the 18 months subsequent to the loan application; and (5) *Market Merger* indicates that a bank located in the market area of the small business loan applicant had been involved in a merger or acquisition during the 18 months prior to the loan application. The *Market Merger* variable reflects merger activity among the competitors of the specific bank that received the loan application and is distinct from dummies for the merger activity of the bank that received the loan application, i.e., *Market Merger* can be true whether or not any of the other merger variables are true. Banking markets are defined as the Metropolitan Statistical Areas (MSAs) in which the small business was headquartered for small businesses that are located in urban areas and as the county of the headquarters for firms located in rural areas.

As shown in Table 1, our sample of 1,519 firm-bank pairs contains 253 observations (16.7 percent) where the bank that received the loan application was an acquirer during the 18 months before the application; 296 observations (19.5 percent) where the bank was an acquirer during the 18 months after the loan application; 84 observations (5.5 percent) where the bank

was a target during the 18 months before the loan application; and 174 observations (11.5 percent) where the bank was a target during the 18 months after the application. In addition, there are 1,251 (82.4 percent) observations where the banking market of the loan applicant was the site of a bank merger during the 18 months before the loan application.

Of the 1,519 firms in our sample, all of which applied for a bank loan, 231 or 15.2 percent were denied credit. Firms applying at a bank that recently had acquired another bank were rejected 16.2 percent of the time (41 of 253), while firms applying at a bank that acquired another bank soon after the loan application were rejected 14.2 percent of the time (42 of 296). Firms applying at a bank that had been acquired by another bank were rejected 13.1 percent of the time (11 of 84), while firms applying at a bank that later was acquired by another bank were rejected 17.8 percent of the time (31 of 174). Firms applying at banks located in merger markets were rejected 16.5 percent of the time (206 of 1251). Firms applying in markets where no mergers occurred were least likely to be rejected (24 of 245, or 9.8 percent).

Of course, factors other than the merger status of the prospective lending bank influence whether or not a bank extends credit to a potential borrower. From the perspective of the lender, the primary concern in deciding whether or not to extend credit to a firm is the probability of default. The literature on residential mortgage lending provides a rich set of potential factors that the lender might use to assess a prospective borrower's default risk (Munnell *et al*. 1996), and many of these are likely to useful in evaluating small business borrowers as well as residential mortgage borrowers.

One set of these factors is related to financial characteristics of the firm, and many of these factors were collected for each firm in the 1993 NSSBF data base. In this study, we include the credit history, age, size, leverage, profitability, and organizational form of the firm; as well as the firm's pre-existing relationships (if any) with its prospective lender. The credit

history of the firm is the number of business delinquencies during the past three years. The age of the firm is measured as (the natural logarithm of) the number of years the firm has been in business under current ownership. Size is measured by (the natural logarithms of) total assets and annual sales. Leverage is measured by the ratio of total equity to total assets. Profitability is return on assets. Organizational form is proxied by a set of dummy variables indicating whether the firm is organized as a proprietorship, partnership, or corporation.

Petersen and Rajan (1994), Berger and Udell (1995), and Cole (1998) provide evidence that the availability of credit to small businesses is a function of the firm's pre-existing relationships with its prospective lender. Consequently, we also include variables to control for the strength of firm-lender relationships. Specifically, we include a variable indicating the length of the firm's pre-existing relationship with its prospective lender, a dummy variable indicating firms that had no pre-existing relationship with the prospective lender, and a variable indicating the number of sources from which the firm obtains financial services.

Characteristics of the primary owner of the firm also might have influenced the lending decision of the bank to which the firm applied for credit. In this study, the credit worthiness of the primary owner is proxied by the number of times during the past three years he or she was delinquent on personal financial obligations.[5] We also include dummy variables for the education of the primary owner at the high school level and beyond college.

The general economic environment in which the firm operates also might affect the bank's perception of the likelihood of repayment. We include the percentage change in annual average employment from 1992 to 1993 for the county in which the firm is located as an indicator of the strength of the local economy. In addition, we include the Herfindahl index of

[5] More specifically, survey respondents were asked the following two questions: (1) Within the past three years, on how many different *personal* obligations has the *principal owner* been 60 or more days delinquent? (2) Within the past three years, on how many different *business*

banking market concentration for the firm's market area. Finally, we include a dummy variable indicating whether or not the firm was located in an urban area, where urban areas are defined as MSAs.

A final set of factors that might affect the likelihood of the firm obtaining a loan relate to the financial condition and organization of the bank itself. At the individual bank level, we include the (natural logarithm of) the assets of the bank, the ratio of equity to assets, the rate of delinquencies, and the ratio of the loss allowance to total loans. To examine whether affiliation with a bank holding company affects the results, we include a dummy variable for membership in a bank holding company. In addition, we aggregate the financial data to the highest holding company, and for members of bank holding companies, we construct an additional group of the financial variables (assets, capital ratios, delinquencies, and loss allowances) for the holding company, while we include zeroes for these variables if the bank is independent.

Table 2 provides descriptive statistics for each of the potential explanatory variables, both for the entire sample and separately for applications that were denied and applications that were accepted. Also presented are the results of a *t*-test for differences in the mean values of the explanatory variables for the group of applicants who were denied credit and the group whose applications were approved.

Firms denied credit were smaller as measured by annual sales ($0.33 million versus $1.56 million); had fewer assets ($0.13 million versus $0.61 million); had more business delinquencies (1.22 versus 0.52); were more likely to have been denied trade credit (25 percent versus 8 percent); had a shorter pre-existing relationship with the prospective lending bank (5.77 years

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obligations has the *firm* been 60 or more days delinquent?

versus 8.67 years); obtained financial services from fewer sources (1.65 versus 1.80); had greater leverage (0.85 versus 0.70); were younger (8.25 years versus 12.30 years); and were less likely to have developed a pre-existing financial relationship with the bank where they sought credit (0.13 versus 0.02). With the exceptions of the number of sources of financial services, the return on assets, and whether the firm was organized as a partnership, each of the differences in these means is statistically significant at least at the 0.05 level, and most are significant at the 0.01 level.

Primary owners who were denied credit tended to have more nonbusiness delinquencies (0.81 versus 0.18) and to be members of a minority group (0.34 versus 0.12). Both of these variables were significant at the 0.01 level. Neither of the education variables (*High-school education* and *Some post-college education*) differ significantly between the groups of firms denied and accepted.

Firms denied credit tended to be located in areas with slower employment growth (1.77 percent versus 2.15 percent); tended to be located in areas with less concentrated banking; and were more likely to be located in urban than rural areas (86 percent versus 76 percent). Only the banking-market concentration and urban location variables were significant at least at the 0.05 level.

Banks that denied credit to small business applicants tended to be larger ($2.4 billion versus $1.2 billion); had lower capital ratios (7.9 percent versus 8.2 percent); higher rates of delinquencies (3.4 percent versus 2.8 percent); and higher loan-loss provisions as a proportion of loans (2.4 percent versus 2.1 percent). When the data were aggregated to the bank holding company level, the differences in financial variables between banking organizations that denied and those that approved loan applications tended to match the differences that were noted at the bank level, with the exception of the capital ratio.

III. Methodology

In examining the factors influencing the probability of loan denial, a single-equation binary logit model is an obvious choice, and it has two desirable properties. First, it yields unbiased and consistent parameter estimates; second, it enables us to make acceptable inferences about the firms that apply for a loan. Hence, we use the logit model in the analysis that follows. The probability-of-denial equation is:

$$D^*_j = \beta' x_j + \varepsilon_j \quad (1)$$

where D^*_j is an unobservable index of the probability that a firm's loan application will be denied by its potential lender; x_j is a vector of characteristics of both the firm and the potential lender, including the merger status of the potential lender; β is a vector of parameter estimates for the independent variables; ε_j is a normally distributed random disturbance term with zero mean and unknown constant variance σ_j^2; and $j = 1, 2, \ldots, M$; where M is the total number of firms applying for credit. Let D_j be an observable variable that is equal to one if $D^*_j > 0$ and zero if $D^*_j \leq 0$.

In this particular application, D_j is equal to one if a firm is denied credit and zero otherwise. Since D^*_j is equal to $\beta' x_j + \varepsilon_j$, the probability that $D^*_j > 0$ is equal to the probability that $\beta' x_j + \varepsilon_j > 0$, or, equivalently, the probability that $\varepsilon_j > -\beta x_j$. Therefore, one can write the probability that D_j is equal to one as the probability that $(\varepsilon_j > -\beta x_j)$, or, equivalently, that Prob $(D_j = 1) = 1 - \Phi(-\beta x_j)$, where Φ is the cumulative distribution function of ε_j, here assumed to be logistic. The probability that D_j is equal to zero is then simply $\Phi(-\beta x_j)$. The likelihood function L for this model is:

$$L = \prod_{D_j = 0} [\Phi(-\beta x_j)] \prod_{D_j = 1} [1 - \Phi(-\beta x_j)] \quad (2)$$

IV. Results

Table 3 presents the results from estimating the logit model of loan denial for six different specifications that reflect the sequential addition of selected groups of explanatory variables. Rather than present the actual coefficients of the logit regression, which are difficult to interpret, we present the odds ratio, which is the relative increase or decrease in the probability of loan denial for a one unit change in the explanatory variable. For a binary variable, the odds ratio indicates the likelihood of loan denial when the binary variable equals one relative to the likelihood of loan denial where the binary variable equals zero.[6]

Column 2 contains the results when the four merger status dummy variables are collapsed into a single indicator variable *Any Merger* (which is equal to 1 if any of the four merger status variables are equal to 1, and equal to 0 otherwise), and this composite variable is included in a logit regression along with the variable *Merger Market*. The results in column 2 show that the value for *Any Merger* is less than one, suggesting that loan applicants at banks involved in mergers were less likely to be denied a loan, but the estimate was not statistically significant. In contrast, the estimate for *Merger Market* is highly significant, and its odds ratio indicates that small business credit applicants in markets where mergers have occurred are more likely to be

[6] Hosmer and Lemshow (1989) present a detailed description of how to interpret the odds ratio associated with logistic regression.

denied a loan. Together, these results appear to contradict the hypotheses that takeover activity reduces the availability of credit to small businesses and that competing banks in merger markets pick up the slack in small business lending created by takeover activity.

Column 3 shows that when we include the complete set of five merger-status variables, only one—*Merger Market*—is statistically significant (*p*-value = 0.002). The odds ratio associated with this variable indicates that applications for credit by firms in markets where there has been a merger during the 18 months prior to the application are more than twice as likely to be denied than applications at banks located in non-merger markets (Note that *Merger Market* is distinct from whether or not the bank that received the loan application has been involved in a merger.)

In column 4, we augment the bank merger variables with a group of variables that describe the firm. *Log of annual sales*—a control for the size of the firm applying for credit—is highly significant (*p*-value = 0.0001), and its associated odds ratio is less than one, indicating that larger firms are less likely to be denied credit. *Business delinquencies* and *Trade credit denied* also are highly significant, and their odds ratios indicates that more delinquencies on business credit obligations and previous trade credit denials reduce the probability of obtaining a loan. *Log of firm age* is significant and its odds ratio is less than one, indicating that older firms are more likely to receive a loan. None of the remaining firm variables (*Log of firm assets, Length of pre-existing relationship with lender, Leverage, Return on assets, Partnership,* and *Corporation*) are significant. When we control for these characteristics of the business, *Merger Market* remains highly significant, while the other bank merger variables remain insignificant.

In column 5, we add a group of variables that describe better the characteristics of the firm's primary owner. Neither of the variables describing the level of education of the primary owner has a statistically significant effect on the likelihood of obtaining a loan. However, higher incidence of the primary owner's personal delinquencies significantly increases the likelihood that the firm's credit application is rejected. Inclusion of the borrower variables does not alter qualitatively the results for the merger status variables.

In column 6, we add both a group of variables that describe the type of market in which the firm is located and a group of financial and structural characteristics of the bank that received the loan application. None of these variables are statistically significant by themselves, but when they are included as controls, the coefficient of *Acquirer after loan application* (banks that acquire another bank after the loan application) becomes significant (p-value=0.02). The odds ratio of 0.58 for this variable indicates that banks planning to make an acquisition are less likely to deny credit to small business borrowers. One explanation for this finding is that aggressive managers attempting to grow by way of acquisitions also are attempting to grow by expanding credit to small businesses.

In column 7, we present our final specification, where we augment the variables appearing in column 6 with two additional dummy variables. The first (*Urban*) indicates that the lender is located in an urban rather than a rural area and the last (*No relationship with lender*) indicates that the firm has established no pre-existing financial relationship with the bank where it is seeking the loan. In this particular specification, *Urban* is statistically insignificant, but *No relationship with lender* is significant and has an odds ratios greater than one, indicating that the probability of loan denial is significantly greater for firms that have not established a pre-

existing relationship with the prospective lender.[7] Inclusion of these last control variables renders the *Merger Market* variable insignificant, but the *Acquirer after loan application* variable remains significant (*p*-value=0.04). Hence, even after we control for business variables, borrower variables, market variables, and bank characteristics, we find evidence that bank takeover activity affects the availability of credit to small businesses.

We find that takeover activity is associated with greater rather than lesser availability of credit to small businesses. This study differs somewhat from the mixed results of Berger *et al*. 1997, which tended to focus on the longer-term adjustment of the portfolios of the consolidated bank. That study found that banking consolidation, when the acquirer was large, could lead to reduced credit availability to small businesses. However, the results of this paper are consistent with Walraven (1997), which found that acquiring banks tended to be banks with higher portions of small business loans. This finding has important policy implications, in that it is inconsistent with the hypothesis that bank mergers reduce the availability of credit to small businesses. Indeed, the results suggest that, to some degree, bank mergers are associated with greater availability of credit to small businesses.

[7] The results for the firm-lender relationship variables are broadly consistent with those reported by Cole (1998).

V. Summary and Conclusions

This study uses data from the National Survey of Small Business Finances to test the hypothesis that bank mergers reduce the availability of credit to small businesses. After controlling (to the extent that the survey data allow) for special characteristics of the loan applicant (including both features of the firm and its principal owner), the financial condition and organizational structure of the prospective lender, and characteristics of the market where the firm is located, we find that bank takeover activity is associated with *greater* rather than reduced availability of credit to small businesses. Specifically, we find that one set of banks involved in merger activity— those that either are in the process of acquiring another bank or those that are "shopping" for an acquisition in the near future—are significantly *more* likely to extend credit to small businesses than other banks. This result suggests that more aggressive lenders may be attempting to expand their business both through increasing their own originations of loans to small businesses as well as through acquisitions of other banks. These findings have important implications for bank regulatory policy, in that they provide evidence that consolidation in the banking industry did not adversely affect the availability of credit to small businesses, at least through 1994. Of course, banking consolidation has continued at a rapid pace since then, pointing to the need for additional data on small business credit availability. Also not addressed is how banking consolidation has affected the terms of credit available to small businesses. We leave these as two interesting areas for future research.

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Table 1

Bank loan denials and approvals in a sample of 1,519 applications by small businesses for bank credit during 1991-94. Separate statistics are presented for applications at banks that were targets or acquirers involved in mergers during the two years surrounding the credit application. Separate statistics also are presented for applications at banks not necessarily involved in a merger but located in banking markets where mergers did occur. Banking markets are defined as MSAs for firms located in urban areas and as counties for firms located in rural areas.

	All applications (column percentage)	Applications denied (row percentage)	Applications approved (row percentage)
All loan applications	1,519 (100%)	231 (15.2%)	1,288 (84.8%)
Applications at acquiring banks prior	253 (16.7%)	41 (16.2%)	212 (83.8%)
Applications at acquiring banks post	296 (19.5%)	42 (14.2%)	254 (85.8%)
Applications at target banks prior	84 (5.5%)	11 (13.1%)	73 (86.9%)
Applications at target banks post	174 (11.5%)	31 (17.8%)	143 (82.2%)
Applications in merger markets	1251 (82.4%)	206 (16.5%)	1045 (83.5%)
Applications in markets with no mergers	245 (16.1%)	24 (9.8%)	221 (90.2%)

Table 2

Descriptive Statistics for characteristics of a sample of 1,519 applications by small businesses for bank credit during 1991-94. Statistics are presented for all applications and for applications that were denied or approved. Standard errors appear in parentheses. In the last column are the values for *t*-tests of the significance of the differences in the mean values of applications denied and applications approved.

Variable	All Applications	Applications denied	Applications approved	*t*-value
Merger Variables				
Acquirer before loan application	0.167	0.177 (0.03)	0.165 (0.01)	-0.48
Acquirer after loan application	0.195	0.182 (0.03)	0.197 (0.01)	0.54
Target before loan application	0.055	0.048 (0.01)	0.057 (0.01)	0.55
Target after loan application	0.115	0.134 (0.02)	0.111 (0.01)	-1.02
Merger market	0.824	0.892 (0.02)	0.811 (0.01)	-2.96*
Business Variables				
Log of annual sales	14.03	12.72 (0.12)	14.26 (0.05)	11.25*
Log of assets	13.09	11.81 (0.13)	13.32 (0.06)	10.47*
Business's delinquencies	0.62	1.22 (0.09)	0.52 (0.09)	-8.61*
Trade credit denied	0.10	0.25 (0.03)	0.08 (0.01)	-8.27*
Length of pre-existing relationship with lender	8.22	5.77 (0.40)	8.67 (0.24)	4.84*
Number of sources for financial services	1.78	1.65 (0.06)	1.80 (0.03)	1.90
Leverage	0.72	0.85 (0.04)	0.70 (0.03)	-2.31*
Return on assets	0.33	0.34 (0.08)	0.32 (0.08)	-0.09
Partnership	0.07	0.06 (0.02)	0.07 (0.01)	0.73
Corporation	0.75	0.68 (0.03)	0.77 (0.01)	2.92*
Log of firm age	2.45	2.11 (0.05)	2.51 (0.02)	7.05*
No relationship with lender	0.04	0.13 (0.02)	0.02 (0.00)	-7.27*

Variable	All Applications	Applications denied	Applications approved	*t*-value
Borrower Variables				
High school education	0.17	0.17 (0.24)	0.18 (0.01)	0.27
Some post-college education	0.61	0.20 (0.03)	0.23 (0.01)	0.93
Personal delinquencies	0.27	0.81 (0.08)	0.18 (0.02)	-11.27*
Market Variables				
Employment growth in area	2.09	1.77 (0.18)	2.15 (0.08)	1.87
Herfindahl index of bank concentration	0.20	0.18 (0.01)	0.20 (0.00)	2.11*
Urban area	0.76	0.86 (0.02)	0.76 (0.01)	-3.40*
Bank characteristics				
Membership in a bank holding company	0.90	0.93 (0.02)	0.90 (0.01)	-1.37
Log of assets (bank)	14.07	14.67 (0.15)	13.96 (0.06)	-4.51*
Equity / assets (bank)	8.12	7.85 (0.00)	8.17 (0.00)	2.47*
Delinquencies / total loans (bank)	2.9	3.36 (0.00)	2.84 (0.00)	-3.01*
Loan loss allowance / total loans (bank)	2.17	2.37 (0.08)	2.13 (0.04)	-2.60*
Log of assets (holding company)	15.15	15.77 (0.17)	15.04 (0.07)	-3.91*
Equity / assets (holding company)	8.29	8.20 (0.12)	8.30 (0.05)	-0.83
Delinquencies / total loans (holding company)	2.9	3.37 (0.19)	2.8 (0.06)	-3.49*
Loan loss allowance / total loans (holding company)	2.12	2.31 (0.06)	2.09 (0.03)	-3.38*

* Indicates that the difference in means is significant at the 0.05 level.

Table 3

Logistic regression results for a sample of 1,519 applications by small businesses for bank credit during 1991-94. Dependent variable is whether a bank approved or denied the firm's loan application. For each variable, the first row is its Odds Ratio and the value in parentheses is the *p*-value of the coefficient. The coefficient itself is not shown.

(1) Variable	(2)	(3)	(4)	(5)	(6)	(7)
Merger Variables						
Any merger	0.94 (0.65)	--	--	--	--	--
Acquirer before loan application	--	0.99 (0.96)	1.19 (0.42)	1.22 (0.37)	0.81 (0.38)	0.88 (0.63)
Acquirer after loan application	--	0.79 (0.23)	0.89 (0.58)	0.88 (0.56)	0.58* (0.02)	0.59** (0.04)
Target before loan application	--	0.74 (0.37)	0.74 (0.40)	0.73 (0.38)	0.86 (0.70)	0.89 (0.78)
Target after loan application	--	1.10 (0.67)	0.89 (0.64)	0.87 (0.57)	0.10 (0.99)	1.02 (0.93)
Merger market	1.98** (0.004)	2.03** (0.002)	2.56* (0.003)	2.67* (0.002)	1.96** (0.02)	1.65 (0.14)
Business Variables						
Log of annual sales			0.69* (0.0001)	0.71* (0.0001)	0.67* (0.0001)	0.69* (0.0001)
Log of assets			0.90 (0.16)	0.90 (0.16)	0.93 (0.32)	0.94 (0.45)
Business's delinquencies			1.45* (0.0001)	1.28* (0.001)	1.28* (0.002)	1.33 (0.0004)
Trade credit denied			2.76* (0.0001)	2.67 (0.0001)*	2.60* (0.0001)	2.45* (0.0004)
Length of pre-existing relationship with lender			0.98 (0.18)	0.98 (0.17)	0.99 (0.46)	1.01 (0.65)
Number of sources for financial services			0.94 (0.54)	0.93 (0.44)	0.95 (0.60)	0.88 (0.23)
Leverage			0.94 (0.42)	0.94 (0.37)	0.97 (0.67)	0.96 (0.58)
Return on assets			1.00 (0.96)	1.00 (0.81)	1.00 (0.91)	1.01 (0.59)
Partnership			0.75 (0.45)	0.78 (0.53)	0.76 (0.50)	0.78 (0.56)
Corporation			1.26 (0.29)	1.30 (0.25)	1.19 (0.47)	1.15 (0.56)
Log of firm age			0.78** (0.05)	0.80 (0.08)	0.78 (0.07)	0.75** (0.04)
No relationship with lender				--	--	5.28* (0.0001)

(1) Variable	(2)	(3)	(4)	(5)	(6)	(7)
Borrower Variables						
High school education				0.90 (0.63)	1.04 (0.88)	1.08 (0.74)
Some post-college education				0.87 (0.49)	0.86 (0.49)	0.90 (0.61)
Personal delinquencies				1.35* (0.001)	1.40* (0.0004)	1.38* (0.001)
Market Variables						
Employment growth in area					0.98 (0.43)	0.97 (0.36)
Herfindahl index of bank concentration					0.37 (0.37)	0.56 (0.62)
Urban area					--	1.85 (0.71)
Bank characteristics						
Membership in a bank holding company					1.22 (0.58)	1.33 (0.45)
Log of assets (bank)					1.09 (0.32)	1.04 (0.85)
Equity / assets (bank)					0.00 (0.27)	0.00 (0.34)
Delinquencies / total loans (bank)					0.00 (0.56)	0.01 (0.66)
Loan loss allowance / total loans (bank)					0.96 (0.68)	0.93 (0.55)
Interaction of log of assets with urban area (bank)					--	1.03 (0.87)
Log of assets (holding company)					1.12 (0.11)	1.18 (0.28)
Equity / assets (holding company)					1.04 (0.70)	1.04 (0.70)
Delinquencies / total loans (holding company)					1.10 (0.38)	1.08 (0.49)
Loan loss allowance / total loans (holding company)					1.23 (0.17)	1.26 (0.15)
Interaction of log of assets with urban area (holding company)						0.95 (0.73)
Pseudo-R Square	0.01	0.01	0.19	0.20	0.24	0.26

**, * Indicates statistical significance at the 0.05 and 0.01 levels, respectively.