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Cookie-Cutter versus Character: The Micro Structure of Small Business Lending by Large and Small Banks

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Abstract

The recent consolidation in the banking system has focused attention on the difference in lending between large and small banks, since large banks lend proportionately less to small business. We use a newly available survey of small business finances conducted by the Federal Reserve System to analyze the micro-level differences between large banks and small banks in the loan approval process. We find that large banks (over $1 billion in assets) appear to employ standard criteria obtained from financial statements in the loan decision process, while small banks (less than $1 billion in assets) deviate from these criteria more and appear to rely on their impression of the character of the borrower to a larger extent. These "cookie-cutter" and "character" approaches are consistent the incentives and environments facing large and small banks.

Cookie-Cutter versus Character: The Micro Structure of Small Business Lending by Large and Small Banks

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I. Introduction

The availability of credit to small businesses has long been an area of concern to policy makers, as well as to small businesses themselves. Congress codified this concern in Section 477 of the FDIC Improvement Act of 1991, which requires that the Federal Reserve Board annually collect and publish information on the availability of credit to small businesses.

Ongoing consolidation in the banking industry has increased the urgency of this issue, with the number of commercial banks declining from 14,400 in 1980 to less than 10,000 as of year-end 1997. During this time, banking industry assets have become increasingly concentrated within the group of money-center and super-regional banks, as these banks have been most active in the takeover market. This has given regulators and policymakers pause because large banks allocate proportionately fewer assets to small business loans than do small banks. Consequently, it is important to understand how banks make small business loans and, in particular, to uncover differences, if any, between the loan approval processes at large and small banks. Anecdotal evidence, at least, suggests that large banks may use a standard quantitative set of criteria for assessing whether a loan should be granted -- i.e., a "cookie-cutter" approach -- while small banks employ more qualitative criteria based upon their loan officers' personal interactions with prospective borrowers -- i.e., the "character" loan. The purpose of this paper is to provide empirical evidence regarding whether or not there are demonstrable differences in

the way that small and large banks make small business loans. In so doing, this study provides

valuable input to policy makers and regulators in evaluating the effects of banking consolidation

on the availability of credit to small businesses.

The effect of the consolidation in banking on the availability of credit to small business

borrowers has been examined in a number of recent studies (see, e.g., Peek and Rosengren

1998; Strahan and Weston 1998; Berger et al. 1997; and Walraven 1997). Other studies have

examined the importance of relationship banking and have explored the effects due to the

differences in borrower characteristics (see, e.g, Cole 1998; Berger and Udell 1995, 1996; Rajan

and Petersen 1994, 1995). A distinguishing feature of this paper is that we focus on

characteristics of both the borrower and the lender, which enables us to examine the micro

structure of the decision to lend to small businesses. In so doing, we find significant differences

in approaches of small and large banks.

We performed our empirical analysis using a newly available survey of small business

finances conducted by the Federal Reserve System that is superior to previous surveys in a

number of ways. Analyzing the decision to grant a small business loan, we find that large banks

(over $1 billion in assets) appear to employ standard criteria obtained from financial statements

in the loan decision process, while small banks (less than $1 billion in assets) do not follow these

criteria as closely and appear to rely more on their impression of the character of the borrower

gathered from an ongoing relationship between the bank and borrower.

The next section surveys the relevant academic literature, shows how the current study

ties these different strands together, and contributes to the analysis of an important public policy

question. The third section discusses relationship banking and the differences in the loan

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approval process that could be expected between large and small banks. The fourth section describes the small business finance survey that serves as the primary source of the data, and specifies the specific variables used and the hypotheses tested in the analysis. The fifth section presents the empirical analysis testing the hypotheses. The final section concludes with a summary of the paper, its policy implications, and suggestions for further research.

II. Survey of the Literature

The first of several strands of literature that is directly relevant to this study deals with credit availability and bank consolidation. Of particular concern is credit availability to small businesses. The informational problems associated with loans to small business may be more easily solved by small banks that are headquartered geographically close to the borrower rather than large banks with centralized decision-making (Berger et al., 1997) and greater lending opportunities. Recent empirical evidence indicates that small banks lend proportionately more to small enterprises (Nakamura, 1993; Keeton, 1995; Berger et al., 1995; Levonian and Soller, 1995; Berger and Udell, 1996; Peek and Rosengren, 1996; and Strahan and Weston, 1996, 1998). The rapid consolidation of the banking system raises concerns that lending to small business will be reduced as small banks are absorbed by larger banks. Some studies find that mergers reduce lending to small business (Peek and Rosengren, 1996; Berger et al., 1997), while others do not find this (Whalen, 1995; Strahan and Weston, 1996, 1998). This reduction in lending to small business can be mitigated by the creation of new banks if the de novo banks lend more to small business than comparable banks. Goldberg and White (1998) find that de novo banks (those in operation for less than three years) do make more small business loans. DeYoung et al. (1998) extend this study and find that as the de novo banks age they make proportionately fewer loans to small business while holding other factors constant. The formation of de novo banks appears to be important for small business lending in an era of bank consolidation.

Information about borrowers is vitally important to the lending process. Some have

suggested that agency costs and information asymmetries have reduced the investment flow to profitable companies.[1] Large lending institutions can produce substantial bodies of information about borrowing firms that can be very helpful in the credit decision process.[2] With the existence of scale economies and durable information, firms with a long lasting relationship with an institutional lender should have greater availability of funds at lower cost. A substantial literature exists that argues that financial intermediaries have a comparative advantage in the production of information about borrowers.[3] The model produced by Boot and Thakor (1994) predicts that as a relationship matures interest rates decrease and collateral requirements are reduced. Other models predict that interest rates will increase as the relationship lengthens.[4] Finally, a number of studies measure the effect on firm value of a bank relationship and find positive abnormal returns for events indicating renewals of the relationships.[5] The current paper emphasizes the differences between large and small banks in their use of information about borrowers.

Five recent studies provide the most relevant empirical evidence related to the current paper. Using data from a survey of small business finance conducted by the Federal Reserve System and the Small Business Administration in 1988 and 1989, Petersen and Rajan (1994)

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[1] See Stiglitz and Weiss (1981), for example.

[2] Among the many studies that deal with this issue are those by Leland and Pyle (1977) and Diamond (1984 and 1991).

[3] See Diamond (1984,1991), Ramakrishnan and Thakor (1984), and Boyd and Prescott (1986).

[4] For example, this can be found in Greenbaum et al. (1989), Sharpe (1990), and Wilson (1993).

[5] See James (1987) and Billett et al. (1995), for example.

examine the value of relationship banking. They find that developing a relationship with an institutional lender increases the availability of financing. Relationships reduce the cost of borrowing, but this effect is smaller than the availability effect. If borrowers attempt to employ multiple lenders, the price of borrowing increases, and the availability of credit decreases.

In a second paper using the same survey data, Petersen and Rajan (1995) explore the effect of credit market competition on lending relationships. Since a lender is more assured of a continuing relationship with a small business borrower in a more concentrated market, lenders tend to provide more credit at lower rates in more concentrated markets. These results hold for young firms, but as the borrowers get older the differences tend to disappear.

Berger and Udell (1995) use the same survey data as did Petersen and Rajan and analyze bank lines of credit extended to small firms. They find that a longer relationship leads to lower rates and to a lower likelihood that collateral is required. This provides additional evidence of the value of the information about the borrower obtained by the lender from a long-term relationship.

Berger and Udell (1996) use data drawn from the Federal Reserve's Survey of the Terms of Bank Lending to Business, the Call Reports, and the Consolidated Report of Condition for Holding Companies to examine relationship lending hypotheses. Focusing on evidence concerning loan quantities, loan interest rates, and collateral requirements, they find evidence that supports the hypothesis that large banks are less inclined to lend to relationship-intensive small business borrowers.

Cole (1998) examines the effect of relationships on the availability of credit by looking more carefully at the nature of the relationship. He uses a new survey of small business finance

conducted by the Federal Reserve, which we also employ in this study and describe in Section IV. As do the studies already discussed, he finds that lenders are more likely to extend credit if they have a relationship with a borrower because of the generation of private information. However, he finds no extra effect if the relationship lasts longer than one year. Thus private information can be generated quickly and can be re-generated if it is lost due to merger. Using firm characteristics as proxies for reputation effects, he finds the importance of firm-lender relationships to be independent of reputation effects.

None of these studies has explored the differences in behavior by different types of banks at a micro level. We extend the previous literature by examining behavioral differences between large and small banks in loan approvals.

III. Large Banks and Small Banks

The previous research clearly indicates that relationship banking is important for granting credit. We hypothesize that relationships are more important for small banks than for large banks. This is due to organizational and operational differences between large and small banks, and we explore these differences in this section.

Large banks (over $1 billion in assets) generally have more branches and are more geographically dispersed than are the smaller banks (less than $1 billion in assets). In order to keep control over the whole organization, the larger banks must establish procedures that will be followed throughout the whole organization. As an organization increases in size and geographic extent, it becomes more difficult for the top management to monitor the behavior of employees; agency problems arise. In order to ensure that loans are being granted in an appropriate manner, management must establish standards that can be followed easily by loan officers and that can be readily monitored and enforced by supervisors. Consequently, we would expect that management would develop a loan granting system that would lead to a consistent approach across branches and personnel. The approach, by necessity, would have to employ easily obtained and verifiable information about the borrowers, such as financial ratios obtained from company financial statements. Consequently, we would expect a "cookie-cutter" approach, with the standard financial variables and ratios of potential borrowers significantly affecting the loan approval/rejection decisions of large banks.[6]

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[6] Our description of the loan decision process that we expect to find in large banks has somewhat the flavor of credit scoring. Though the time period studied in the empirical section of this paper precedes the announced use of credit scoring methods for small business loans by large banks, credit scoring had already been in widespread use for residential mortgage loans

Small banks, in contrast, do not face agency and control problems that are as severe as those faced by large banks. Top management can more easily monitor the behavior of loan officers and coordinate the operation of various parts of the institution. There is less need to establish rigid standards for lending. More flexibility is possible and often is desirable. Small banks are likely to have more private information about potential borrowers because of proximity and a more personal relationship between bank and customer. Furthermore, ownership and management are more likely to be the same or closely allied in the small bank, thus reducing that level of agency problems. Consequently, we would expect small banks to use information about the borrower obtained through relationships and from other sources and thus for small banks to employ more of a "character" approach. This would mean that small banks might grant loans to customers who do not meet the standardized requirements that larger banks would employ. To confirm this hypothesis, the empirical evidence should show that small banks' lending decisions adhere less strictly to standardized financial variables than do large banks' decisions.

The empirical evidence below tests these hypotheses about the differences between large and small banks in the credit granting process. The evidence provides confirmation that large and small banks do behave differently.

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and household credit card loans. It is a process for standardizing lending decisions in ways that would be especially appealing to the bureaucratic/managerial needs of large banks. For a further discussion of credit scoring, see Mester (1997).

IV. Data and Hypotheses

The primary data for this study are taken from the 1993 National Survey of Small Business Finances (NSSBF), which was co-sponsored and co-funded by the Federal Reserve Board and the U.S. Small Business Administration.[7] The firms surveyed constitute a nationally representative sample of 4,637 small businesses operating in the U.S. as of year-end 1992, where a small business is defined as a non-financial, non-farm enterprise employing fewer than ·500 full-time equivalent employees. These data are broadly representative of approximately 5.0 million firms operating in the U.S. as of year-end 1992.

The NSSBF provides detailed information about each enterprise's most recent borrowing experience during 1990-94, including whether the firm applied for credit, the identity and characteristics of the potential lender to which the firm applied, 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, what were the terms of the loan. The survey data also provide information on each enterprise's balance sheet; its credit history; the firm's characteristics, including standard industrial classification (SIC) category, organizational form, and age; and demographic characteristics of each firm's primary owner, including age, education, experience, and credit history. Balance sheet and income statement data are derived from the enterprise's year-end 1992 financial statements. Credit history, firm characteristics, and demographic characteristics of each firm's primary owner are taken as of year-end 1993.

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[7] For a detailed description of the 1993 NSSBF, which was used by Cole (1998), see Cole and Wolken (1995). For a description of the 1987 NSSBF, which was used by Petersen and Rajan (1994, 1995) and Berger and Udell (1995), see Elliehausen and Wolken (1989).

Because the loan application data stretch from 1990-1994, while the enterprise and owner data are from 1992 and 1993, there is the possibility that a loan application may pre-date the enterprise and owner data and thus the latter may be influenced by the former, reversing the causality in which we are interested (i.e., the influence of the enterprise/owner data on bank lender decisions) and introducing potential endogeneity. However, the vast majority of loan applications (more than 85%) in the sample occurred in 1993 and 1994, and even for loan applications made earlier the bank lender may have anticipated subsequent events, so we do not believe that endogeneity is a serious problem for our study.

For the purposes of our study, we focus on the loan applications that were made by an enterprise to an identifiable commercial bank. There were 1,233 such applications in our sample, and in 86.5% of the cases, the bank agreed to make the loan to the applicant. To obtain the characteristics of the bank to which the loan application was made, we used Call Report data obtained from the Federal Reserve System's National Information Center. Specifically, we matched NSSBF loan data with Call Report data as of the year-end preceding the year in which the application was made.[8]

The loan applicants in this sample are a self-selected group: Presumably, only those enterprises whose owners believed that they had a high probability of obtaining a loan from the identified bank would bother to apply for the loan from that bank. Nevertheless, not all of them were in fact successful, and the characteristics of those who were successful and unsuccessful, as well as the characteristics of the bank that approved or rejected the application, provide us with the basis for testing our hypotheses. To summarize, our results can be used to make

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[8] For example, we matched loan applications made during 1994 with year-end 1993 Call Report data.

inferences about firms that applied for loans, but not about firms that did not apply for loans. In order to be able also to make inferences about the latter group of firms, one would need to employ a methodology that corrects for possible sample selection bias, such as that proposed by Heckman (1979). We leave that step to future research.

Table 1 displays descriptive statistics for the variables extracted from the NSSBF and from the FDIC Call Reports that are used in our analyses, their brief definitions, means, and ranges. The remainder of this section will expand on those variable definitions and on how we will use the variables to test the hypotheses discussed in Section III.

The dependent variable that we use in all of our tests is LOANAPPR: a 1,0 variable indicating whether the bank approved or denied the enterprise's request for a loan. As noted above, the loan was approved 86.5% of the time.

We group our explanatory variables into three categories: (1) enterprise characteristics; (2) primary owner characteristics; and (3) bank characteristics. We will first present our general expectations as to the relationships between these variables and our dependent variable (LOANAPPR); we will then discuss our more specific expectations as to the differences that we would expect to find in the behavior of larger banks and smaller banks.

A. General hypotheses

(1) Firm characteristics. Our general expectations fundamentally follow those of Berger and Udell (1993) and Berlin (1996): Lenders will lend only when they have high expectations of being repaid and thus will strongly favor borrowers with characteristics that reassure the bank as to the likelihood of being repaid. We add to this the ideas of Petersen and Rajan (1995) that

lenders often must invest substantial resources in investigating and monitoring small, young borrowers and thus will be more likely to lend if they can be reassured that a successful borrower will not quickly repay the loan and (with its credit history thus certified and enhanced) switch to another lender who does not need to invest as much in determining the borrower's credit-worthiness.

LFIRMSIZE is the log of the firm's assets, as of year-end 1992. We expect that a firm with more assets would be able to provide more reassurance to a bank that its loan would be repaid and thus would be more likely to be accepted for a loan. We expect a positive relationship between LFIRMSIZE and LOANAPPR.

FIRMLEVER is the ratio of the firm's equity (net worth) to its assets, as of year-end 1992.[9] We expect that firms with higher equity ratios (lower debt ratios) are less likely to become insolvent and thus would be more likely to be accepted for a loan. We expect a positive relationship between FIRMLEVER and LOANAPPR.

LFIRMAGE is the log of the firm's age as of year-end 1992. We expect that an older firm, with a more established track record, would be more likely to be accepted for a loan. We expect a positive relationship between LFIRMAGE and LOANAPPR.

MSA is a 1,0 dummy variable indicating whether the firm is located in a metropolitan area. Though the location of the firm itself is unlikely to be an important determinant of its credit worthiness, the levels of seller (bank) concentration are generally much higher in rural

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[9] To control for erroneous extreme values, this ratio was limited to values in the range of -1.0 to +3.0.

areas than in urban areas.[10] Where concentration is higher, borrowers have fewer alternative lenders to whom they can turn. Following Petersen and Rajan (1995), this may cause lenders to be more willing to lend to a small business borrower in the first place.[11] We thus expect a negative relationship between MSA and LOANAPPR.

FIRMDELINQ is the number of credit obligations on which the firm was delinquent during the previous three years.[12] More past delinquencies should discourage a bank from lending to a loan applicant. We expect a negative relationship between FIRMDELINQ and ·LOANAPPR.

FRMBNKREL is a 1,0 dummy variable indicating whether the firm and the bank had a business relationship prior to the loan application. Since prior relationships make the loan applicant more transparent to the bank, they should increase the likelihood that a bank would approve a loan application. We expect a positive relationship between FRMBNKREL and LOANAPPR.[13]

LYRSFBREL is the log of the number of years for which the firm and the bank have had a relationship (i.e., the number of years that the firm reported doing business with the bank).

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[10] As reported in DeYoung et al. (1997), the mean Herfindahl-Hirschman Index (HHI) for rural markets for 1993-1996 was 0.2835; for urban markets, it was 0.1036.

[11] The higher concentration is also likely to mean higher lending rates (Hannan, 1991). But the loan applicant is presumably already aware of the prevailing level of interest rates in its area and has nevertheless decided to apply for a loan.

[12] The survey capped the magnitude of this variable (and of OWNDELINQ, described below in the text) at three: The possible answers to the survey question were: zero, one, two, or three or more delinquencies.

[13] In our sample, only eight loan applicants (two in the small bank sample, and six in the large bank sample) did not have a prior relationship with the bank. In a sense, there is a "small sample" aspect to this variable. Nevertheless, the data are available and can be used.

Though more years provide more of a track record, it may be the case that only the recent experiences matter. Thus, LYRSFBREL may have a positive relationship with LOANAPPR or it may be insignificant.[14]

(2) Primary owner characteristics. Since the credit worthiness of a small business may be ultimately linked to the credit worthiness of its primary owner, the latter's characteristics may be important. Again, the lending bank would seek characteristics that would reassure itself that it would be repaid.

OWNDELINQ is the number of credit obligations on which the primary owner of the firm has been delinquent during the previous three years. More delinquencies should discourage the bank from lending. We expect a negative relationship between OWNDELINQ and LOANAPPR.

(3) Bank characteristics. Banks clearly do differ in their proclivities with respect to small business lending (Berger and Udell, 1996; DeYoung et al., 1997; Goldberg and White, 1998). We have selected three bank characteristics that other studies have shown to be important.

LBANKSIZE is the log of the bank's total assets, as of the year-end preceding the loan application.[15] As was noted in Section II, numerous studies have shown that larger banks tend to be less inclined to lend to small businesses than are smaller banks. We expect a negative relationship between LBANKSIZE and LOANAPPR.

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[14] Cole (1998) tested whether the number of years of the relationship with the lender, the log of the number of years, or a dummy variable indicating zero years or positive years were important in explaining loan denial rates and found that only the dummy variable (i.e, the equivalent of our FRMBNKREL variable) was statistically significant. Because our sample is different from that analyzed by Cole, we wanted to test anew whether the length of the relationship matters.

[15] More specifically, it is the log of the bank's assets when expressed in thousands of dollars.

BANKCAP is the ratio of the bank's "tier 1" capital to its risk-adjusted assets, as of the year-end preceding the loan application. Tier 1 capital is primarily the bank's net worth; risk-adjusted assets are the weighted average of the bank's assets, with four categories of risk weights (0%, 20%, 50%, and 100%) applied.[16] If a bank is capital constrained, it would be more likely to reject a loan application, which would argue for a negative relation between BANKCAP and LOANAPPR; but if all or most banks are sufficiently above the required level of Tier 1 capital, which is 4% of risk-weighted assets, then capital may be irrelevant to the bank's loan decision.

LBANKAGE is the log of the age of the bank in years, as of the year-end preceding the loan application. Goldberg and White (1998) have found that de novo banks tend to make more small business loans than do otherwise similar incumbents; but DeYoung (1998) and DeYoung et al. (1997) have found that the de novo banks' positive differential tends to diminish with age, so that a bank that is about 20 years old has a portfolio of small business loans (as a percentage of assets) that is not significantly different from the pattern of yet older banks. Accordingly, we expect a negative relationship between LBANKAGE and LOANAPPR, although the average age of the banks in our sample (76.9 years) is such that the effect should be small.

B. Specific hypotheses for large and small bank differences.

The specific motivation for this paper is to test whether big banks and small banks differ in the way that they approach the loan application approval/rejection decision for small business

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[16] The 0% weight applies to "full faith and credit" government obligations; the 20% weight applies to U.S. agency and similar obligations; the 50% weight applies to residential real estate loans; and the 100% weight applies to all commercial and commercial real estate loans.

loans. Big banks are likely to be more bureaucratic, and their loan officers are more likely to make decisions "by the numbers." Loan approval/rejection decisions are likely to be strongly based on the loan applicant's easily verified financial data: a "cookie cutter" process. Smaller banks may be less bureaucratic, and their loan officers may be able to use less formal and more subjective criteria in their decisions; "character" or relationship lending may be more important.

Accordingly, we expect the formal financial data to be quantitatively and statistically more significant in explaining the lending decisions of large banks. Conversely, we expect the formal financial variables to provide a less satisfactory fit for regressions that try to explain the lending decisions of small banks, since these variables are likely to fail to capture the subjective criteria that small banks employ in their decisions.

IV. Empirical Results

The formal empirical tests of the hypotheses developed in Sections III and IV consist of regressions in which LOANAPPR -- a 1,0 variable indicating whether a specific small business's loan application at a specific bank was approved or rejected by that bank -- is the dependent variable and the remaining variables described in Section IV are the right-hand-side independent variables. We first present and discuss simple OLS regression results, because of their intuitive clarity. But, because the dependent variable is limited to values of 0 and 1, we also present and discuss a similar set of logit regression results. As will be seen, the basic outcomes of the two techniques are quite similar.

A. OLS results.

Table 2 presents three sets of OLS results: for our full sample of loan applications, for the loan applications to larger banks (banks with $1 billion or more in assets), and for the loan applications to smaller banks (banks with less than $1 billion in assets).

1. All banks. Turning first to the full sample, we see that the general hypotheses of Section IV are generally supported. The coefficients on LFIRMSIZE, FIRMLEVER, and LFIRMAGE are positive and significant: larger, better capitalized, and older firms are more likely to have their loan applications approved. The coefficient on MSA is negative and significant: A small business in a rural area (where the number of bank lenders is fewer) is more likely to have its loan application approved, which provides support for the Petersen and Rajan (1995) hypothesis.

The number of delinquencies by the firm (FIRMDELINQ) has the expected negative and significant effect on loan approvals. The existence of a prior relation ship between the enterprise and the bank (FRMBNKREL) has the expected positive and significant effect on loan approvals, while the number of years of the relationship (LYRSFBREL) has a positive effect, but the coefficient is statistically insignificant. The number of delinquencies by the owner (OWNDELINQ) has the expected negative and significant effect on loan approvals.

The coefficient on LBANKSIZE is negative and significant. Our micro-level data confirms the macro-level results of many other studies: Large banks are less inclined to make loans to small businesses than are smaller banks.

The coefficient on BANKCAP is negative, as expected, but insignificant. Since the average value for this variable in our sample is 11.98%, and the minimum value is 5.03%, the general irrelevance of this variable is not surprising. The effect of LBANKAGE is positive but insignificant, and the coefficient is quantitatively small. As was noted above the average age of the banks in our sample is 76.9 years, and only 179 banks out of 1,233 are less than 20 years old, so the results found by DeYoung (1998) and DeYoung et al. (1997) have little opportunity to appear here.

Overall, the general hypotheses developed in Sections III and IV hold up well in this regression.[17]

2. Comparing large and small banks. The second and third regressions presented in

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[17] An additional set of regressions (not shown) include a set of thirty-five 1,0 dummy variables representing the two-digit primary SIC codes of the loan applicants. The inclusion of these dummy variables do not change the basic results reported for the overall sample or for the sub-samples discussed in the text below. Only one of the thirty-five coefficients is statistically significant, and the addition of the group of thirty-five variables does not satisfy an F-test for significant additional explanatory power in the regressions.

Table 2 report the OLS results for large banks (with assets greater than $1 billion) and small banks (with assets less than $1 billion). Rather than discuss each regression separately, we will discuss each variable and compare the coefficients in the large bank and small bank regressions.

LFIRMSIZE: The coefficients are positive and significant for both regressions. The size of the loan applicant is a positive influence on the approval rates for both large and small banks. But the coefficient in the large bank regression is almost four times as large as the coefficient in the small bank regression, and the former t-value is substantially greater than the latter. Large banks appear to rely much more heavily on the applicant's size in their loan approval decisions.

FIRMLEVER: The coefficient is positive and significant for large banks, but is negative and insignificant for small banks. Large banks rely on the applicant's capitalization; small banks generally do not.

LFIRMAGE: The coefficients are positive for both regressions. But the coefficient is smaller and insignificant for large banks; it is 50% larger and statistically significant for small banks. The durability of the firm apparently provides more assurance for smaller banks.[18]

MSA: The coefficients are negative for both regressions. However, the coefficient is quantitatively more important and statistically significant for large banks, while it is less than half the magnitude for small banks and is insignificant. For large banks, the Petersen-Rajan

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[18] A possible reason why large banks make less use of firm age would be as follows: If loan officers are rotated among branches more frequently in large (bureaucratic) banks, then age of the firm would have little meaning for a new loan officer who had not had the opportunity actually to observe the firm's aging. In a smaller bank, by contrast, a loan officer with greater longevity in one place might have greater informal familiarity with a firm and its operations over the years, even if the bank and the firm had not had any formal financial relationship. This explanation is consistent with the more general hypothesis that relationships are more important for smaller banks.

effect appears to be important. By contrast, small banks in urban areas appear to be less concerned that their borrowers will switch to other lenders; lending relationships do seem to be more important.

FIRMDELINQ: The coefficients are negative and significant for both regressions, but the quantitative magnitude and t-value is greater for large banks than for small banks. Small banks are apparently somewhat more willing to overlook delinquencies, as would be consistent with relationship lending.

FRMBNKREL: The coefficients are positive for both regressions, but the coefficient is insignificant for large banks, whereas it is statistically significant and over twice the quantitative magnitude for small banks. A prior financial relationship with the loan applicant clearly matters much more for small banks.

LYRSFBREL: The coefficients are positive for both regressions but are significant in neither. It is the fact of a prior relationship, not its length, that matters (especially for small banks).

OWNDELINQ: The coefficients are negative and significant for both regressions, and the quantitative magnitudes and t-values are similar in the two regressions. Delinquencies by a primary owner are considered significant by both kinds of banks; relationship lending does not gloss over these personal "character" flaws.

LBANKSIZE: The coefficients are negative but insignificant for both regressions. The major negative consequences of bank size for small business lending appear when large banks are compared with small banks (as in the overall sample) but not within the size categories.

BANKCAP: The coefficients are negative and insignificant for both regressions. The

results found for the overall sample are reproduced for each sub-sample: The banks are not significantly capital constrained in their lending decisions.

LBANKAGE: The coefficients are positive for both regressions but are statistically and quantitatively insignificant in both cases. Again, the results of the full sample are found in the two sub-samples.

R^2: The R^2 for the large bank regression is 0.21; the R^2 for the small bank regression is 0.10. The formal financial variables do a substantially better job of explaining large banks' lending decisions than in explaining small banks' lending decisions. The latter group of banks must be relying on other, more subjective measures in deciding whether to approve or deny a loan application.

3. A summing up. The regression encompassing the overall sample of loan application decisions by banks does a respectable job of explaining the banks' decision in terms of the general hypotheses, but the overall sample masks crucial differences between large banks and small banks in the criteria that they appear to use in approving or rejecting loan applications. The two separate regressions for large banks and for small banks show significant[19] and important differences. The large banks appear to be more influenced by the formal financial information presented by the firm, and these variables do a better overall job of explaining the large banks' loan approval/rejection decisions. Small banks appear to be less guided by a firm's asset size or by its capitalization level, are more willing to overlook the firm's past delinquencies, and are quite focused on whether the loan applicant has had a previous financial

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[19] The two regressions satisfy a formal Chow test, allowing the rejection of the null hypothesis that the coefficients of the two regressions are basically the same. The computed F-statistic is 2.34; the 95% confidence point for $F(13, 1207)$ is about 1.75.

relationship with the bank; the overall set of variables do a poorer job of explaining the small banks' lending decisions, indicating that other, more subjective variables are likely to be important.

In sum, it does appear that large banks are more inclined to make their lending decisions with respect to small business loans "by the numbers." The results are likely to be "cookie cutter" loans. By contrast, small banks are less guided by the formal numbers (except for the firm's age) and more concerned about relationships. The results are consistent with "character" loans.

B. Logit regressions.

Table 3 presents a set of logit regressions that use the same explanatory variables as were used in Table 2 and that split the overall sample into the same sub-groups of large and small banks. As a comparison of the coefficient signs and t-values for the variables in Tables 2 and 3 quickly reveals, the logit results are quite similar to the OLS results. Our general hypotheses continue to hold up well for the overall sample; and the split of the sample continues to indicate that the lending decisions of large and small banks do seem to be based on differing criteria and weights, along the "cookie cutter" and "character" lines that we have indicated.

VI. Conclusion and Implications

The empirical analysis has shown that large banks and small banks differ in their approach to small business loans. Large banks in general employ a "cookie-cutter" approach to lending in order to control for agency problems and to maintain consistency throughout the bank. Small banks, in contrast, rely more on "character" and pay less attention to formal financial variables. Small banks face less of an agency problem and have superior knowledge about their small business borrowers and thus find it more advantageous to use a more discretionary approach.

In the current environment of rapid consolidation of the banking system this difference in lending approach can have major implications. As banks consolidate, information about small business customers is lost. The empirical evidence indicates that large banks make fewer loans to small business. In order to compensate for this reduction of credit to small business, the creation of new banks, which have been shown to lend more to small business than similar sized banks, may be needed.

This paper has dealt only with the approval/rejection of loan requests and has not treated the interest rates of the loans that are granted nor the collateral required. These factors need to be examined with respect to the different approaches between large and small banks in small business lending in order to obtain a full picture of the lending process. The interrelationship of these factors will be evaluated in future research.

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Table 1: Means and Ranges of the Variables

Variable	Brief Definition	Mean	Minimum	Maximum
LOANAPPR	1,0 variable indicating whether a firm's loan application was approved or rejected by the bank	0.87	0.00	1.00
LFIRMSIZE	The log of the firm's assets	12.99	6.36	18.42
FIRMLEVER	The ratio of the firm's equity (net worth) to its assets	0.48	-1.00	3.00
LFIRMAGE	The log of the firm's age	2.58	0.00	4.96
MSA	1,0 dummy variable indicating whether the firm is located in a metropolitan area	0.76	0.00	1.00
FIRMDELINQ	The number of delinquencies reported by the firm during the previous 3 years	0.63	0.00	3.00
FRMBNKREL	1,0 dummy variable indicating whether the firm and the bank had a prior relationship	0.99	0.00	1.00
LYRSFBREL	The log of the number of years for which the firm and the bank have had a relationship	1.99	0.00	4.44
OWNDELINQ	The number of delinquencies reported by the primary owner during the previous 3 years	0.27	0.00	3.00
LBANKSIZE	The log of the bank's total assets (in thousands)	14.07	9.41	18.98
BANKCAP	The ratio of the bank's "tier 1" capital to its risk-adjusted assets	0.12	0.05	0.59
LBANKAGE	The log of the bank's age of the bank in years	4.07	0.69	5.27

(LOANAPPR as dependent variable; t-statistics in parentheses)

	Full sample	Large banks	Small banks
const.	0.74 (7.34)	0.42 (1.64)	0.83 (5.04)
LFIRMSIZE	0.04 (7.99)	0.05 (7.88)	0.01 (2.15)
FIRMLEVER	0.03 (2.24)	0.05 (2.81)	-0.0005 (0.03)
LFIRMAGE	0.05 (2.98)	0.04 (1.86)	0.06 (2.76)
MSA	-0.06 (2.73)	-0.10 (2.44)	-0.04 (1.40)
FIRMDELINQ	-0.04 (4.30)	-0.05 (3.45)	-0.03 (2.20)
FRMBNKREL	0.25 (2.20)	0.17 (1.16)	0.45 (2.25)
LYRSFBREL	0.02 (1.31)	0.03 (1.26)	0.01 (0.32)
OWNDELINQ	-0.06 (4.39)	-0.06 (3.08)	-0.05 (3.11)
LBANKSIZE	-0.03 (5.57)	-0.02 (1.63)	-0.02 (1.31)
BANKCAP	-0.08 (0.37)	-0.04 (0.01)	-0.08 (0.37)
LBANKAGE	0.02 (1.91)	0.03 (1.58)	0.02 (1.22)
R^2	0.17	0.21	0.10
n	1233	638	595
mean of dep. var.	0.87	0.82	0.91

(LOANAPPR as dependent variable; t-statistics in parentheses)

	Full sample	Large banks	Small banks
const.	0.51	-1.29	1.18
	(0.47)	(0.60)	(0.50)
LFIRMSIZE	0.35	0.42	0.21
	(7.25)	(6.90)	(2.37)
FIRMLEVER	0.21	0.36	-0.02
	(1.67)	(2.20)	(0.12)
LFIRMAGE	0.57	0.44	0.77
	(3.29)	(1.99)	(2.63)
MSA	-0.84	-1.07	-0.63
	(2.91)	(2.37)	(1.53)
FIRMDELINQ	-0.36	-0.39	-0.31
	(4.26)	(3.63)	(2.22)
FRMBNKREL	1.89	1.31	3.08
	(2.18)	(1.24)	(1.98)
LYRSFBREL	0.25	0.32	0.05
	(1.43)	(1.48)	(0.16)
OWNDELINQ	0.30	-0.27	-0.32
	(2.84)	(1.96)	(1.98)
LBANKSIZE	-0.26	-0.18	-0.24
	(4.85)	(1.65)	(1.29)
BANKCAP	-0.59	-0.15	-1.13
	(0.24)	(0.04)	(0.31)
LBANKAGE	0.22	0.24	0.22
	(2.14)	(1.70)	(1.27)
n	1233	638	595
mean of dep. var.	0.87	0.82	0.91