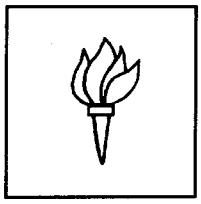

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UNIVERSAL BANKING AND THE FUTURE OF SMALL BUSINESS LENDING

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Abstract

We examine the contention that as banks become larger and more organizationally complex -- i.e., more like universal banks -- they may reduce the supply of credit to small business borrowers. This would be consistent with an effort to reduce Williamson-type managerial diseconomies in providing services for large and small borrowers jointly. We investigate the empirical association of loan price and quantity with bank size and complexity, using a data set with over 900,000 bank loans. The data support the proposition that larger, more complex banks may reduce the supply of small business lending, although other institutions may replace many of these loans.

Keywords: bank, universal, loan, collateral
J.E.L. codes: G21, G28, L11, L89

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UNIVERSAL BANKING AND THE FUTURE OF SMALL BUSINESS LENDING

I. Introduction

Over the past 25 years, the U.S. financial landscape has changed dramatically. An increasingly volatile marketplace greatly accelerated the pace of financial innovation and forced significant changes in the regulation of financial markets and institutions. Quite possibly the biggest impact of these changes has been felt in the banking sector. During this period, banks significantly altered and expanded the product mix offered to their large corporate clients. The emphasis moved from direct on-balance sheet lending to off-balance sheet finance and nontraditional activities, including some activities typically associated with universal banking, such as corporate securities underwriting. In addition, large U.S. banks have been full participants in the creation and development of new markets for large corporate customers such as the derivatives market and the Eurobond market.

During this same period, the fabric of interstate banking regulation -- a stalwart of twentieth century U.S. banking -- also began to unravel as bank holding companies took advantage of reciprocity agreements among groups of states with regional banking compacts. The resulting mergers have in some cases created huge supperregional banks, formed through the consolidation of multiple large regional banks (e.g., NCNB, Citizens and Southern, and Sovran became NationsBank). In other cases, mergers of large money center banks created even larger money center banks (e.g., Bank of America with Security Pacific, Chemical Bank with Manufacturers Hanover). The Interstate Banking and Branching Efficiency Act of 1994 will likely accelerate these trends -- virtually complete nationwide branch banking is scheduled to be allowed by 1997. In addition, if current legislative proposals permitting some form of universal banking pass, the management of banks is likely to become much more organizationally complex, since more activities will be performed by banks and bank holding companies.

Many argue that one category of bank clientele may have been lost in this shuffle: small business borrowers. Heightened political concern about small businesses was reflected in Section 477 of the

Federal Deposit Insurance Corporation Improvement Act of 1991 (FDICIA) which required that the Federal Reserve Board report periodically to Congress on the availability of credit to small businesses.[1] The White House is also hosting a conference in June 1995 (funded by Congress) to set the federal small business agenda for the near future. One of the dominant issues at the conference is the "small business person's access to capital".[2]

One reason for the concern over small business credit availability is the argument that small business has fallen victim to the increasing size and complexity of banking organizations. The proliferation of new bank product lines may have forced an internal competition for scarce capital and managerial attention in which the small business component of banking may have been losing ground. The recent wave of bank acquisitions may have had an equally powerful impact. Acquiring banks have often imposed their own idiosyncratic policies and procedures, stripping acquired banks of their autonomy and sometimes their management. More importantly, these critics argue, the process may have robbed acquired banks of their community identity and their appetite for loans to small local businesses.

Arguably, these forces have had little downside cost for consumers who demand relatively generic financial services and who increasingly buy these services in national markets with substantial nonbank competition. It would also have little downside cost for large and middle-market businesses who demand the breadth of service that the more universal-like money center banks and the superregional banks offer, and who benefit from access to alternative sources of funding such as the public securities market and the private placement market. However, for the small business customer the story is different (so goes the argument). Small local companies may need an individual bank that has an understanding of the local business market and is staffed by personnel with local roots. These are said to be necessary conditions

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[1]See the Federal Reserve Board (1994a,b) for the most recent reports on the availability of credit to small business.

[2]See Tannenbaum's (1995) quote of Philip Lader, the top official at the Small Business Administration. That article also contains more details on the conference.

for the establishment and the continuation of a banking relationship and the tailoring of services to meet the idiosyncratic needs of the small firm. As banking organizations have become larger and more complex they may have reduced their supply of loans to small businesses. This (asserted) problem may be exacerbated by the fact that the pool of independent community banks which could absorb this contraction in supply has been reduced by the acquisition of small banks by large banking organizations. From December 1979 to June 1994, the number of independent U.S. banking organizations (independent banks plus holding companies that are not owned by other holding companies) fell by more than 30% from 12,647 to 8,838.

The importance of small banks to small business borrowers is reflected in Table 1 which shows the domestic credit availability by credit size and bank size based on data from the June 1994 Call Report. The collection of these data on small business credit issued by banks is a response to the FDICIA reporting requirement. Credit availability here is defined as the maximum of i) the loan amount borrowed from the respondent bank, ii) the entire amount participated across banks (if applicable), and iii) the total credit commitment from the respondent bank. As shown in the top half of the table, of the $63.17 billion of total bank credit available to businesses with bank credit needs of $100,000 or less, $41.13 billion (or 65.1%) is provided by banks whose assets are $1 billion or less. About half of all banks (5,137 of 10,631) report that all, or substantially all, of their business loans are $100,000 or less. In contrast, banks with more than $10 billion in assets provide only $7.82 billion or 12.4% of the total credit to these borrowers, despite the fact that these large banks provide almost half of the total domestic commercial bank credit.

The bottom half of the table shows that as banks become larger they devote substantially less of their portfolio to small borrowers. Banks with $100 million or less in asset size devote on average 5.85% of their total adjusted assets (including reserves) to borrowers with bank credit of $100,000 or less. In contrast, banks with more than $10 billion in assets devote less than one-tenth as much of their portfolio, only 0.43%, to small business borrowers in this category. These raw data would appear to suggest that

a sharp drop in small business credit is likely to occur as the banking industry consolidates and a greater share of the banking market is taken by banks with over $10 billion in assets.

The argument that the supply of banking services to small businesses decreases with bank size and complexity can be cast in somewhat more rigorous economic terms. This form of the argument synthesizes two generally unrelated theories found in the academic literature. The first is the proposition that the delivery of banking services to small businesses is a fundamentally different activity from the delivery of services to large borrowers. Lending to small borrowers tends to be more information intensive and relationship-driven, whereas lending to large borrowers tends to be more transaction-driven and also often involves the joint provision of more nontraditional banking products, such as derivative contracts and underwriting services. The second theory is the organizational model of the firm usually associated with Williamson (1967) that emphasizes managerial diseconomies associated with the provision of multiple activities in large, complex organizations.[3] Putting these two theories together yields the implication that large, complex banking organizations may try to minimize the managerial diseconomies associated with servicing both large and small borrowers by reducing the supply of credit to some of the small borrowers.

Support for the proposition that small business lending is fundamentally different from large business lending can be found in the recent banking literature. Petersen and Rajan (1993,1994) and Berger and Udell (1995) find evidence that at least some types of lending to small businesses tend to be relationship-driven. That is, these loans depend upon private information gathered through contact between the bank and the borrower over time. The data in these studies suggest that over the course of the relationship, the information gathered is used to refine the terms of the lending contract. Small business borrowers with longer banking relationships tend to pay lower interest rates, have fewer collateral requirements, and become less dependent on trade credit. Berger and Udell (1995) also found

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[3]These managerial diseconomies can be rationalized in a transactions cost framework or an agency theory framework. For a discussion of the distinction between these approaches, see Williamson (1988).

that small businesses tend to consolidate their working capital financing with a single bank. These features of small business lending stand in sharp contrast to large firm bank lending. Large business bank loans tend to be generic in nature, transaction-driven, and provided by multiple banks in syndicated loans or credit facilities. These arguments are also consistent with Ang (1992), who emphasizes that small business lending tends to be very idiosyncratic in nature. These studies of small business finance are also rooted in a growing information-based theoretical literature on relationship lending (Greenbaum et al. 1989, Sharpe 1990, Wilson 1993, Petersen and Rajan 1993, Boot and Thakor 1994a).

The special nature of small business banking can also be viewed in the context of modern banking theory (Diamond 1984,1991, Ramakrishnan and Thakor 1984, Boyd and Prescott 1986, Boot and Thakor 1994b). In this view, financial intermediaries are specialists in the production of information about borrowers and the design of contracts which address issues related to the sparseness of information about borrower quality and behavior. However, because the acuteness of these information problems tends to be greater for smaller firms, the nature of the debt contract tends to vary with the size of the firm (see Carey et al. 1993). More generally, providing credit and transactions services to smaller businesses in a relationship context bears little resemblance to providing transaction-driven capital market services to large corporate clients.

As alluded to above, the theory of organizational behavior primarily associated with Williamson (1967) suggests some reasons why the trend toward large, complex banking organizations may have reduced the supply of credit to small borrowers, given that this line of business is substantially different from the provision of financial services to large borrowers. As banking institutions have become larger and more complex, an effective diseconomy of scale or of complexity sets in as more dimensions of managerial oversight become necessary. For example, the joint provision of banking services to small businesses (with its emphasis on relationship lending and local orientation), with the capital markets services typically demanded by large corporations necessarily complicates the management of the banking organization. More generally, the trend toward larger banking organizations with expanded product lines

and increased geographic dispersion has significantly complicated the managerial structure of the banking organization. This has often resulted in increased layers of management (vertical complexity) and an increased number of parallel functions (horizontal complexity). The organizational diseconomies associated with increased size and complexity provide an incentive for larger, more complex banks to abandon their small business clientele in order to focus their efforts more narrowly and avoid these diseconomies.

The purpose of our paper is to examine the proposition that the movement toward larger and more complex banking firms may come at the expense of the provision of some traditional banking services, particularly commercial lending to small businesses. The issue is whether the trends toward larger, more complex institutions, the new nationwide banking deregulation, globalization of financial markets, and universal banking, are pursued at the expense of small businesses.

Our approach is to investigate empirically the association between commercial lending and both bank size and management/functional complexity using commercial loan pricing and bank call report data. Specifically, we test whether large and complex banks have a reduced supply of credit (i.e., a higher price and lower quantity) to some or all types of small business borrowers relative to smaller, less complex banks. Our analysis focuses on bank size and three different categories of organizational complexity as explanatory variables in price and quantity regressions. The three complexity categories which potentially lead to a reduced supply of small business lending are i) measures of the layers of ownership/management, ii) measures of the numbers of different bank operating units, and iii) measures of the variety of different functions within the banking organization.

The paper proceeds as follows. In the next section, we set forth our testable hypotheses. In the third section, we describe our data and test procedures. In section IV, the empirical results are presented. Section V offers some conclusions.

II. The Testable Hypotheses

The potential empirical association between the supply of credit to small businesses and both bank

size and complexity can be formally stated in three hypotheses. The first and third hypotheses are associated with a decreased supply of credit to at least some small business borrowers by large, complex banks, while the second hypothesis forms our null under which there are no effects of bank size and complexity. The two alternative hypotheses stem from a Williamson view of the banking organization in which larger and more complex banks seek to reduce managerial and functional diseconomies associated with supplying credit services to distinctly different classes of borrowers. These banks choose instead to focus their efforts on a more homogeneous clientele and on other nontraditional banking activities to serve this clientele. The hypotheses are fully described below.

H1: *The Small Borrower Hypothesis*

Under the *Small Borrower Hypothesis* H1, larger and more organizationally complex banks have a reduced supply of credit to small business borrowers. These banks may reduce the supply of small business credit through either price or quantity rationing. In the price rationing case, we should observe that small business borrowers are presented with higher interest rates and/or stiffer collateral requirements -- i.e., face a higher risk-adjusted price for credit -- from larger, more organizationally complex banks than from other banks, all else equal. In the quantity rationing case, fewer small borrowers receive credit from large, complex banks than from other banks, but the remaining borrowers who do receive credit from these banks face the same interest rate and collateral pricing terms as small borrowers at small, less complex banks.

Under **both** the price and quantity rationing cases, the quantity of credit issued to small borrowers by large, complex banks is reduced. Under price rationing, fewer small business borrowers choose to take credit offered at the higher price, whereas under quantity rationing, fewer small business borrowers are offered credit on any terms by large, complex banks.

H2: *The Null Hypothesis*

Under the *Null Hypothesis* H2, there is no association between the supply of credit to small

business borrowers and either bank size or organizational complexity. The interest rate charged on a small business loan, the collateral pledged against a small loan, and the amount of credit available to small business borrowers will not vary with bank size and complexity under this null hypothesis after controlling for the economic conditions of the bank and borrower.

H3: *The Relationship Borrower Hypothesis*

The *Relationship Borrower Hypothesis* H3 is similar to the *Small Borrower Hypothesis* H1 in that it specifies that the availability of credit to small business borrowers will be affected by the size and complexity of the bank. However, H3 differs from H1 in that H3 distinguishes between two categories of small business borrowers -- one of which is affected by the size and complexity of the bank, and one of which is not. Under this hypothesis, some small business loans are relatively generic and involve essentially the same credit analysis techniques -- analysis of financial ratios, credit checks, plant and equipment appraisals, etc. -- that are associated with larger, transaction-driven loans. For simplicity, we will use the term 'ratio loans' to refer to this category of business loans -- a category for which credit analysis of financial ratios and other factors conducted at the origination stage substantially reveals the true credit quality of the borrower.

The other category of small business loans requires more than just a 'ratio' analysis. These are loans for which the bank-borrower relationship is relatively important. For these loans, the dynamic production of information over the course of the relationship becomes an important element in determining the interest rate, collateral requirements, and the quantity of credit supplied. This includes information about the behavior of the firm with regard to its activities with the bank other than borrowing (e.g., its deposit activity) and its obligations to other stakeholders in the firm. The important information in relationship lending may also include privately observed data about the principals of the firm, who often provide implicit or explicit personal guarantees or collateral, and whose character and managerial expertise may be crucial to the repayment of the loan. The acquisition of these types of private

information requires loan officers with an intimate knowledge of the local community -- typically loan officers with local roots. We refer to loans extended to this second category of small borrowers as 'relationship loans'. In making relationship loans, the ability of the bank's management and loan officers to acquire information in the local community about this type of borrower through the 'relationship' is paramount.

Under the *Relationship Borrower Hypothesis*, as banks become larger and more complex the amount of credit available to 'relationship borrowers' is reduced. However, because 'ratio loans' to small businesses are made in substantially the same way as loans to large businesses, the supply of 'ratio loans' is essentially unaffected by a bank's size and complexity. Because the data available to researchers are not fully capable of distinguishing between ratio borrowers and relationship borrowers, the impact of bank size and complexity on the **average** loan interest rate and **average** collateral requirements on the pool of small business loans that are issued is theoretically indeterminate. It first depends on whether relationship borrowers pay a higher or lower price for credit on average than ratio borrowers. It seems reasonable to assume that relationship borrowers are likely to be charged a higher average price, all else equal, for two reasons. First, relationship borrowers are likely to be riskier in ways that are not accounted for in our control variables for the creditworthiness of the borrower. That is, the fact that these companies do not have public track records, and the fact that conventional credit analysis is not sufficient to ferret out borrower quality are likely to be associated with higher risk. Second, relationship lending is more likely to be associated with lender market power over the borrower. The ability of banks to extract rents over time is a characteristic of a number of theoretical models of the bank-borrower relationship, including Sharpe (1990), Petersen and Rajan (1993), and Wilson (1993).

The impact of bank size and complexity on the average price of credit paid by the pool of small borrowers also depends on how relationship borrowers are rationed. If relationship borrowers are quantity rationed, then the average interest rate and the average collateral requirement will decline as the

fraction of relationship borrowers in the pool of small borrowers decline. That is, removing some of the higher-priced borrowers from the pool will reduce the average price offered to the remaining borrowers. On the other hand, if relationship borrowers are price rationed, the impact of bank size and complexity on the average price is indeterminate. The average price offered to the remaining pool of borrowers depends on whether the decrease in the proportion of relationship borrowers in the pool (which lowers the average price) dominates the effect of the higher price paid by the relationship borrowers who remain in the pool.

Thus, as banks become larger and more complex under the *Relationship Borrower Hypothesis* H3, the effect on price (i.e., interest rate and collateral requirements) is indeterminate, while the effect on quantity is negative as banks reduce their supplies of credit to relationship borrowers. Despite the general price indeterminacy, however, the *Relationship Borrower Hypothesis* H3 is empirically identified in the special case in which the reduction in relationship lending produces a decrease in average loan price as well as a decrease in loan quantity. In contrast, if the average loan price increases or remains constant and the loan quantity decreases, then either of the two alternative hypotheses -- the *Small Borrower Hypothesis* H1 or the *Relationship Borrower Hypothesis* H3 could explain the data.

Thus, the association between the supply of credit to small business borrowers and both bank size and complexity as predicted by the three hypotheses can be summarized as follows. Under the *Small Borrower Hypothesis* H1, the effect of increasing bank size and complexity on the price of credit to small business borrowers is either positive or zero, while the effect on the quantity of credit supplied is negative. Under the null hypothesis H2, the effect of greater bank size and complexity on the price of credit and the quantity of credit to small business borrowers is zero. Finally, under the *Relationship Borrower Hypothesis* H3, the effect of increasing bank size and complexity on the average price of credit to small business borrowers could be negative, zero, or positive, while the effect on the quantity of credit supplied is negative. Thus, Hypothesis H3 is uniquely identified in the special case of a decrease in

average loan price accompanied by a decrease in loan quantity.

III. Data and Test Procedures

In order to examine Hypotheses H1, H2, and H3, we will test whether our measures of size and complexity described below affect the price and quantity of loans issued by banks. We use a data set with information on over 900,000 domestic commercial loans issued quarterly by a sample of U.S. banks over the time period 1986:Q3 to 1994:Q2. The large number of observations allows us to test a number of dimensions of size and complexity, and to specify quite a few variables in the regressions for the purpose of statistical control.

The data are taken primarily from the Federal Reserve's Survey of Terms of Bank Lending to Business (STBL), the Consolidated Report of Condition for commercial banks (Call Report), and the Consolidated Report of Condition for bank holding companies (Y-9C). The STBL surveys approximately 340 banks per quarter (although the respondent set is not constant over time), obtaining detailed information on the contract terms of all domestic commercial and industrial loans made during one or more days of the first week of the second month of the quarter. In addition to interest rate and loan amount, the STBL contains a number of contract terms, such as whether collateral was pledged, whether the loan was issued under a commitment agreement, etc., which help describe the price of the loan and the quantity of credit available to the borrower. The survey oversamples large banks, intentionally including the largest 48 U.S. banks. This is helpful in our inference problem, since we wish to examine the behavior of large, complex banks versus small, noncomplex banks, and there are proportionately very few large, complex banks in the U.S. population as a whole. The STBL data are matched with a number of variables measuring the size and complexity of banking organizations taken from the bank Call Report and the holding company Y-9C report. As shown below, we also include in the analysis a large number of control variables taken from a number of data bases on the condition of banks, their regulatory treatment, their local economic environment, and time series factors that may affect the demand for and supply of bank credit to small business borrowers.

In all, the data set has observations on 921,627 commercial loans, information on 9,800 quarterly bank Call Reports by 499 different banks over 32 time periods. As shown below, we have specified 14 variables measuring bank size and complexity in the regression analysis, and have included more than 70 other right-hand-side variables for the purpose of statistical control.

Our data set has a wealth of information available about commercial banks, the loan contracts they issue, and the economic environment of bank, but unfortunately does not have specific information about borrowers except what is implied by their loan contracts and the other variables. For this reason, we proxy for the size of the borrower by the amount of credit that banks make available to it. Small borrowers are assumed to be those whose loan, including any amounts participated, is small and whose total credit facility (if applicable) is also small. In defining the size of borrower we will use seven size categories, ranging from less than $10,000 in credit available to over $1,000,000 in credit available. As discussed below, we are also able to control somewhat for the risk and other qualities of the borrower by including a number of loan contract terms, such as whether the bank required collateral, whether the bank issued a commitment, whether the loan was part of a participation, and whether the loan rate was based on the prime rate.

The models of loan prices are relatively straightforward. The equation for the interest rate charged on a loan is given by:

$$PREM_{ijt} = \alpha + \sum_{c=1}^{C} \beta_c \, CONTRACT_{cijt} + \sum_{b=1}^{B} \gamma_b \, BANKCONDITION_{bjt}$$
$$+ \sum_{r=1}^{R} \delta_r \, BANKREGULATORY_{rjt} + \sum_{e=1}^{E} \eta_e \, BANKENVIRON_{ejt}$$
$$+ \sum_{w=2}^{T} \theta_w \, TIMEDUM_{wt} + \sum_{s=1}^{S} \rho_s \, BANKSIZE_{sjt} \qquad (1)$$
$$+ \sum_{y=1}^{Y} \phi_y \, MULTILAYERS_{yjt} + \sum_{m=1}^{M} \omega_m \, MULTIBANKUNITS_{mjt}$$
$$+ \sum_{n=1}^{N} \tau_n \, NONBANKACTIVITY_{njt} + \epsilon_{1ijt}$$

The definitions and sample means of the individual variables in equation (1) are shown in Table 2. All financial variables are converted to 1994:Q2 dollars to be comparable across the data set and to be consistent with the 1994:Q2 data shown earlier in Table 1. The sample means are not necessarily representative of the average or median U.S. bank because of the inclusion of all the largest banks in our data set. Most banks in the U.S. population are quite small, less than $50 million in assets, although most of the assets of the industry are held by the large banks represented here.

The dependent variable, $PREM_{ijt}$, is the annualized nominal interest rate on loan i issued by bank j at time t less the nominal rate on a Treasury security of comparable repayment duration at time t. By expressing the price of the loan as the premium over the credit risk-free rate of comparable repayment duration, we control for the effect of the yield curve, which may be nonlinear.[4]

CONTRACT represents a set of contract terms on the loan, including whether the loan is secured (COLLAT), whether the loan was issued under a commitment (COMMIT), whether the loan is part of a participation (PARTIC), whether the loan rate is tied to the bank's prime rate (PRIME), whether the loan is callable (DEMAND), whether the loan is fixed-rate or floating-rate (FLOAT), the log of the

[4]PREM and many of the other loan contract terms are discussed in more detail in Berger and Udell (1990,1992).

repayment duration of the loan (LNDURATION)[5], and the log of the dollar size of the loan amount issued by the respondent bank (LNLOANSIZE).

The most important set of contract terms is a series of dummies for the amount of credit available to the borrower (CREDITAVAIL), which is measured as the maximum of the amount lent by the respondent bank, the amount lent by all banks in a participation (if any), and the amount of the associated loan commitment by the bank (if any). By defining credit availability this way, we proxy for the size of borrower. Large borrowers may borrow relatively small amounts from an individual bank, but typically only as a partial drawdown on a larger line of credit or as a partial share of a larger loan that is participated among several banks. Thus, only if the loan amount issued by the respondent bank is small, the total participation amount (if any) is small, and the commitment by the bank is small do we consider it to be a small business loan.

Our definition of credit availability is almost identical to the "original amounts" asked for on the Call Report small business lending form. Our first 4 size classes combined (CREDITAVAIL1, 2, 3, and 4) correspond to the smallest Call Report size class of $0 to $100,000, and our largest 3 size classes correspond directly to the 3 largest Call Report size classes. Note that our finding that 44.6% of borrowers are in the largest size class with over $1 million in credit availability reflects in substantial part the fact that the STBL oversamples the largest banks.[6]

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[5]The purpose of this variable is to proxy for the risk associated with the time until the loan is repaid. DURATION is the weighted average time until the scheduled repayment of principal and interest. This is similar to the formula for the more conventional repricing duration, and equals the repricing duration for a fixed-rate loan.

[6]Some possible inconsistencies between the Call Report data on small business lending and the STBL data should be noted. As discussed above, about half of all banks (5,137 of 10,631) responded on the Call Report that 'all or substantially all' of their C&I loans had 'original amounts' (essentially what we call credit availability) of $100,000 or less, and did not have to fill in the details of the distributions of these 'original amounts'. In our Table 1 and in previous research (Peek and Rosengren 1994), it is assumed that 100% of the commercial loans of these banks are in the $\leq$ $100,000 size class. To check on the accuracy of this assumption, we examined the STBL data for all of the banks that responded to the 1994:Q2 STBL and also claimed that 'all or substantially all' of their C&I loans were $100,000 or less on the 1994:Q2 Call Report. There were 54 such banks. We computed dollar-years (DOLYEARS)

As it turns out, the distinction between credit availability as we have defined it here and simple loan amount reported by the bank on the STBL is rather important. If loan sizes were used in place of our total credit availability, the proportion of loans that are $10,000 and below (size class 1) would be 17.9% rather than 6.7%. Similarly, combining the smallest four size classes, 66.8% of all loans in the sample are at or below $100,000 in loan size, and yet only 28.3% of these loans had credit availability

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for each of the individual STBL loans of these banks -- the product of the loan amount and its repayment duration. As discussed in more detail in the text below, the DOLYEARS of new loan **flow** are proportional to the average dollars they are expected to represent over time as a loan **stock** on the balance sheet. Assuming that the STBL sample loans are reasonably representative of the loans held by these banks, we expect the proportion of the STBL DOLYEARS that are in the ≤ $100,000 size classes to be close to 100% for these banks. The comparison is, of course, less than ideal, because the STBL loans for any given quarter represent only a small portion of the subsequent total loan portfolio and because the repayment duration is imperfectly measured (particularly for the demand notes that have no stated maturity).

Surprisingly, only 44.1% of the DOLYEARS of these 'all or substantially all' banks had CREDITAVAIL of $100,000 or less. Of the remaining loans, 16.0% of the DOLYEARS were in the $100,001 - $250,000 class, 38.3% in the $250,001 - $1 million class, and 1.6% over $1 million. One possible explanation for this seeming inconsistency is that some of the banks may have understated the proportion of their loan portfolios over $100,000 in filling out the Call Report. This could occur, for example, if the person filling out the form did not understand that 'original amount' was the maximum of the loan amount, the participation amount, and the commitment amount, or did not have easy access to these records for the whole domestic commercial and industrial loan portfolio.

To examine this possibility, we tried calculating the CREDITAVAIL size classes from the STBL data by loan amount alone, so that more loans would be measured as being $100,000 or less. This procedure raised the proportion of loans of $100,000 or less only to 50.5% (21.8%, 27.7%, and 0%, respectively, in the larger three size classes). Thus, any difficulty in using participation or commitment data explain at most a small part of the problem. We then examined whether these banks were interpreting 'all or substantially' as the **number** of loans rather than the dollar value. This procedure further raised the proportion of to 95.8% (2.9%, 1.3% and 0% respectively). This finding strongly suggests that respondent banks may have generally interpreted 'all or substantially' in terms of number of loans rather than amount of available credit. If so, the Call Report may not be very informative regarding the dollar proportion of a bank's loan portfolio that is devoted to 'small business borrowers'.

We then investigated whether there might be a more general problem of underreporting the 'original amounts' on the Call Report by comparing the STBL and Call Report for banks that responded to the STBL, but did **not** claim an 'all or substantially all' concentration in small loans in the 1994:Q2 Call Report (236 banks). A similar problem arose. The STBL proportions for the CREDITAVAIL size groupings ≤ $100,000, $100,001-$250,000, $250,000-$1 million, and > $1 million are 1.0%, 1.4%, 4.5% and 93.2%, respectively. This compared to proportions based on the Call Report of 4.7%, 3.4%, 9.3% and 82.6% respectively. Again, applying loan size in place of CREDITAVAIL size to the STBL reduces the problem considerably -- the proportions become 3.6%, 5.4% 14.2%, and 76.8%, respectively. Thus, the data are consistent with the hypothesis that some banks are reporting based on loan size rather than the 'original amounts' required in the Call Report forms.

as small as $100,000. The main reason for this large difference is that most of the loans are issued under commitment agreements that give the borrowers substantially more credit than the amount drawn down at any one time. These data suggest that the loan size by the respondent bank may be significantly misleading as a guide to indicating small borrowers.

Although we do run a single regression with all the CREDITAVAIL dummies included on the right-hand-side of equation (1), our preferred method is to run the price regressions separately for loans in each of 7 different CREDITAVAIL size classes. This allows the coefficients of **all** the variables to differ with the size of the borrower as proxied by CREDITAVAIL. In this manner, we not only measure the effects of bank size and complexity on the prices of loans to small business borrowers, but also compare these effects between loans to small and large borrowers across our 7 CREDITAVAIL size classes.

The purposes of the loan contract terms are threefold. First, as already discussed, the amount of credit made available to the borrower is used to proxy for the size of borrower and to compare the effects of bank size and complexity between small and large borrowers. Second, the contract terms control for features of the loan that are likely to affect the payoffs, and therefore would affect the interest rate or premium charged. A loan that is secured (i.e., COLLAT = 1) should have a lower value of PREM all else equal, since the bank can reduce its losses in the event of default by taking recourse against the security. A loan under commitment (COMMIT = 1) may have a higher or lower price because the bank is compensated with commitment fees that may cross-subsidize or be cross-subsidized by the interest rate on the loan. Similarly, floating-rate loans (FLOAT = 1), callable loans (DEMAND = 1), and loans based on prime (PRIME = 1) may be expected to have different starting rates than fixed-rate, fixed maturity, and money-market-rate based loans, respectively, because of the different sharing of interest rate risks, etc. The repayment duration variable, included in both linear and quadratic terms (LNDURATION, 1/2 $LNDURATION^2$), allows for a risk premium in the dependent variable PREM that depends on the repayment duration of the loan. Loan size, also included in first- and second-order terms

(LNLOANSIZE, 1/2 LNLOANSIZE^2), accounts for possible economies of scale in credit evaluation and loan issuing costs (Udell 1989). LNLOANSIZE may also proxy to some degree for borrower size beyond what is controlled for with the CREDITAVAIL dummies, which combine the effects of loan size, participation amount, and commitment amount.

Third, the contract variables control for the risk and repayment characteristics of the borrowers. Earlier research has suggested that borrowers who pledge collateral may be riskier on average than other borrowers (Berger and Udell 1990,1992,1995, Booth 1992,1993, Scott and Smith 1986), that borrowers who receive loan commitments may be safer on average than other borrowers (Koppenhaver 1989, Avery and Berger 1991a,b, Berger and Udell 1990). It is also generally expected that borrowers whose rates are based on the prime rate (PRIME = 1) are riskier than other borrowers. Similarly, larger borrowers are usually believed to safer than smaller borrowers. The other contract terms may be used to separate safer and riskier borrowers as well. As it turns out, the controls for contract terms are quite important -- all of the contract terms are correlated with PREM, some of them quite highly.

BANKCONDITION in equation (1) represents a set of variables describing the condition of the bank making the loan, consisting of capital and problem loan ratios. In equation (1), we drop the individual loan subscript 'i' for these variables to indicate that these variables are constant for all loans i for a given bank j at time t. Banks with weak capital positions and/or large proportions of problem loans may be likely to reduce their supply of loans, raising PREM, in response to market and regulatory pressures to keep their risks under control. The condition of the bank's portfolio may also reflect its lending base. Banks with depleted capital reserves and relatively large stocks of problem assets may be in depressed localities or have relationships with troubled borrowers, which would further shift inward their supply curves for loans, possibly raising the rates charged.

The BANKCONDITION variables include the three capital ratios for which regulators enforce minimums, the Tier 1 and Total risk-based capital ratios and the leverage capital ratio -- T1RAT,

TOTRAT, and LEVRAT, respectively.[7] We also include the one-year change in the leverage capital ratio, ΔLEV, to capture the effects of dynamic changes in capital, such as negative shocks that deplete a substantial portion of the bank's 'normal' capital amount. The troubled asset categories consist of the ratios of nonperforming loans to total adjusted assets (TAA), NPFRAT, the ratio of commercial real estate loans to TAA, CRERAT, the ratio of other real estate owned to TAA, OREORAT, and the ratio of weighted classified assets to TAA, WCLASSRAT.[8,9,10,11] We measure the capital variables as **the negatives of the ratios** to make the interpretation of all of the BANKCONDITION variables consistent -- for all the condition ratios, a higher value indicates worse condition and a likely decrease in loan supply and possibly higher value of PREM. Second-order terms in all these variables (i.e., 1/2 $T1RAT^2$, etc.) are included to capture nonlinearities -- it is expected that both market and regulatory reactions to a marginal change in condition will be larger, the worse the condition of the bank. Many of the BANKCONDITION variables have been used in recent studies of whether there was an aggregate change in loan supply or 'credit crunch' in the early 1990s (e.g., Haubrich and Wachtel 1993, Berger and Udell

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[7]Although the current capital regulations were not in effect prior to 1990, we apply these ratios retrospectively under the assumption that similar standards may have been implicitly in effect at the time. The leverage ratio applied retrospectively is very similar to the actual leverage ratio in effect during this earlier period.

[8]Commercial real estate (CRERAT) is not a true troubled loan category in the sense that the other variables are, since it generally includes fully performing loans. However, it is included because many banks had problems with these loans in the early 1990s.

[9]The WCLASSRAT weights follow the 20/50/100 regulatory rules of thumb for evaluating capital adequacy. Jones and King (1995) found these relative weights to be fairly accurate in predicting future charge-offs. Note that WCLASSRAT may embody some element of regulatory treatment and information (similar to the BANKREGULATORY variables below), but we prefer to categorize it as primarily reflecting the objective condition of the bank.

[10]The NOCLASS dummy and the NOCAMEL dummy below are included to help account for a few observations in which these data from the immediately prior bank examination were unavailable.

[11]The use of total adjusted assets (TAA) in the denominators (i.e., adding loan and lease loss reserve and allocated transfer risk reserve to total assets) is necessary because all the problem loan categories in the numerators also include the reserves held against them.

1994, Hancock and Wilcox 1994, Hancock, Laing and Wilcox 1995, Peek and Rosengren 1994,1995a,b).

The BANKREGULATORY variables measure regulatory assessments of, and reactions to bank condition. The composite CAMEL ratings reasonably summarize regulator opinion and indicate the likely degree of regulatory discipline applied to the bank (we exclude the dummy CAMEL1 from the estimation as the base case). It is also possible that the CAMEL dummies may reflect aspects of bank condition not well captured by the BANKCONDITION ratios and may provide information that private-sector agents use in applying market discipline as well (Berger and Davies 1995). It is expected that banks with worse CAMEL ratings (closer to 5) will have a lower supply of new loans and possibly higher loan prices, all else equal. That is, banks with poor examination ratings may reduce their supplies of loans and raise rates, switching into safer securities or reducing the overall size of the bank in efforts to improve examination ratings. We also include dummy variables for the primary federal regulator of the bank to control for differences in regulatory treatment among regulators (FED excluded as the base case).

The BANKENVIRON variables control for the exogenous economic environment facing the bank at the time the loan is issued. The local market Herfindahl index of concentration (HERF) and the bank's market share are included to control for market power in pricing the loans, and have been shown in prior research to affect bank prices and profitability (e.g., Berger and Hannan 1989,1995, Hannan 1991, Berger 1995). The bank's state income growth rate and unemployment rate (STGROW, STUNEMP) control for the robustness of the local economy, and the dummy variable for whether the bank is headquartered in a Metropolitan Statistical Area (MSA) controls for urban-rural differences.

The TIMEDUM variables are simply a set of time dummies for each quarter (TIMEDUM1 excluded as the base time period). In equation (1), we drop the individual loan and bank subscripts 'ij' for these variables to indicate that these time effects are constant for all loans i and for all banks j at time t. The time dummies control for a number of exogenous demand and supply factors for loans that change over time, including the health of the macroeconomy, the level of open-market interest rates, the slope of the term structure, aggregate changes in risk, seasonal factors, and secular trends in lending and

borrowing behavior. As well, TIMEDUM controls for regulatory changes over time, such as changes in capital requirements that are thought by many to have caused the so-called 'credit crunch' of the early 1990s.

We next turn to the exogenous factors of greatest interest to this research, the size and complexity variables. The BANKSIZE variables are dummies that account for four bank asset size classes -- SMALLBANK (omitted from the regressions as the base case), MEDBANK, LARGEBANK, and HUGEBANK -- which correspond roughly to what might be considered to be small community banks (total assets $\leq$ \$100 million), medium-sized banks (\$100 million to \$1 billion), large regional banks (\$1 billion to \$10 billion), and money center or superregional banks (over \$10 billion).

The *Small Borrower Hypothesis* H1 -- which holds that larger banks have a reduced supply of credit available to small commercial borrowers as a whole relative to other banks, all else equal -- predicts that the PREM loan pricing regression will yield either positive or zero coefficients on MEDBANK, LARGEBANK, and HUGEBANK that increase with the asset size group. That is, if larger banks reduce the supply of credit to small borrowers through price rationing, and if we have adequately controlled for exogenous conditions other than bank size and complexity with our control variables for contract terms, bank condition, regulatory assessments, bank environment, and time-series effects, then loan prices should be increasing in the size of bank. If the reduction in supply takes the form of quantity credit rationing, then the coefficients on the bank size classes would be zero. Under the *Null Hypothesis* H2, there is no change in the supply of credit to small borrowers by larger banks, implying zero coefficients for the bank size class dummies. Finally, under the *Relationship Borrower Hypothesis* H3, the price effects could be positive, negative, or zero. Under this hypothesis, larger banks reduce the supply of credit to 'relationship borrowers', but continue to extend credit to 'ratio borrowers'. As discussed above, it is likely that relationship borrowers face a higher price for credit. Therefore, if the supply reduction to these borrowers takes the form of quantity credit rationing, the average price paid

by the remaining small borrowers would be reduced, since the proportion of high-price relationship borrowers would be less. As an illustrative limiting case, if all of the 'relationship borrowers' received **no** credit from large banks, the average price for these banks would fall to the average price for 'ratio' loans. If the supply reduction takes the form of price rationing, the change in the average price paid by the remaining small borrowers would depend upon whether the reduction in the proportion of loans issued to relationship borrowers by large banks (which reduces average price) dominates the effect of the higher prices charged to the remaining 'relationship borrowers' (which increases average price). Recall that we can distinguish between the *Small Borrower Hypothesis* H1 and the *Relationship Borrower Hypothesis* H3 only in the special case in which average price decreases.

The bank complexity variables are sorted into three groups, depending upon the type of managerial complexity that is being described. In all cases, the variables are dummies such that a value of 'one' indicates that the managerial structure of the bank is more complex, so that the predicted signs of all of the complexity coefficients are mutually consistent under any of the hypotheses (with one possible exception noted below).

The MULTILAYERS variables indicate whether there are additional layers of management over the bank. BHC denotes that the bank is owned by a holding company, adding at least one layer of management above bank managers. MULTILEVELBHC signifies that the main 'direct holder' of the bank is not the 'high holder', i.e., that another holding company owns the main holding company that directly owns the bank, adding one or more extra layers of oversight. PUBLICLYTRADED indicates that the bank's high holder is registered with the SEC for public trading, thus adding shareholders from the public as an additional layer potentially governing the behavior of the bank. Under the *Small Borrower Hypothesis* H1 and the *Relationship Borrower Hypothesis* H3, these additional levels of management are likely to reduce the supply of credit to small borrowers, with price and quantity effects as described above.

The MULTIBANKUNITS variables describe the extent to which the managers of the bank also have responsibility for managing other, parallel banking units. To the extent that this makes administration more difficult or agency-cost prone, the supply of credit to small borrowers may be reduced. The MULTIBANKBHC variable denotes whether the bank is in a multi-bank holding company, i.e., that the holding company has to manage multiple banking units doing essentially the same function.[12] MULTISTATEBHC reflects whether the high holding company operates banks in more than one state. This may make management more difficult than for a multi-bank holding company in one state because multiple state regulations and business environments must be coped with and because a generally greater geographic distance between banks may make close monitoring of middle managers at the bank level more difficult for holding company managers. BRANCH100 denotes that the bank has at least 100 bank branches. Having a very large number of offices that are usually spread over a wide geographic area may make monitoring of individual branches difficult and lead to agency problems and a reduced supply of lending to small businesses. On the other hand, it is possible that having a large number of branches may have an offsetting effect that tends to increase the supply of credit to small borrowers, since the greater number of branches may make the bank more accessible to small businesses. Thus, the predicted coefficient of BRANCH100 may be ambiguous under any of the three hypotheses, since it may reflect conflicting effects.

The final set of complexity variables, NONBANKACTIVITY, measure the presence of activities outside of traditional local deposit-taking and lending in which the banking organization may be involved. Such activities may take managerial energy away from the core business of banking and reduce the supply of credit made available to small businesses. These variables might be loosely thought of as measuring the 'universality' of the banking organization. SECTION20SUB indicates whether the high holder has a Section 20 subsidiary that may engage in underwriting activity. The findings with regard to this

[12]Except where otherwise indicated, we use the high holding company in defining the variables having to do with holding company ownership or activities.

variable may be particularly relevant to the debates over Glass-Steagall repeal and universal banking, since the union of commercial banking and investment banking is at the center of these debates. The variable FOREIGNOFFICES equals one if the bank has foreign offices, which could draw attention away from local lending. NONBANKASSETS indicates whether more than 5% of the consolidated assets of the high holding company are in nonbank subsidiaries.[13] The variable DERIVATIVES equals one if the total notional value of all swaps, futures, forwards, options, etc. (i.e., off-balance sheet instruments with payoffs that are primarily dependent on market prices of other securities) exceeds 5% of total adjusted bank assets. Finally, NONBANKINCOME denotes whether more than 1% of the bank's net income derives from fees for fiduciary and other activities not directly related to the deposit and loan businesses. As noted above, under the *Small Borrower Hypothesis* and the *Relationship Borrower Hypothesis*, a 'one' for any of these complexity variables (except perhaps BRANCH100) would predict a reduction in the supply of credit made available to small borrowers.

As an additional element of the price vector representing the supply of loans, we also model the decision to require collateral on the loan. For each of the 7 CREDITAVAIL groups, we run a logit regression for the probability of collateral being pledged on the loan using the same right-hand-side variables as in equation (1) except of course that COLLAT is excluded.[14] For many small businesses, collateral requirements may be a more important element of the pricing vector than the interest rate on the loan. When collateral requirements are increased, the quantity of small business lending may be

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[13]The term 'consolidated assets' of the high holding company refers to combined assets of all its lowest-tier subsidiaries, i.e., banks, finance companies, etc., that are owned by the high holder or by other holding companies that are in turn owned by the high holder.

[14]The treatment of COLLAT as endogenous could create a bias in the estimation of the PREM equation (1), since COLLAT was used as a right-hand-side variable in that equation. However, it seems likely that such a bias would be relatively small. We assume a recursive structure in which the decision to require collateral is made before or independently of the decision on the loan interest rate or that the BANKCONDITION, BANKREGULATORY, and other variables explain the COLLAT decision up to a random error that is not significantly correlated with the PREM random error ϵ_1. Such an assumption was found to be justified in a prior research paper that had access to detailed data on individual borrower characteristics (Berger and Udell 1995).

decreased by more than when the interest rate is increased because many small businesses simply do not have access to significant collateral. As well, under the *Small Borrower Hypothesis* H1 and the *Relationship Borrower Hypothesis H3*, an increase in collateral requirements may be a more likely method for large, complex banks to use in reducing the supply of credit to small (and possibly relationship-dependent) borrowers. When information about the borrower is lacking, an increase in the interest rate is likely to create or aggravate moral hazard and adverse selection problems, whereas an increase in collateral requirements reduces these problems.

We next consider the equations to be estimated to test for the effects of the reduction in the supply of small business loans on the **quantity** of lending implied by the different hypotheses. Recall that the quantity results are crucial to distinguishing between the null and alternative hypotheses because the price effects of the alternative hypotheses are often ambiguous. Only if the quantity of credit issued to small borrowers by large, complex banks is reduced relative to other banks, all else equal, is the null hypothesis of no effect of bank size and complexity clearly rejected.

Unfortunately, specification of the quantity regressions is not as straightforward as the price regressions. In order to measure whether large, complex banks supply less small business credit relative to small, noncomplex banks in the same economic environment, we must at least implicitly specify the alternative uses of the financial resources for the two types of banks. The reason is that large and small banks **are** fundamentally different in ways that do not necessarily reflect their orientation toward small borrowers. It is a fact, rather than an interesting economic hypothesis, that large banks engage in large business lending and other activities which are essentially out of the reach of small banks. In part, this reflects legal lending limits -- a U.S. commercial bank cannot issue a credit to a single borrower exceeding 15% of its equity capital. Thus a bank with $100 million in assets with a 6% equity-to-asset ratio could not have an outstanding exposure to a single borrower over $900,000. As well, there are economies to scale in risk-taking in the market. A large bank can easily diversify away the risk of a $1

million loan to a single borrower, whereas the market would likely penalize a small bank with high rates on its uninsured debt for concentrating a large portion of its portfolio in a credit to a single borrower. Similarly, large banking organizations can more easily absorb risks in the underwriting, guarantee, derivative, and other nontraditional banking markets, and perhaps provide synergies for large corporate customers who prefer to have these services packaged together with lending and payments services.

In specifying our null and alternative hypotheses, we assume that securities -- broadly defined as all assets other than loans -- are the alternative use of funds that absorb the changes when lending decisions differ in an important way between large, complex banks and small, noncomplex banks. Under the null hypothesis H2, large banks may acquire large loans that substitute for securities holdings that a small bank would have, but keep the same ratio of small loans to total adjusted assets TAA. Similarly under the null, as banks become more complex and have more layers of management, manage more banking units, or engage in more nonbank activities, no energy or resources are withdrawn from the small business lending function, so that the proportion of small loans to TAA remain constant. Under the *Small Borrower Hypothesis* H1 and the *Relationship Borrower Hypothesis* H3, large banks make large loans at least partly at the expense of investing in small business loans, so that the ratio of small business loans to TAA is lower than that of small banks, all else equal. Similarly, the two alternative hypotheses both predict that more bank management complexity (extra layers, extra banking units, or extra nonbanking functions) creates agency problems and/or diverts managerial talents from small business lending, reducing the ratio of small business loans to total portfolio size.

As an illustrative example, consider a case in which a number of small banks merge to become a large bank. Under either the null or alternative hypotheses, the large bank may choose to engage in large loans that were not feasible for the small banks. Under null hypothesis H2, the large bank sells securities (non-loan assets) to fund the new investment, leaving the ratio of small business loans to total adjusted assets unchanged, whereas under the *Small Borrower Hypothesis* H1 and the *Relationship*

Borrower Hypothesis H3, the large bank funds some or all of the new investments by reducing the supply of small business loans. Similarly, the large bank may become more complex, adding managerial layers or expanding activities. Under the null, these do not affect the quantity of small business loans supplied, but under the alternatives, the quantity lent to small businesses declines through either price or quantity rationing of credit.

To conduct the quantity tests, we run regressions that are again similar to equation (1), but with different dependent variables and with data that are aggregated for a given bank at given time period, rather than using individual loan observations as in the PREM and COLLAT equations. The aggregation is performed because the null and alternative hypotheses are about the proportion of TAA devoted to small business lending, rather than about the characteristics of the individual loans.

Each dependent variable takes a log-odds logit form of the probability that a dollar of total adjusted assets of a given bank at a given time will be invested in domestic commercial loans in a certain CREDITAVAIL size class. In order to compare the **flow** of new loans issued from the STBL data with the **stock** of adjusted assets from the Call Report, we compute for each loan its 'dollar-years' -- the product of the loan amount and the loan repayment duration. In this way, each loan is measured in proportion to its expected representation over time in the bank's future loan portfolio.[15] The sample probability that a dollar of TAA will be in CREDITAVAIL size class k for bank j at time t is measured by:

$$Prob_{kjt} = DOLYEARS_{kjt} \times (CILN_{jt} / \sum_{k'=1}^{7} DOLYEARS_{k'jt}) \; / \; TAA_{jt} \quad (2)$$

where $DOLYEARS_{kjt}$ indicates the total dollar-years in CREDITAVAIL size class k for bank j at time t, the middle expression is the ratio of total domestic commercial and industrial (C&I) loans on the Call

[15]For example, a $100,000, 5-year loan receives 50 times the dollar-years as a $10,000, one-year loan, since the larger, longer-duration loan will represent 50 times as much of the stock of the bank's total adjusted assets on average over time.

Report balance sheet to the total DOLYEARS for all CREDITAVAIL size classes in the STBL loan sample for the bank. Multiplying by this ratio in effect applies the STBL dollar-year proportions to the entire domestic C&I loan portfolio of the bank.[16] The dependent variables in the quantity equations are of the log-odds form, $\ln[Prob_{kjt}/(1-Prob_{kjt})]$, and the equations are estimated for each of the 7 CREDITAVAIL size classes. The right-hand-side variables in the equations are the same as in the PREM regressions shown in equation (1) above, except that the loan contract variables (CONTRACT) are replaced by weighted averages for the loans in the CREDITAVAIL size class being examined, using the DOLYEARS proportions as relative weights. These equations are estimated by weighted least squares in order to avoid heteroskedasticity problems.[17] Under the *Small Borrower Hypothesis* H1 and the *Relationship Borrower Hypothesis* H3, larger, more complex banks should have smaller predicted probabilities of assets being in the small CREDITAVAIL size classes. Under the null hypothesis H2, the bank size and complexity variables should have zero coefficients.

IV. Empirical Results

Table 2 shows the results of running the loan interest rate premium regression, i.e., the PREM regression given in equation (1). In the first column, we show the results of estimating the model for the entire data set. In this model, we include the credit availability size class dummies CREDITAVAIL1-7 directly in the equation, effectively allowing a separate intercept effect for each borrower size. The subsequent regressions are run for the individual CREDITAVAIL size classes, which effectively allows for both intercept and slope dummies for every variable that depend on borrower size. We also show a run in which the first 4 size classes are combined -- i.e., the loans with credit availability amounts between $0 and $100,000 are aggregated (located on the table between CREDITAVAIL size classes 4

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[16]Prior to the 1989:Q3, the STBL data included a small number of domestic construction and land development loans in addition to domestic C&I loans. We assume that the inclusion of these loans does not have a significant effect on the relative distribution of loans across CREDITAVAIL size classes.

[17]Each observation was divided by a number proportional to the estimated standard error of its error term $[\{(1/Prob_{kjt}) + [1/(1-Prob_{kjt})]\} / DOLYEARS_{kjt}]^{1/2}$.

and 5). As noted above, this grouping matches the smallest size class reported on the Small Business lending form in the Call Report. It also makes for a subsample that rivals the number of observations in the larger size classes.

The main purposes of the first regression are to establish a basic set of results against which to judge the CREDITAVAIL size class findings, and to show how the analysis is performed. The subsequent regressions address the main questions of our inquiry into how bank size and complexity affects lending to small borrowers in particular and how this differs from the effects for large borrowers. To conserve space, we do not report the coefficients on the time dummies ($TIMEDUM_w$, w=2,...,32), although these variables are in every estimated equation.

The coefficients of the control variables in the full-sample PREM equation are mostly but not all of the expected signs, and almost all are statistically significant because of the over 900,000 degrees of freedom in estimation. The control variables generally thought to be associated with greater borrower risk or smaller borrower size, such as COLLAT and PRIME, typically have higher coefficients indicating a higher loan interest rate, consistent with expectations. Similarly, the coefficients of variables indicating poorer bank condition or worse examination ratings typically imply higher loan rates. The coefficients of the variables measuring the amount of the credit available to the borrower, the CREDITAVAIL dummies, uniformly indicate that larger borrowers pay lower rates. The coefficient of CREDITAVAIL7 of -0.0124 suggests that borrowers with credit available over $1 million pay about 124 basis points less on their loans, all else equal, than borrowers with credit available of $10,000 or less. The coefficients of the loan size variables (LNLOANSIZE, 1/2 $LNLOANSIZE^2$) similarly indicate that larger loans are made at lower rates. In the interest of brevity, we will forgo any further discussion of the control variable coefficients.

Turning to the bank size and complexity variables in the full-sample regression, the coefficients of the BANKSIZE variables MEDBANK, LARGEBANK and HUGEBANK suggest that larger banks charge lower rates on loans **to borrowers who receive credit** from larger banks, all else equal.

Specifically, the coefficients of LARGEBANK and HUGEBANK of -0.0096 and -0.0107, respectively, suggest that banks in the largest two size classes with over $1 billion in assets charge rates about 1 full percentage point lower than banks with $100 million or less in assets (SMALLBANK), all else equal. It must be emphasized that we only observe the credit terms offered to borrowers who receive credit, and we do not observe the higher prices that may be offered to those who are price rationed or the infinite prices that may be offered to those who are quantity rationed. Although this equation does not distinguish between the effects on small and large borrowers, it is indicative that the null hypothesis of no loan supply effect of bank size is not consistent with the data. These results are suggestive of two possible conclusions. First, larger banks may have an **increased** supply of credit, which would be diametrically opposed to either the *Small Borrower Hypothesis* H1 or the *Relationship Borrower Hypothesis* H3. Alternatively, larger banks may have a reduced supply of credit to 'relationship borrowers', and the remaining 'ratio borrowers' pay lower interest rates on average, consistent with the *Relationship Borrower Hypothesis* H3. We cannot distinguish between these possibilities until we examine the quantity regressions below.

The variables measuring multiple layers of bank management (MULTILAYERS) suggests that additional layers tend to raise loan interest rates, consistent with the *Small Borrower Hypothesis* and the *Relationship Borrower Hypothesis*. However, these effects are generally quite small. The BHC coefficient, which measures the effect of being in a one-bank holding company (since the MULTIBANKBHC variable below controls for multi-bank holding companies) yields a predicted 17 basis point increase in loan interest rates, which seems unlikely to be large enough to reduce the quantity of lending substantially. The estimated effects of the other two MULTILAYERS measures, being in a multi-tier BHC organization (MULTILEVELBHC) and being governed in part by public traders (PUBLICLYTRADED), are even smaller. We can also compute the total or cumulative effect of the MULTILAYERS variables by the sum of the 3 coefficients, which gives 25 basis points. This suggests

a relatively small effect of this type of bank complexity on the price of business loans. However, as above for the bank size effects, a definitive conclusion regarding our 3 main hypotheses must await the quantity results.

The multiple banking units variables MULTIBANKUNITS and the non-traditional bank activities variables NONBANKACTIVITY have signs going both directions and most of the effects are very small. The coefficient with the largest magnitude is the -15 basis point estimated effect of MULTIBANKBHC. This suggests that multi-bank holding companies charge a bit less for their loans than one-bank holding companies, but about the same as banks that are not in holding companies, given that these banks also have the +17 basis point effects of BHC described above. The conflicting signs should probably not be too disturbing, given the large number of variables tested and the small magnitudes of the individual coefficients. The better guide is likely the summary or total effects when the coefficients are added together. The estimated total cumulative effect of having multiple banking units (MULTIBANKUNITS) is only -12 basis points and the estimated total effect of non-traditional bank activities (NONBANKACTIVITY) is only +6 basis points.

We can also examine the estimated effects of all of the size and complexity variables jointly by summing their parameter estimates. The effect of all the observed complexity plus the maximum effect of size in our model is obtained by adding the HUGEBANK parameter to the sum of the complexity effects. This total gives the estimated effect of the difference between a very large universal bank -- or as close to it as occurs in the U.S. with the multinational, underwriting, money center banking organizations -- and a small community bank that engages only in traditional deposit and loan activities. As shown in the table, the estimated difference in loan rates between a money center universal-type bank and a small community bank is -88 basis points. Of this total, the large complex bank charges 107 basis points less because it is large, and 19 basis points more because it is complex. Thus, the model predicts that large, universal-type banks have a substantially lower average price for credit than small, noncomplex banks, all of it due to size, but with some minor offset for complexity. As noted above, however, the

overall reduced average price for the large banks could reflect an increase in loan supply by large banks or a reduced supply of higher-priced relationship loans.

Thus, examination of the overall effects of bank size and complexity suggest very little effect of complexity, at least through price, but that size has an important effect in reducing average loan price. These findings would tend to suggest that the consolidation of the banking industry that would likely accompany nationwide banking and branching may have important effects on the supply of credit, but that expansion of bank powers toward universal banking may not have significant effects in this regard. Whether the reduced average price effect found thus far reflect a general increase in supply versus a reduction in the supply of 'relationship loans' and a change in the portfolio mix toward lower-priced 'ratio loans' awaits examination of the quantity data.

The remaining columns of Table 3 show the PREM regression results broken up by the size of the borrower, as proxied by the CREDITAVAIL size classes. Under the *Small Borrower Hypothesis* H1 and the *Relationship Borrower Hypothesis* H3, the bank size and complexity variables should have their largest effects on the supply of credit to the smallest borrowers.

The results do vary by CREDITAVAIL size class, but are generally consistent with the overall findings in the first column that incorporated all the loans. Examining the BANKSIZE dummy variables first, the largest banks are again found to charge the lowest rates -- on the order of magnitude of about 1 full percentage point below the rates charged by small, community banks. The effects differ somewhat by the size of the borrower. The effect of bank size on the premium charged is the **least** for the smallest CREDITAVAIL borrowers, has the greatest magnitude for those with credit availability between $50,000 and $100,000, and then falls again with borrower size. These results are quite consistent with the *Relationship Borrower Hypothesis* H3, under which the average loan price decline would be concentrated in interior borrower size classes where there is a mix of both relationship borrowers and ratio borrowers. That is, for the *Relationship Borrower Hypothesis* to be correct, the bank must have substantial

proportions of **both** relationship and ratio borrowers, so that a reduction in the supply of credit to the relationship borrowers reduces the representation of high-rate borrowers in the borrower pool. For the largest and smallest size classes, most of the banks likely concentrate on ratio lending and relationship lending, respectively, so there can be little effect on the average interest rate of changing the mix of credits by reducing lending to the relationship borrowers. However, in the middle borrower size classes, there are likely many of both types of borrowers, so a reduction in lending to relationship borrowers may reduce the average premium charged significantly towards the premiums charged to ratio borrowers.

There are also some nontrivial effects of the complexity variables that are again concentrated in the middle borrower size classes. For largest and smallest size classes of borrowers, the total effects of the complexity variables are close to negligible. However, for the middle sizes between $10,001 and $100,000 in credit availability, the summary effects of complexity lie between +36 and +71 basis points, suggesting a possible decrease in supply of credit for these classes by more complex banks. There is no single variable explaining the complexity results, but some patterns do arise. The MULTILAYERS and NONBANKACTIVITY variables generally raise loan rates, suggesting that having additional managerial layers or straying outside traditional deposit and loan bank activities may create internal agency problems and/or raise managerial transactions costs that discourage small business lending. Of the MULTILAYERS variables, the effect of one-bank holding companies (BHC) generally raises loan rates the most, but these are usually offset by the multi-bank holding company form (MULTIBANKBHC), which is included as a MULTIBANKUNITS variable. Of the NONBANKACTIVITY variables, having foreign offices (FOREIGNOFFICES) and having significant nonbank operations in the holding company (NONBANKASSETS) have the largest and most consistent effect in raising the rates charged to borrowers.

Table 4 shows the results of the collateral probability equations. Unfortunately, computational limitations proscribed our use of the standard logit procedure with all 921,627 loan observations. As a consequence, we report in the ALL LOANS column a grouped log-odds weighted least squares equation

for each bank-date combination, where the probability in question is the probability that a dollar-year of the loans reported on the STBL will be secured. This is analogous to the log-odds equations for the probability that a dollar-year will be in a given CREDITAVAIL size class described above.[18] Since there are only 9,800 bank-date combinations used in the grouped log-odds equation, this reduced the available data by almost 99%, so a considerable amount of the estimation efficiency and test power is expected to be lost. However, the individual CREDITAVAIL borrower size class regressions in Table 4 were unaffected by this problem. Because of this estimation problem and because the dollar-year weighting implies that the 'ALL LOANS' regression will be dominated by the largest loans (which are of the least concern here), we defer consideration of this regression until after the CREDITAVAIL size class regressions.

Examination of Table 4 suggests that larger banks less often require collateral, consistent with the easier loan pricing terms described in the previous table. The bank size parameters in the various CREDITAVAIL borrower size class regressions are statistically significant and suggest that large banks consistently require collateral much less often than small banks. For each borrower size class, we evaluate the change in the probability of collateral being pledged implied by the HUGEBANK parameter, evaluated at the subsample mean for that size class.[19] For most of the borrower size classes, the models predict that the largest banks reduce the probability that collateral will be pledged **by borrowers that receive credit** on the order of magnitude of 25 percentage points. Similar to the PREM results, this effect is greatest in the middle borrower size classes. The largest effect is in the $250,000 to $1 million

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[18]Also similar to the quantity regressions, all the loan contract variables (CONTRACT) are replaced by DOLYEAR-weighted averages for the loans in each bank-date observation, including the CREDITAVAIL dummies.

[19]The change in probability from changing exogenous variables in a logit equation is given by $Prob_1 - Prob_0 = [\exp(L_0 + \Delta L)/\{1 + \exp(L_0 + \Delta L)\}] - Prob_0$, where $Prob_1$ and $Prob_0$ are the new and original probabilities, and L_0 is the original log-odds ratio $[\ln(Prob_0/(1-Prob_0)]$ and ΔL is the predicted change in the log-odds ratio (i.e., the parameters times the changes in the exogenous variables). Thus, when evaluating the effect of bank size on the probability of a loan in a given size class being secured, $Prob_0$ is the mean of COLLAT for the size class and ΔL is the parameter on HUGEBANK times 1.

CREDITAVAIL size class, where the HUGEBANK coefficient of -2.087 implies a 46.7 percentage point reduction in the probability of collateral for large banks (evaluated at the subsample mean for that size class which is 80.4%). Examination of the ALL LOANS column also suggests that larger banks less often require collateral, but none of the BANKSIZE coefficients is statistically significant, presumably due to the smaller number of observations in this equation. As for the PREM findings, the COLLAT findings suggest that either larger banks have an increased supply of commercial loans as reflected in a lower risk-adjusted price for credit, or that the *Relationship Borrower Hypothesis* H3 is correct and large banks eliminate some relationship lending and focus on lending to 'ratio borrowers' who tend to have easier credit terms that less often call for collateral than 'relationship borrowers'.

A surprise is that the complexity variables generally show quite different results in the Prob(COLLAT) regressions from the PREM regressions. The summary effects of the complexity variables is negative for almost all of the credit availability size classes, indicating easier average lending terms for small borrowers who receive credit from more complex banks. This is in contrast with the higher loan rates associated with complexity for a given collateral status shown in the previous table. The exceptions are the two largest borrower size classes and the 'ALL LOANS' category which also primarily reflects the largest loans. The negative summary effects of the complexity variables for small borrowers generally spans all 3 types of complexity measured here, multiple management layers (MULTILAYERS), multiple banking units (MULTIBANKUNITS), and nonbanking activities (NONBANKACTIVITY). The total effects of HUGEBANK and all the complexity variables are quantitatively substantial in the individual regressions. These range from a 33 to a 46 percentage point decrease in the probability of collateral being pledged for a large, complex bank versus a small, noncomplex bank.

Finally, Table 5 shows the quantity regressions in which we evaluate the probability that a dollar of total adjusted assets will be devoted to commercial loans as a whole (first column), and to commercial loans of various borrower sizes proxied by CREDITAVAIL (remaining columns). Recall that the loan

flows are transformed into asset dollar equivalents by dollar-year weighting them. Also, the equations use logit log-odds ratios for each of the 9,800 bank-date combinations, rather than employing individual loan data, since the null and alternative hypotheses are formulated in terms of the allocation of the bank's entire asset portfolio, rather than the characteristics of individual loans. We defer discussion of the results of the 'ALL LOANS' regression in the first column of Table (5) because the dollar-year weighting means that the 'all loans' results are likely dominated by the largest loans, which are of the least concern here.

The results in Table 5 for the individual CREDITAVAIL size classes suggest that larger bank size generally reduces the supply of credit to all sizes of borrowers, except for the borrowers in the largest size class. For example, in the CREDITAVAIL1 log-odds equation (the smallest loans), the coefficient of HUGEBANK of -3.093 implies a reduction in the probability of a dollar of total adjusted assets being invested in loans of $10,000 or under of .878 percentage points when evaluated at the sample mean proportion of .920 percent (note that both numbers are rounded to .009 in Table 5). That is, being a money center or superregional bank instead of a small community bank, all else equal, would predict that the proportion of lending to very small business borrowers would be almost entirely eliminated. Similarly, for CREDITAVAIL classes 2-6, the HUGEBANK coefficients are negative, statistically significant, and generally imply reductions in the proportions of the portfolio devoted to the individual loan categories of about 1 to 2 percentage points from mean values of about 1 to 3 percent. Thus, large bank size is likely to eliminate most -- or in some cases almost all -- of the proportion of the portfolio invested in small business lending is consistent with the aggregate average figures presented in Table 1 above. The important difference here is that the result holds when using individual bank data over time and incorporating over 70 control variables for other factors as well as controlling for bank complexity.

These results, combined with the pricing results above, tend to support *Relationship Borrower Hypothesis* H3 described above, at least with regard to bank size. Larger banks tend to charge lower loan

rates and have lower collateral requirements to small borrowers, but issue much fewer loans to these groups. Presumably, the reduction in lending to 'relationship borrowers' lowers the average rate and collateral requirements paid by the remaining pool of borrowers, which contains a higher proportion of 'ratio borrowers'. 'Ratio borrowers' tend to have lower interest rates and fewer collateral requirements because they are less risky and have more alternative sources of funds than 'relationship borrowers'.

For large corporate borrowers in CREDITAVAIL size class 7, the results indicate a substantial increase in the quantity of credit supplied of about 6.0 percentage points associated with HUGEBANK from a mean of about 13.6 percent of the portfolio in this size category. As discussed above, this is not a surprise or an interesting economic hypothesis -- it is simply a fact that large banks devote more of their portfolios to large corporate loans. The 'ALL LOANS' category in the first column of Table 5 similarly shows a predicted increase in total domestic C&I lending as a proportion of the portfolio as bank size increases.[20] This primarily reflects the increase in the supply of loans over $1 million, which compose about 80 percent of the total dollar-years in the STBL loan sample.[21]

Turning to the complexity variables, a similar pattern of reduced supply of credit to small commercial borrowers by more complex banks is evident, although it also appears to apply to the largest borrowers. In every regression, the summary or total effect of complexity, i.e., the sum of the coefficients of the 11 complexity dummy variables, is negative and statistically significant. The predicted effect is substantial in most cases, but somewhat smaller than the effect of size, predicting less than a 1 percentage point decline in the proportion of total adjusted assets in most of the CREDITAVAIL borrower size classes owing to the cumulative effect of the complexity variables. For the largest

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[20]Note that we do not include the CREDITAVAIL dummies as control variables in the 'All Loans' quantity equation, since the decisions about the size of borrower and the total amount of loans issued are endogenously intertwined.

[21]The result that larger banks lend more is also consistent with the finding elsewhere that bank mergers increase the loan-to-asset ratio (Akhavein, et al. 1995), suggesting that the cross-sectional association between bank size and lending is consistent with the dynamic process that usually creates most of the size.

borrowers, the predicted reduction in credit due to complexity wipes out the entire increase in lending due to bank size.[22] The reason for this unexpected result appears to be a single bank that is in the data set for 29 quarters with '1's for 10 of the 11 complexity variables, and yet consistently has only about half of the sample average proportion of its portfolio devoted to lending over $1 million. An exception to the finding that more complexity reduces the quantity lent occurs for the managerial layers variables (MULTILAYERS). In most cases, additional layers of bank management appear to predict an **increase** in the supply of credit, although this increase is in all cases more than offset by the decreases in lending associated with owning multiple banking units (MULTIBANKUNITS) and engaging in nontraditional banking activities (NONBANKACTIVITY).

The quantity results for the complexity variables clearly reject the null hypothesis H2. However, the association between managerial complexity and the pricing of bank credit to small borrowers is ambiguous, with loan interest rates generally being higher but collateral requirements generally being lower for banks with complex organizational structures. Therefore the results provide support for the *Small Borrower Hypothesis* H1 and the *Relationship Borrower Hypothesis* H3 jointly for the bank complexity or 'universality' effects, but the mixed pricing results make it difficult to distinguish the support between the two hypotheses. This contrasts somewhat with the bank size effect, which more clearly supports the *Relationship Borrower Hypothesis* H3.

V. Conclusions

Much attention has been focused recently on the availability of bank credit to small businesses. Some of this concern is related to the argument that as U.S. banks become larger and more

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[22]The total effect of size and complexity is measured as about -1 percentage point, even though the increase in probability due to size shown in the table is larger than the decrease in probability due to complexity. The reason for this seeming inconsistency is that under the nonlinear log-odds formulation, the changes in probability due to changes in the log-odds are larger as the probability nears .5. The change in probability from size alone is larger than the change from complexity alone -- even though the change in log-odds is larger in absolute value for complexity alone -- because the change in size increases the probability toward .5.

organizationally complex, they may be less inclined to service the credit needs of small local businesses than they have in the past. That is, as banks become larger, have more layers of management, manage more operating units, and engage in an expanded range of financial activities -- i.e., as they become more like universal banks -- they may focus their attention more on large business customers to the exclusion of small business borrowers. Arguably, relationship-driven lending to small businesses may be a substantially different activity than transaction-driven lending and other financial services typically provided to large businesses. Therefore, the possibility exists that larger, more organizationally complex banks may reduce their supply of credit to small borrowers in order to diminish Williamson-type managerial diseconomies associated with providing credit services to both small and large businesses. The decrease in supply may take the form of price rationing, quantity rationing, or both.

In this paper we test three hypotheses about the association between the supply of credit to small business borrowers and both bank size and organizational complexity. Our *Small Borrower Hypothesis* H1 and our *Relationship Borrower Hypothesis* H3 predict that larger and more organizationally complex banks will have a reduced supply of credit to some or all small business borrowers, while our null hypothesis H2 predicts no effect. Specifically, under our *Small Borrower Hypothesis*, large and organizationally complex banks supply less credit to small borrowers as a whole relative to other banks in the same economic circumstances. In contrast, under our *Relationship Borrower Hypothesis*, large and organizationally complex banks have lower credit supplies to small 'relationship borrowers' relative to other banks, but do not reduce supply to other small 'ratio borrowers' whose loans are more similar to large, transaction-driven credits. That is, we allow for the possibility that some small business loans are relatively generic and involve the same credit analysis techniques as large loans (e.g., analysis of financial ratios, credit checks, collateral appraisals) and do not rely on local bank-borrower relationships to acquire information about borrower quality. Under the *Relationship Borrower Hypothesis*, these transaction-driven loans continue to be supplied by large, complex banks, but small relationship borrowers are price

rationed or quantity rationed by these banks.

We test the empirical implications of each of these hypotheses with respect to both the **price** of credit and the **quantity** of credit available to small versus large business borrowers. Under either the *Small Borrower Hypothesis* H1 or the *Relationship Borrower Hypothesis* H3, the quantity of credit issued to small borrowers as a proportion of total adjusted bank assets is smaller for large, complex banking organizations than for other banks, all else equal. The price of credit, measured here by the loan interest rate and collateral requirements, may differentiate between the two alternative hypotheses. Under the *Small Borrower Hypothesis*, the price of credit issued to small borrowers by large, complex banks may either be higher or unchanged relative to other banks, depending upon whether the reduction in supply takes the form of price rationing or quantity rationing, respectively. Under the *Relationship Borrower Hypothesis*, the average price of credit paid by the small borrowers **that receive credit** may go up, down, or remain constant, depending upon whether the decrease in the proportion of the relatively high-priced relationship borrowers is offset by any increase in the average price paid by the remaining borrowers. The null hypothesis H2 predicts no effect of bank size or complexity on credit prices or on quantities lent to small business borrowers.

The evidence generally supports the *Relationship Borrower Hypothesis* H3, and may also provide somewhat lesser support for the *Small Borrower Hypothesis* H1 as well. With respect to bank size, we find that larger banks tend to charge lower loan rates to and less often require collateral of small business borrowers. The estimated price effects are quite substantial -- large banks are predicted to charge about 100 basis points less on loans issued to small businesses and require collateral about 25 percent less of the time than small banks. Larger banks also tend to issue many fewer loans to these borrowers -- the empirical model predicts that the effect of large bank size eliminates most (and in some cases almost all) of the loans to small business borrowers. These data are consistent with the *Relationship Borrower Hypothesis* H3, under which the reduction in lending to 'relationship borrowers' lowers the average

interest rate and collateral requirements offered to those remaining in the small borrower pool -- because the pool consists of a higher proportion of 'ratio borrowers' who tend to pay a lower price for credit. The data clearly reject the null hypothesis H2, of no effect of bank size on loan supply.

With respect to organizational complexity, the results are less strong overall and it is more difficult to distinguish between the support for the *Small Borrower Hypothesis* H1 and for the *Relationship Borrower Hypothesis* H3. For the organizational variables as a whole, the total or cumulative price effect differs for the interest rate and collateral findings. A bank that is organizationally complex in all 11 dimensions measured here is predicted to impose a collateral requirement less frequently for small borrowers, but charge a higher interest rate given its collateral requirements than a bank that is not complex in any of the dimensions. The price results are also somewhat mixed among the individual complexity variables, with prices generally increasing in some of them and decreasing in some of them.

The quantity regressions suggest that banks that are more organizationally complex overall generally provide less credit to small borrowers, although this result does not hold for all of the individual complexity variables. The overall quantity findings for the complexity variables generally provide support for Williamson-type managerial diseconomies that result in less credit being provided to small business borrowers by more complex banking organizations. However, the mixed price results make it difficult to determine whether it is small borrowers as a whole (Hypothesis H1) or relationship-dependent small borrowers in particular (Hypothesis H3) that are primarily having their supply of credit reduced. In either event, the null hypothesis H2 of no effect of bank complexity is rejected -- complex banks (as well as large banks) clearly treat small borrowers differently from noncomplex banks (and small banks). Also, the findings 1) that the predicted effect of bank size in reducing quantities of small loans (i.e., the HUGEBANK coefficient) is much larger than the total effect of the bank complexity variables, and 2) that the complexity variables have some conflicting price results, both suggest that complexity may not be as important as bank size in reducing the supply of credit to small borrowers.

Our results are consistent with those who have expressed concern that as banks become larger and more complex, they may become less inclined to supply credit services to small businesses. However, these findings do not necessarily suggest that the trend toward consolidation in the U.S. banking industry will result in a great contraction of credit to this segment of the business community because other institutions may pick up much of the slack left by consolidation. To the extent that loans to small businesses are currently positive net present value (NPV) investments, they will likely remain so, although perhaps primarily so only for institutions other than large, complex banking organizations.[23]

The findings suggest that an important role may remain for community-based banks who have an advantage over large banks in extending loans to small businesses. Their local roots and knowledge of the local community and the entrepreneurs who run local businesses may be critical in providing the type of relationship-driven loans that many small businesses need.

Some additional data also support these conclusions about the future of U.S. banking. The State of California has had unrestricted statewide branching for many years and most of its banks (204 of 382) had assets of $100 million or less as of 1994:Q2, suggesting that small, community banks will survive nationwide branching. Similarly, in those countries who have adopted the universal banking template, large universal banks **and** smaller banks who cater to smaller businesses continue to coexist. In Germany, for example, large universal banks known as 'Grossbanken' operate side-by-side with smaller regional banks, private banks, and savings banks with distinct local orientations (although these smaller institutions also have some 'universal' powers). Similarly, in Switzerland, locally-based cantonal banks coexist with the Grossbanken, each type of bank having a different market niche. Consequently, an implication of our results is that the managerial diseconomies incurred by large and complex banks in the

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[23]There is also a possibility that some of the small business loans of the past were not positive NPV investments when evaluated at competitive market interest rates. The reason is that regulatory protection from competition (e.g., branching restrictions, interest rate ceilings, the safety net) may have allowed some small banks to survive while making negative net present value loans that boosted the bank owner/manager's standing in the community or otherwise suited his/her personal preferences. If so, many of these loans may be eliminated after nationwide bank consolidation.

delivery of credit to small 'relationship borrowers' may impose limits on the degree of consolidation that will occur in the U.S. banking industry.

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Table 1
Domestic Commercial and Industrial Credit at U.S. Commercial Banks

By size of bank and amount of credit available to the borrower[1]

(June 1994, current dollars)

Size of bank	Amount of credit available				
	$100,000 or less[2]	$100,101-$250,000	$250,001-$1,000,000	More than $1,000,000	All
Assets, Millions of dollars:	Amount outstanding (billions of dollars)				
100 or less	19.16	3.84	4.58	1.08	28.65
101 - 1,000	21.97	10.10	18.92	17.21	66.78
1,001 - 10,000	14.23	9.11	21.92	96.50	141.76
More than 10,000	7.82	5.61	16.57	186.25	216.24
Total	63.17	28.66	61.98	301.05	453.43
Assets, Millions of dollars:	Proportion of total adjusted banking assets[3]				
100 or less	0.0585	0.0117	0.0140	0.0033	0.0876
101 - 1,000	0.0325	0.0150	0.0280	0.0255	0.0989
1,001 - 10,000	0.0131	0.0084	0.0202	0.0890	0.1308
More than 10,000	0.0043	0.0031	0.0091	0.1021	0.1185
Total	0.0161	0.0073	0.0158	0.0770	0.1159

[1] The amount of credit available, or "original amount," is reported as the maximum of a) the amount of the loan borrowed from the bank, b) the size of the entire participation across banks (if any), and c) the size of the loan commitment under which the loan was drawn (if any).

[2] For some banks – particularly small banks – the value of domestic C&I loans less than $100,000 may be overstated because banks which reported all or substantially all of their C&I loans as $100,000 or less in value were treated as if all of their C&I loans were in fact less than or equal to $100,000. About half of all banks – 5,137 of the 10,631 reporting banks are subject to this ambiguity. See footnote in text.

[3] Total adjusted assets in the denominator includes the value of the loan and lease loss reserve and the allocated transfer risk reserve, since the value of loans in the numerator also includes these reserves.

Source: Consolidated Report of Condition, Schedule RC-C, part II.

Table 2

Variable Definitions and Sample Means

(All financial values are in constant 1994:Q2 dollars.)

Symbol	Definition	Sample Mean
	A. Loan Premium and Other Contract (CONTRACT) Terms	
PREM	Annualized loan interest rate less the Treasury rate of equal repayment duration, except that floating-rate loans over 4 weeks use the 4-week Treasury rate.	.041
COLLAT	Dummy variable, equals one if collateral is pledged.	.723
COMMIT	Dummy variable, equals one if the loan is made under commitment.	.760
PARTIC	Dummy variable, equals one if any portion of the loan is part of a participation.	.029
PRIME	Dummy variable, equal to one if the loan rate is tied to the prime rate.	.834
DEMAND	Dummy variable, equals one if the loan is callable on demand.	.515
FLOAT	Dummy variable, equals one if the loan rate is not fixed.	.831
DURATION	The repayment duration of the loan in years, the weighted average time until the loan is repaid, to be distinguished from the more usual concept of repricing duration (measured in natural log terms as LNDURATION in the regressions.	.524
LOANSIZE	The dollar size of the loan (measured in natural log terms as LNLOANSIZE in the regressions).	670,760
CREDITAVAIL	Set of 7 dummy variables for the amount of credit available to the borrower. Calculated as the maximum of a) the amount of the loan borrowed from the bank, b) the size of the entire participation across banks (if any), and c) the size of the loan commitment under which the loan was drawn (if any).	
CREDITAVAIL1	($0 - $10,000)	.067
CREDITAVAIL2	($10,001 - $25,000)	.081
CREDITAVAIL3	($25,001 - $50,000)	.061
CREDITAVAIL4	($50,001 - $100,000)	.074
CREDITAVAIL5	($100,001 - $250,000)	.106
CREDITAVAIL6	($250,001 - $1,000,000)	.165
CREDITAVAIL7	(over $1,000,000)	.446
	B. Bank Condition Variables (BANKCONDITION) **(Each averaged over the four previous quarters except as indicated.)**	
T1RAT	Negative of the ratio of Tier 1 capital to total risk-weighted assets.	-.114

Symbol	Definition	Sample Mean
TOTRAT	Negative of the ratio of Total Tier 1 plus Tier 2 capital to total risk-weighted assets.	-.129
LEVRAT	Negative of the ratio of Tier 1 capital to total adjusted assets (total assets plus loan and lease loss reserve and allocated transfer risk reserve).	-.072
ΔLEV	The change in the leverage ratio from the fifth period lag to the first period lag.	.002
NPFRAT	Ratio of nonperforming assets (past due, nonaccrual, renegotiated) to total adjusted assets.	.026
OREORAT	Ratio of other real estate owned to total adjusted assets.	.006
CRERAT	Ratio of commercial real estate loans to total adjusted assets.	.226
WCLASSRAT	Ratio of weighted classified assets to total adjusted assets from most recent examination. Weights are 20% for assets classified as substandard, 50% for doubtful, and 100% for loss.	.010
NOCLASS	Dummy variable, equals one if classified asset data are not available.	.099
	C. Bank Regulatory Variables (BANKREGULATORY)	
CAMEL1	Dummy variable, equals one if the composite CAMEL rating from the most recent examination was a '1' (the best rating).	.182
CAMEL2	Dummy variable, equals one if the composite CAMEL was a '2'.	.499
CAMEL3	Dummy variable, equals one if the composite CAMEL was a '3'.	.153
CAMEL4	Dummy variable, equals one if the composite CAMEL was a '4'.	.063
CAMEL5	Dummy variable, equals one if the composite CAMEL was a '5'.	.018
NOCAMEL	Dummy variable, equals one if CAMEL data are not available.	.085
FED	Dummy, equals one if the bank's primary federal regulator is the Federal Reserve.	.116
OCC	Dummy, equals one if the bank is OCC-regulated.	.575
FDIC	Dummy, equals one if bank is FDIC-regulated.	.309
	D. Bank Environmental Variables (BANKENVIRON)	
HERF	Herfindahl index of local market concentration.	.196
SHARE	Bank's share of local market deposits.	.157

Symbol	Definition	Sample Mean
STGROW	Real state income growth (%).	.014
STUNEMP	State unemployment rate (%).	.062
MSA	Dummy variable, equals one if the bank is in a Metropolitan Statistical Area.	.722
	E. Time Dummies (TIMEDUM)	
$TIMEDUM_w$	Dummy variable, equals one if the observation is in the wth time period, w=1,...,T, the number of time periods (32 in our sample).	---
	F. Bank Size Variables (BANKSIZE)	
SMALLBANK	Dummy variable, equals one if bank has total assets less than or equal to $100 million.	.213
MEDBANK	Dummy variable, equals one if bank has total assets between $100 million and $1 billion.	.290
LARGEBANK	Dummy variable, equals one if bank has total assets between $1 billion and $10 billion.	.361
HUGEBANK	Dummy variable, equals one if bank has total assets above $10 billion.	.136
	G. Multiple Bank Management Layers Variables (MULTILAYERS)	
BHC	Dummy variable, equals one if bank is owned by a bank holding company.	.804
MULTILEVELBHC	Dummy variable, equals one if the main 'direct holder' is not the 'high holder', i.e., that the main holding company that owns the bank is owned by another bank holding company.	.183
PUBLICLYTRADED	Dummy variable, equals one if the bank's high holding company is registered with the SEC for public trading.	.531
	H. Multiple Banking Units Variables (MULTIBANKUNITS)	
MULTIBANKBHC	Dummy variable, equals one if the bank's high holder owns multiple banks.	.557
MULTISTATEBHC	Dummy variable, equals one if the bank's high holder owns banks in multiple states.	.400
BRANCH100	Dummy variable, equals one if the bank has 100 or more branches.	.162

Symbol	Definition	Sample Mean
	I. Nonbanking Activities Variables (NONBANKACTIVITY)	
SECTION20SUB	Dummy variable, equals one if the bank's high holder has a Section 20 subsidiary that may engage in underwriting activity.	.078
FOREIGNOFFICES	Dummy variable, equals one if the bank has foreign offices.	.119
NONBANKASSETS	Dummy variable, equals one if more than 5% of the bank's high holder's consolidated assets are in nonbank subsidiaries.	.237
DERIVATIVES	Dummy variable, equals one if the total notional value of the bank's swaps, forwards , futures, and similar contracts exceeds 5% of the bank's total adjusted assets.	.280
NONBANKINCOME	Dummy variable, equals one if more than 1% of the bank's net income is derived from fees for fiduciary activities and other activities not directly related to deposits and loans.	.279

J. Proportions of Total Adjusted Assets in Domestic C&I Loans by CREDITAVAIL Class

ALL CLASSES		.162
CREDITAVAIL1	($0 - $10,000)	.009
CREDITAVAIL2	($10,001 - $25,000)	.012
CREDITAVAIL3	($25,001 - $50,000)	.013
CREDITAVAIL4	($50,001 - $100,000)	.016
CREDITAVAIL5	($100,001 - $250,000)	.022
CREDITAVAIL6	($250,001 - $1,000,000)	.034
CREDITAVAIL7	(over $1,000,000)	.136

Data Sources: Federal Reserve Survey of Terms of Bank Lending to Business
Consolidated Report of Condition and Income for Banks (Schedule RC)
Consolidated Report of Condition and Income for Bank Holding Companies (Schedule Y9-C)
FDIC Summary of Deposits
Supervisory Information System
National Information Center Entity Structure Data File
Regional Economic Information System, Bureau of Economic Analysis

Table 3

OLS Regressions of Loan Rate Premium (PREM) on Control, Size, and Complexity Variables

	ALL LOANS		CREDITAVAIL1 $0 – $10,000		CREDITAVAIL2 $10,001 – $25,000		CREDITAVAIL3 $25,001 – $50,000		CREDITAVAIL4 $50,001 – $100,000	
Variable	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats
INTERCEPT	0.0383*	102.878	-0.0068	-0.552	0.0547*	9.271	0.0145*	3.238	0.0210*	7.197
COLLAT	0.0038*	137.924	-0.0032*	-21.994	-0.0009*	-9.166	0.0017*	16.271	0.0027*	30.407
COMMIT	0.0017*	42.557	-0.0025*	-10.819	0.0019*	13.265	0.0013*	8.832	0.0017*	13.008
PARTIC	0.0001	1.771	-0.0047*	-2.993	-0.0071*	-6.413	-0.0049*	-5.241	-0.0034*	-5.159
PRIME	0.0064*	157.038	0.0020*	10.619	0.0023*	16.141	0.0029*	17.856	0.0035*	23.347
DEMAND	-0.0009*	-32.108	-0.0040*	-19.159	-0.0031*	-24.933	-0.0013*	-11.358	-0.0005*	-5.153
FLOAT	0.0036*	88.096	-0.0020*	-10.754	0.0024*	18.550	0.0035*	24.316	0.0037*	27.784
LNDURATION	-0.0010*	-58.530	-0.0027*	-23.168	-0.0019*	-28.247	-0.0010*	-15.380	-0.0005*	-8.186
1/2 LNDURATION^2	-0.0001*	-9.947	-0.0003*	-7.387	-0.0003*	-9.717	0.0000*	1.968	0.0002*	10.789
LOANSIZE	0.0019*	33.568	0.0177*	5.832	-0.0022	-1.651	0.0070*	7.039	0.0048*	7.654
1/2 LOANSIZE^2	-0.0003	-60.726	-0.0026*	-6.976	0.0001	0.442	-0.0009*	-8.149	-0.0006*	-9.054
CREDITAVAIL2	-0.0051*	-80.668								
CREDITAVAIL3	-0.0052*	-74.355								
CREDITAVAIL4	-0.0065*	-92.054								
CREDITAVAIL5	-0.0080*	-112.387								
CREDITAVAIL6	-0.0095*	-130.283								
CREDITAVAIL7	-0.0124*	-162.381								
T1RAT	-0.0316*	-20.800	-0.0873*	-5.552	-0.0134*	-2.076	0.0191*	3.074	0.0042	0.866
1/2 T1RAT^2	-0.4110*	-19.360	-2.3431*	-12.118	-0.4264*	-4.454	-0.4307*	-4.626	-0.3872*	-5.324
TOTRAT	0.0340*	21.878	0.1396*	8.200	0.0309*	4.580	0.0031	0.479	0.0033	0.697
1/2 TOTRAT^2	0.4026*	18.980	2.3535*	12.180	0.4202*	4.395	0.4310*	4.630	0.3868*	5.325
LEVRAT	-0.0091*	-5.530	-0.0301*	-4.004	-0.0468*	-8.137	-0.0400*	-6.998	-0.0276*	-5.060
1/2 LEVRAT^2	0.1251*	7.575	-0.0034	-0.064	0.2439*	5.487	0.2165*	5.249	0.0556	1.155
Δ LEV	0.0025*	3.781	-0.0088	-1.161	0.0246*	5.421	0.0173*	4.269	0.0286*	8.464
1/2 Δ LEV^2	-0.0091*	-8.929	-0.0052	-0.726	0.0170*	3.321	0.0092	1.632	0.0311*	5.668
NPFRAT	0.0428*	20.765	0.0624*	5.281	0.1004*	12.983	0.0635*	8.063	0.0593*	9.045
1/2 NPFRAT^2	0.1583*	4.351	-0.3276	-1.854	-0.5368*	-4.606	0.1262	1.008	0.0323	0.301
OREORAT	-0.0280*	-6.737	0.1501*	6.852	-0.0144	-0.950	-0.1009*	-6.336	-0.0384*	-2.853
1/2 OREORAT^2	0.6585*	3.979	-3.8240*	-6.138	-0.4890	-1.082	2.5428*	4.591	-0.0394	-0.081
CRERAT	-0.0022*	-4.200	0.0144*	4.067	0.0183*	8.170	0.0123*	5.557	0.0112*	6.231
1/2 CRERAT^2	0.0159*	8.057	-0.0214	-1.607	-0.0418*	-5.182	-0.0287*	-3.646	-0.0239*	-3.767
WCLASSRAT	0.0065*	2.043	-0.1241*	-5.359	-0.0808*	-5.157	-0.0018	-0.121	0.0081	0.678
1/2 WCLASSRAT^2	-0.4267*	-5.464	1.3180*	2.610	1.3577*	3.593	-0.0365	-0.108	0.2402	0.810
NOCLASS	-0.0004*	-4.201	-0.0008	-1.136	-0.0008	-1.778	-0.0012*	-2.594	-0.0004	-1.042
CAMEL2	0.0013*	34.137	0.0004	1.793	0.0008*	5.033	0.0010*	6.417	0.0010*	7.837
CAMEL3	0.0012*	21.254	0.0015*	4.095	0.0002	1.026	0.0011*	4.854	0.0011*	5.756
CAMEL4	0.0016*	19.831	0.0013*	2.258	0.0020*	5.263	0.0009*	2.423	0.0009*	3.131
CAMEL5	0.0018*	15.090	0.0056*	6.929	0.0044*	7.773	0.0029*	5.418	0.0013*	2.807
NOCAMEL	0.0021*	18.981	0.0033*	4.501	0.0012*	2.283	0.0021*	4.307	0.0008	1.914
OCC	0.0006*	19.055	0.0003	1.458	0.0020*	14.828	0.0005*	3.189	0.0005*	3.923
FDIC	0.0009*	16.477	0.0028*	10.136	0.0027*	14.503	0.0015*	7.354	0.0009*	5.519
HERF	-0.0045*	-23.168	0.0005	0.506	-0.0046*	-5.992	-0.0024*	-3.099	-0.0030*	-4.562
SHARE	0.0026*	21.168	0.0117*	17.018	0.0090*	18.601	0.0056*	11.525	0.0040*	9.727
STGROW	0.0165*	11.254	0.0208*	2.802	0.0319*	5.701	0.0310*	5.272	0.0413*	8.531
STUNEMP	0.0310*	31.248	-0.0242*	-4.446	-0.0018	-0.482	0.0078*	2.049	0.0063	1.940
MSA	-0.0020*	-29.796	0.0003	1.131	-0.0020*	-9.149	-0.0012*	-5.022	0.0007*	3.242

Additional parameters on next page

Table 3 (continued)

OLS Regressions of Loan Rate Premium (PREM) on Control, Size, and Complexity Variables

	ALL LOANS		CREDITAVAIL1 $0 – $10,000		CREDITAVAIL2 $10,001 – $25,000		CREDITAVAIL3 $25,001 – $50,000		CREDITAVAIL4 $50,001 – $100,000	
Variable	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats
					SIZE AND COMPLEXITY VARIABLES					
MEDBANK	-0.0058*	-41.918	-0.0012*	-2.988	-0.0024*	-6.806	-0.0067*	-16.306	-0.0089*	-23.214
LARGEBANK	-0.0096*	-68.444	-0.0055*	-11.977	-0.0071*	-18.341	-0.0107*	-24.744	-0.0132*	-33.580
HUGEBANK	-0.0107*	-72.760	-0.0078*	-14.526	-0.0088*	-21.061	-0.0123*	-26.607	-0.0141*	-33.775
BHC	0.0017*	27.048	0.0018*	6.124	0.0025*	11.423	0.0013*	5.857	0.0019*	10.191
MULTILEVELBHC	0.0001*	3.645	0.0001	0.514	0.0007*	5.102	0.0003*	2.507	-0.0003*	-3.016
PUBLICLYTRADED	0.0007*	20.133	0.0005*	2.380	0.0013*	9.171	0.0010*	7.155	0.0008*	6.961
MULTILAYERS(TOTAL)	0.0025*	36.895	0.0025*	6.696	0.0045*	17.608	0.0026*	10.239	0.0023*	10.933
MULTIBANKBHC	-0.0015*	-30.482	-0.0030*	-11.287	-0.0023*	-12.183	-0.0016*	-8.385	-0.0020*	-12.878
MULTISTATEBHC	0.0002*	4.454	0.0020*	8.860	0.0008*	4.981	0.0004*	2.200	0.0009*	6.626
BRANCH100	0.0001*	4.259	-0.0002	-1.068	0.0005*	3.873	0.0006*	4.338	0.0008*	6.876
MULTIBANKUNITS(TOTAL)	-0.0012*	-24.436	-0.0012*	-3.797	-0.0010*	-4.530	-0.0006*	-3.129	-0.0004*	-2.168
SECTION20SUB	0.0008*	21.391	0.0032*	9.238	0.0017*	8.309	0.0000	0.083	-0.0002	-1.295
FOREIGNOFFICES	0.0003*	8.536	0.0001	0.296	0.0014*	9.166	0.0016*	11.417	0.0012*	10.675
NONBANKASSETS	0.0005*	17.433	0.0000	-0.188	0.0013*	11.470	0.0009*	8.308	0.0009*	9.243
DERIVATIVES	-0.0002*	-7.501	-0.0025*	-11.147	-0.0008*	-5.859	-0.0004*	-3.151	-0.0004*	-3.629
NONBANKINCOME	-0.0007*	-26.621	-0.0014*	-7.980	0.0000	-0.212	0.0002	1.717	0.0001	0.992
NONBANKACTIVITY(TOTAL)	0.0006*	9.486	-0.0007	-1.375	0.0036*	11.801	0.0023*	8.134	0.0016*	6.626
COMPLEXITY(TOTAL)	0.0019*	21.770	0.0006	1.044	0.0071*	19.907	0.0043*	12.452	0.0036*	12.452
SIZE & COMPLEXITY(TOTAL)	-0.0088*	-55.811	-0.0072*	-10.604	-0.0017*	-3.492	-0.0080*	-15.465	-0.0105*	-23.049
F-TEST SIZE & COMPLEXITY	934.596		76.700		122.926		91.528		141.903	
Num. Obs.	921,627		61,903		74,471		56,035		68,057	
Adj. R^2	0.382		0.170		0.218		0.217		0.253	

* Statistically significant at the 5% level, two-sided

Note: Time dummies, $TIMEDUM_w$, w=2,...,32, included in regressions but not shown here.

Table 3 (continued)

OLS Regressions of Loan Rate Premium (PREM) on Control, Size, and Complexity Variables

	CREDITAVAIL1-4		CREDITAVAIL5		CREDITAVAIL6		CREDITAVAIL7	
	$0 – $100,000		$100,001 – $250,000		$250,001 – $1,000,000		$1,000,000+	
Variable	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats
INTERCEPT	0.0686*	40.788	0.0184*	10.212	0.0207*	16.625	0.0177*	18.023
COLLAT	-0.0007*	-11.912	0.0044*	62.274	0.0055*	87.977	0.0061*	163.784
COMMIT	0.0000*	0.807	0.0018*	16.674	0.0014*	13.014	0.0013*	16.129
PARTIC	-0.0057*	-10.745	-0.0025*	-5.889	-0.0002	-0.896	0.0004*	5.642
PRIME	0.0022*	26.391	0.0042*	35.937	0.0048*	48.433	0.0094*	173.380
DEMAND	-0.0024*	-34.852	-0.0007*	-9.880	-0.0001*	-2.274	-0.0006*	-17.533
FLOAT	0.0011*	14.331	0.0047*	41.181	0.0051*	48.008	0.0064*	108.281
LNDURATION	-0.0016*	-42.065	-0.0004*	-9.046	-0.0008*	-21.362	-0.0006*	-29.085
1/2 LNDURATION^2	-0.0001*	-7.544	0.0002*	13.289	0.0001*	4.060	0.0001*	8.942
LOANSIZE	-0.0034*	-9.718	0.0039*	10.715	0.0023*	10.618	0.0020*	24.844
1/2 LOANSIZE^2	0.0001*	3.219	-0.0005*	-12.981	-0.0003*	-14.614	-0.0002*	-37.652
CREDITAVAIL2								
CREDITAVAIL3								
CREDITAVAIL4								
CREDITAVAIL5								
CREDITAVAIL6								
CREDITAVAIL7								
T1RAT	-0.0037	-1.009	-0.0160*	-4.341	-0.0398*	-12.900	-0.0647*	-30.888
1/2 T1RAT^2	-0.6595*	-12.212	-0.3790*	-6.736	-0.5618*	-12.125	-0.4519*	-17.097
TOTRAT	0.0278*	7.265	0.0075*	2.070	0.0310*	10.354	0.0453*	21.592
1/2 TOTRAT^2	0.6606*	12.245	0.3561*	6.364	0.5419*	11.719	0.4360*	16.523
LEVRAT	-0.0399*	-12.657	-0.0131	-1.938	0.0111*	2.909	0.0219*	5.557
1/2 LEVRAT^2	0.1431*	5.985	0.2561*	2.893	0.2436*	5.979	0.0526	1.004
Δ LEV	0.0170*	7.081	0.0001	0.049	0.0015	1.009	0.0101*	7.374
1/2 Δ LEV^2	0.0135*	4.677	-0.0174*	-3.270	-0.0157*	-6.315	-0.0044	-1.400
NPFRAT	0.0648*	14.841	0.0491*	9.141	0.0738*	16.778	0.0288*	9.554
1/2 NPFRAT^2	-0.1388*	-2.041	0.3808*	4.014	-0.1152	-1.475	0.1726*	2.957
OREORAT	0.0220*	2.566	-0.0529*	-4.925	-0.0559*	-5.838	-0.0563*	-8.667
1/2 OREORAT^2	-1.1251*	-4.135	-1.0870*	-2.681	2.8562*	6.587	3.7322*	11.315
CRERAT	0.0164*	13.140	0.0195*	14.316	0.0096*	8.668	-0.0133*	-18.994
1/2 CRERAT^2	-0.0381*	-8.467	-0.0526*	-10.855	-0.0231*	-5.774	0.0534*	18.722
WCLASSRAT	-0.0453*	-5.428	0.0353*	4.075	-0.0370*	-5.497	0.0346*	8.657
1/2 WCLASSRAT^2	0.7195*	3.658	-0.8030*	-4.004	-0.0008	-0.005	-0.8431*	-8.099
NOCLASS	-0.0010*	-4.050	-0.0007*	-2.474	-0.0005*	-2.396	0.0001	0.588
CAMEL2	0.0007*	8.302	0.0010*	10.788	0.0015*	19.615	0.0015*	29.811
CAMEL3	0.0006*	4.311	0.0011*	7.667	0.0015*	13.567	0.0017*	23.617
CAMEL4	0.0009*	4.227	0.0010*	4.612	0.0023*	13.785	0.0023*	23.427
CAMEL5	0.0037*	12.195	0.0012*	3.331	0.0014*	5.789	0.0007*	4.463
NOCAMEL	0.0023*	8.310	0.0014*	4.475	0.0010*	4.038	0.0016*	11.463
OCC	0.0010*	13.330	-0.0001*	-1.487	-0.0011*	-15.244	0.0005*	10.512
FDIC	0.0022*	20.474	-0.0005*	-3.428	-0.0012*	-10.617	-0.0013*	-16.118
HERF	-0.0027*	-6.437	-0.0012*	-2.391	-0.0050*	-12.337	-0.0044*	-17.135
SHARE	0.0085*	32.032	0.0026*	8.158	0.0021*	8.182	-0.0022*	-13.491
STGROW	0.0313*	10.098	0.0288*	7.877	0.0177*	5.623	-0.0182*	-9.067
STUNEMP	-0.0013	-0.621	0.0352*	13.707	0.0529*	24.869	0.0295*	21.657
MSA	-0.0011*	-8.854	0.0009*	4.999	-0.0008*	-5.275	-0.0021*	-18.760

Additional parameters on next page

Table 3 (continued)

OLS Regressions of Loan Rate Premium (PREM) on Control, Size, and Complexity Variables

	CREDITAVAIL1-4		CREDITAVAIL5		CREDITAVAIL6		CREDITAVAIL7	
	$0 – $100,000		$100,001 – $250,000		$250,001 – $1,000,000		$1,000,000+	
Variable	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats
				SIZE AND COMPLEXITY VARIABLES				
MEDBANK	-0.0034*	-17.465	-0.0108*	-27.873	-0.0061*	-12.061	-0.0065*	-7.767
LARGEBANK	-0.0080*	-38.295	-0.0147*	-37.042	-0.0086*	-17.119	-0.0088*	-10.512
HUGEBANK	-0.0103*	-44.917	-0.0148*	-36.233	-0.0093*	-18.221	-0.0091*	-10.942
BHC	0.0023*	19.009	0.0018*	12.147	0.0021*	15.664	0.0000	0.223
MULTILEVELBHC	0.0004*	6.028	-0.0002*	-1.984	-0.0006*	-9.590	-0.0006*	-13.954
PUBLICLYTRADED	0.0008*	10.596	0.0005*	5.182	0.0006*	8.567	0.0003*	6.558
MULTILAYERS(TOTAL)	0.0036*	25.250	0.0021*	12.658	0.0021*	14.424	-0.0003*	-2.597
MULTIBANKBHC	-0.0027*	-26.431	-0.0023*	-18.640	-0.0018*	-17.247	0.0007*	10.403
MULTISTATEBHC	0.0011*	12.779	0.0007*	6.924	0.0001	1.152	-0.0005*	-7.998
BRANCH100	0.0008*	10.069	0.0004*	4.750	-0.0004*	-5.859	-0.0003*	-6.138
MULTIBANKUNITS(TOTAL)	-0.0009*	-7.276	-0.0012*	-9.064	-0.0021*	-20.541	0.0000	0.272
SECTION20SUB	0.0010*	9.698	-0.0008*	-7.022	-0.0006*	-6.508	0.0011*	24.841
FOREIGNOFFICES	0.0014*	16.487	0.0005*	5.876	-0.0003*	-4.887	-0.0002*	-5.030
NONBANKASSETS	0.0009*	14.929	0.0008*	11.847	0.0004*	6.951	0.0000	-0.841
DERIVATIVES	-0.0009*	-11.366	-0.0008*	-9.862	-0.0001	-1.840	0.0005*	10.516
NONBANKINCOME	-0.0002*	-3.915	0.0002*	2.671	-0.0007*	-13.268	-0.0008*	-24.436
NONBANKACTIVITY(TOTAL)	0.0022*	13.435	-0.0001	-0.495	-0.0013*	-9.462	0.0005*	6.532
COMPLEXITY(TOTAL)	0.0049*	25.161	0.0009*	3.853	-0.0014	-7.700	0.0003*	2.489
SIZE & COMPLEXITY(TOTAL)	-0.0054*	-20.039	-0.0139*	-32.044	-0.0107	-20.400	-0.0088*	-10.529
F-TEST SIZE & COMPLEXITY	377.945		195.790		163.289		169.455	
Num. Obs.	260,466		97,418		152,485		411,258	
Adj. R^2	0.178		0.312		0.317		0.499	

* Statistically significant at the 5% level, two-sided

Note: Time dummies, $TIMEDUM_w$, w=2,...,32, included in regressions but not shown here.

Table 4

Logit Regressions of the Probability that a Loan is Secured

	ALL LOANS		CREDITAVAIL1		CREDITAVAIL2		CREDITAVAIL3		CREDITAVAIL4	
	GROUPED LOGIT		$0 – $10,000		$10,001 – $25,000		$25,001 – $50,000		$50,001 – $100,000	
Variable	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats
INTERCEPT	1.430	0.403	14.367*	9.198	7.432*	6.968	7.233*	7.766	0.552	0.802
COMMIT	-0.005	-0.236	0.370*	12.522	-0.095*	-3.689	0.061*	2.070	0.233*	7.906
PARTIC	-0.226*	-4.166	0.068	0.324	0.295	1.425	0.346	1.672	0.257	1.549
PRIME	1.031*	22.594	-0.410*	-17.289	-0.637*	-24.244	-0.658*	-19.003	-0.546*	-15.045
DEMAND	-0.405*	-8.218	0.915*	34.085	0.866*	38.139	0.497*	21.089	0.348*	16.031
FLOAT	-0.282*	-4.460	0.468*	20.534	0.301*	13.240	0.284*	9.804	0.171*	5.601
LNDURATION	0.030*	2.348	0.156*	26.402	0.176*	36.524	0.136*	26.438	0.099*	20.753
1/2 LNDURATION^2	0.184*	7.221	0.520*	35.025	0.573*	44.935	0.432*	30.493	0.302*	22.582
LOANSIZE	-0.113*	-2.587	-3.357*	-8.768	-1.021*	-4.239	-1.046*	-5.065	0.466*	3.190
1/2 LOANSIZE^2	-0.591*	-2.971	0.442*	9.430	0.128*	4.665	0.113*	4.948	-0.054*	-3.467
CREDITAVAIL2	4.128	0.963								
CREDITAVAIL3	1.908	0.515								
CREDITAVAIL4	1.642	0.472								
CREDITAVAIL5	2.948	0.872								
CREDITAVAIL6	3.596	1.069								
CREDITAVAIL7	2.874	0.852								
T1RAT	2.331	0.598	9.233*	4.382	13.506*	9.441	4.636*	3.724	2.530	1.821
1/2 T1RAT^2	-1.519	-0.032	-86.207*	-3.069	12.323	0.705	18.535	1.010	68.656*	3.983
TOTRAT	0.229	0.052	-4.977*	-2.162	3.158*	2.634	1.861	1.464	1.197	1.067
1/2 TOTRAT^2	11.318	0.241	87.054*	3.101	34.433*	2.011	-17.108	-0.931	-75.730*	-4.632
LEVRAT	-9.433*	-2.764	-2.119	-1.593	-8.793*	-7.780	-6.815*	-5.093	-1.095	-0.508
1/2 LEVRAT^2	-179.149*	-4.033	28.724*	2.213	34.071*	4.319	39.288*	3.154	27.237	1.000
Δ LEV	4.483*	3.915	-2.088*	-2.203	2.020*	2.384	2.135*	2.112	2.209*	2.183
1/2 Δ LEV^2	10.591*	4.051	-2.620*	-2.258	1.907*	1.984	13.042*	3.503	56.506*	2.097
NPFRAT	-4.281	-1.628	-5.972*	-3.837	-9.673*	-6.686	-5.429*	-3.350	-5.019*	-3.353
1/2 NPFRAT^2	-16.363	-0.282	0.530	0.021	-4.338	-0.189	-22.265	-0.844	-39.909	-1.642
OREORAT	21.618*	4.142	-5.206	-1.595	-8.325*	-2.347	0.663	0.169	4.311	1.283
1/2 OREORAT^2	-663.781*	-2.007	339.371*	2.563	690.365*	4.319	335.095	1.932	-43.084	-0.330
CRERAT	1.015	1.752	-1.611*	-3.611	-1.953*	-4.866	-1.759*	-3.989	-0.852*	-2.107
1/2 CRERAT^2	-7.273*	-2.856	-0.860	-0.515	-0.049	-0.035	-0.968	-0.625	-5.476*	-3.937
WCLASSRAT	-6.403	-1.902	-5.270	-1.714	12.865*	4.509	-0.590	-0.199	-2.954	-1.057
1/2 WCLASSRAT^2	302.964*	2.481	377.181*	4.850	-71.517	-0.990	55.815	0.782	39.664	0.546
NOCLASS	-0.028	-0.219	0.721*	7.843	0.738*	8.044	0.609*	5.973	0.244*	2.693
CAMEL2	0.391*	8.468	0.178*	6.488	0.159*	6.000	0.034	1.131	-0.016	-0.561
CAMEL3	0.497*	8.860	0.202*	4.396	0.169*	3.930	0.007	0.138	-0.014	-0.327
CAMEL4	0.485*	5.702	0.026	0.377	-0.008	-0.114	-0.036	-0.488	0.151*	2.264
CAMEL5	1.301*	7.859	0.098	0.954	0.103	0.988	0.401*	3.617	0.354*	3.220
NOCAMEL	0.248	1.864	-0.876*	-9.069	-0.628*	-6.528	-0.647*	-6.036	-0.328*	-3.421
OCC	0.286*	7.927	-0.047	-1.817	-0.331*	-13.215	-0.116*	-3.958	-0.039	-1.364
FDIC	1.157*	16.102	-0.226*	-6.406	-0.519*	-15.062	-0.354*	-8.629	-0.356*	-9.033
HERF	1.242*	5.566	0.376*	2.767	1.111*	7.894	0.335*	2.080	1.641*	10.318
SHARE	0.278*	2.011	0.389*	4.512	0.552*	6.314	1.208*	12.060	1.178*	12.122
STGROW	3.050*	2.029	-2.128*	-2.250	-5.059*	-4.896	-1.684	-1.376	-2.802*	-2.430
STUNEMP	-3.597*	-3.291	-0.417	-0.608	-3.612*	-5.262	-0.866	-1.115	1.779*	2.339
MSA	0.318*	2.556	0.018	0.524	0.094*	2.434	-0.142*	-2.868	0.055	1.090

Additional parameters on next page

Table 4 (continued)

Logit Regressions of the Probability that a Loan is Secured

Variable	ALL LOANS GROUPED LOGIT		CREDITAVAIL1 $0 – $10,000		CREDITAVAIL2 $10,001 – $25,000		CREDITAVAIL3 $25,001 – $50,000		CREDITAVAIL4 $50,001 – $100,000	
	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats
SIZE AND COMPLEXITY VARIABLES										
MEDBANK	-0.459	-0.513	-0.964*	-18.845	-0.786*	-11.200	-0.542*	-5.617	-0.683*	-6.106
LARGEBANK	-0.513	-0.574	-0.905*	-15.429	-0.966*	-12.929	-0.756*	-7.571	-1.036*	-9.070
HUGEBANK	-0.549	-0.613	-0.788*	-11.596	-1.029*	-12.785	-1.080*	-10.262	-1.328*	-11.227
Δ PROB(HUGEBANK)	-0.120		-0.192		-0.251		-0.262		-0.315	
BHC	0.110	1.261	-0.018*	-0.470	-0.020	-0.504	0.331*	7.349	0.452*	10.569
MULTILEVELBHC	0.074*	2.333	-0.144*	-5.485	-0.130*	-5.337	0.040	1.536	0.043	1.759
PUBLICLYTRADED	0.108*	3.111	-0.104*	-3.746	-0.011	-0.442	-0.162*	-5.732	-0.146*	-5.477
MULTILAYERS(TOTAL)	0.293*	3.093	-0.266*	-5.767	-0.161*	-3.508	0.210*	4.082	0.349*	7.119
Δ PROB(MULTILAYERS)	0.054		-0.066		-0.037		0.045		0.065	
MULTIBANKBHC	-0.243*	-3.838	-0.078*	-2.339	-0.020	-0.594	-0.114*	-2.978	-0.127*	-3.405
MULTISTATEBHC	0.227*	5.125	0.070*	2.436	0.008	0.283	-0.010	-0.320	-0.077*	-2.391
BRANCH100	-0.318*	-9.428	-0.573*	-21.918	-0.522*	-21.583	-0.366*	-13.673	-0.316*	-12.412
MULTIBANKUNITS(TOTAL)	-0.334*	-5.773	-0.581*	-14.472	-0.534*	-13.978	-0.490*	-11.788	-0.520*	-13.147
Δ PROB(MULTIBANKUNITS)	-0.071		-0.144		-0.129		-0.116		-0.115	
SECTION20SUB	0.366*	11.723	-0.024	-0.542	0.102*	2.818	-0.054	-1.518	-0.107*	-3.242
FOREIGNOFFICES	-0.072*	-2.267	0.261*	8.468	0.101*	3.623	0.089*	3.086	0.076*	2.870
NONBANKASSETS	-0.089*	-3.574	-0.166*	-7.549	-0.288*	-14.252	-0.055*	-2.460	-0.159*	-7.489
DERIVATIVES	0.180*	4.224	0.026	0.921	0.009	0.343	0.040	1.455	-0.065*	-2.445
NONBANKINCOME	0.206*	7.675	0.004	0.196	-0.066*	-3.255	-0.015	-0.689	0.049*	2.333
NONBANKACTIVITY(TOTAL)	0.590*	8.851	0.101	1.620	-0.142*	-2.605	0.005	0.093	-0.205*	-3.766
Δ PROB(NONBANKACTIVITY)	0.100		0.025		-0.033		0.001		-0.043	
COMPLEXITY(TOTAL)	0.549*	5.225	-0.746*	-10.562	-0.8367*	-13.083	-0.275*	-3.985	-0.377*	-5.810
Δ PROB(COMPLEXITY)	0.094		-0.182		-0.204		-0.064		-0.082	
SIZE & COMPLEXITY(TOTAL)	-0.000	-0.000	-1.534*	-17.646	-1.866*	-19.892	-1.356*	-11.777	-1.704*	-13.568
Δ PROB(SIZE & COMPLEXITY)	-0.000		-0.338		-0.427		-0.327		-0.401	
F-TEST SIZE & COMPLEXITY	30.264		90.518		88.199		57.146		76.094	
Num. Obs.	9,800		61,903		74,471		56,035		68,057	
Adj. R^2	0.245									
Pseudo R^2			0.099		0.103		0.060		0.056	
Subsample Mean of COLLAT	0.730		0.542		0.650		0.665		0.721	

* Statistically significant at the 5% level, two-sided

Note: Time dummies, $TIMEDUM_w$, w=2,...,32, included in regressions but not shown here.

Note: Pseudo-R2 were computed as 1-(LLF/LLI), where LLF is the log likelihood for the estimated model nd LLI is the Log likelihood when the model includes only a constant.

Table 4 (continued)

Logit Regressions of the Probability that a Loan is Secured

	CREDITAVAIL1-4 $0 – $100,000		CREDITAVAIL5 $100,001 – $250,000		CREDITAVAIL6 $250,001 – $1,000,000		CREDITAVAIL7 $1,000,000+	
Variable	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats
INTERCEPT	-0.609*	-2.178	-1.448*	-2.947	0.263	0.665	8.467*	20.518
COMMIT	0.375*	36.141	0.274*	10.488	0.262*	9.788	-0.157*	-7.767
PARTIC	0.309*	3.204	0.400*	3.295	0.291*	3.852	-0.073*	-4.492
PRIME	-0.501*	-35.854	-0.212*	-6.884	0.147*	5.609	0.986*	78.067
DEMAND	0.690*	59.920	0.227*	12.262	0.289*	17.911	0.224*	23.032
FLOAT	0.385*	30.951	0.178*	6.252	0.376*	14.210	0.425*	30.122
LNDURATION	0.144*	57.390	0.104*	25.069	0.068*	19.309	-0.001	-0.388
1/2 LNDURATION^2	0.468*	69.423	0.304*	25.431	0.208*	20.265	0.052*	9.929
LOANSIZE	0.465*	7.913	0.756*	7.949	0.478*	7.722	-0.870*	-36.218
1/2 LOANSIZE^2	-0.033*	-5.154	-0.086*	-8.934	-0.062*	-10.670	0.046*	24.121
CREDITAVAIL2								
CREDITAVAIL3								
CREDITAVAIL4								
CREDITAVAIL5								
CREDITAVAIL6								
CREDITAVAIL7								
T1RAT	4.704*	7.767	2.558*	2.636	1.668	1.808	6.472*	11.627
1/2 T1RAT^2	-1.268	-0.141	49.7266*	3.497	-7.163	-0.547	109.070*	15.907
TOTRAT	1.018	1.612	1.679	1.748	3.821*	4.098	-3.644*	-6.557
1/2 TOTRAT^2	4.695	0.525	-45.305*	-3.205	10.023	0.764	-107.916*	-15.850
LEVRAT	-3.974*	-7.373	-5.865*	-2.996	-1.924	-1.651	3.831*	2.561
1/2 LEVRAT^2	21.279*	5.058	-32.891	-1.281	18.751	1.460	53.164*	2.395
Δ LEV	-0.193	-0.476	-0.234	-0.372	3.194*	3.970	4.915*	10.105
1/2 Δ LEV^2	0.024	0.046	1.934	1.252	10.304*	4.910	14.158*	11.076
NPFRAT	-6.019*	-8.031	-3.805*	-2.742	-1.781	-1.471	-2.561*	-3.019
1/2 NPFRAT^2	-14.362	-1.190	-47.962*	-1.984	-52.467*	-2.455	19.635	1.145
OREORAT	-5.149*	-2.887	3.028	1.036	17.944*	6.723	13.343*	7.379
1/2 OREORAT^2	432.863*	5.464	-75.047	-0.658	-367.069*	-3.189	63.271	0.670
CRERAT	-1.234*	-5.974	0.878*	2.586	1.517*	5.262	2.590*	13.953
1/2 CRERAT^2	-2.856*	-3.887	-8.760*	-7.359	-10.270*	-10.024	-12.252*	-16.070
WCLASSRAT	1.766	1.245	8.334*	3.752	5.230*	2.803	-6.252*	-5.581
1/2 WCLASSRAT^2	89.053*	2.512	-95.855	-1.888	-143.131*	-3.222	8.017	0.261
NOCLASS	0.600*	12.908	0.389*	5.030	0.211*	3.207	0.259*	7.074
CAMEL2	0.101*	7.333	0.044	1.730	0.171*	7.691	0.207*	15.283
CAMEL3	0.138*	6.291	-0.050	-1.344	-0.069*	-2.184	0.187*	9.615
CAMEL4	0.089*	2.646	-0.181*	-3.183	0.295*	6.182	0.657*	22.890
CAMEL5	0.239*	4.582	-0.009	-0.098	0.167*	2.336	0.505*	11.500
NOCAMEL	-0.649*	-13.285	-0.320*	-3.868	0.011	0.157	-0.076	-1.988
OCC	-0.156*	-11.768	-0.037	-1.484	-0.074*	-3.565	-0.018	-1.490
FDIC	-0.390*	-21.398	-0.338*	-9.734	-0.338*	-10.593	0.276*	11.473
HERF	0.963*	13.374	2.078*	14.722	1.292*	10.858	0.795*	10.934
SHARE	0.629*	14.001	1.377*	15.769	1.211*	15.780	0.199*	4.304
STGROW	-2.611*	-4.943	-0.515	-0.501	2.492*	2.735	2.634*	4.824
STUNEMP	-1.621*	-4.588	3.474*	5.126	3.164*	5.222	-2.463*	-6.561
MSA	0.099*	4.865	-0.113*	-2.275	-0.105*	-2.210	0.131*	4.083

Additional parameters on next page

Table 4 (continued)

Logit Regressions of the Probability that a Loan is Secured

Variable	CREDITAVAIL1-4 $0 – $100,000		CREDITAVAIL5 $100,001 – $250,000		CREDITAVAIL6 $250,001 – $1,000,000		CREDITAVAIL7 $1,000,000+	
	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats
				SIZE AND COMPLEXITY VARIABLES				
MEDBANK	-0.836*	-24.095	-0.932*	-6.441	-1.328*	-6.135	-1.458*	-3.844
LARGEBANK	-0.968*	-25.916	-1.385*	-9.483	-1.816*	-8.386	-1.606*	-4.237
HUGEBANK	-1.033*	-25.505	-1.651*	-11.125	-2.087*	-9.578	-1.800*	-4.745
Δ PROB(HUGEBANK)	-0.252		-0.383		-0.467		-0.421	
BHC	0.118*	5.887	0.495*	12.858	0.776*	22.286	0.550*	22.211
MULTILEVELBHC	-0.071*	-5.719	0.051*	2.384	-0.066*	-3.540	-0.087*	-7.818
PUBLICLYTRADED	-0.085*	-6.415	-0.065*	-2.823	0.130*	6.362	0.099*	8.015
MULTILAYERS(TOTAL)	-0.038	-1.625	0.481*	11.225	0.840*	21.964	0.561*	21.278
Δ PROB(MULTILAYERS)	-0.009		0.078		0.101		0.095	
MULTIBANKBHC	-0.035*	-2.049	-0.112*	-3.416	-0.466*	-15.754	-0.279*	-14.049
MULTISTATEBHC	0.000	0.023	0.087*	3.130	0.325*	13.399	0.093*	5.900
BRANCH100	-0.454*	-36.185	-0.278*	-12.350	-0.281*	-14.530	-0.195*	-16.576
MULTIBANKUNITS(TOTAL)	-0.489*	-25.129	-0.303*	-8.896	-0.422*	-14.483	-0.381*	-21.238
Δ PROB(MULTIBANKUNITS)	-0.118		-0.060		-0.075		-0.081	
SECTION20SUB	-0.072*	-4.004	-0.141*	-4.988	-0.234*	-10.068	-0.017	-1.373
FOREIGNOFFICES	0.104*	7.425	-0.009	-0.385	-0.176*	-9.286	-0.017	-1.591
NONBANKASSETS	-0.190*	-18.049	-0.134*	-7.252	-0.053*	-3.273	-0.073*	-7.934
DERIVATIVES	-0.006	-0.493	-0.060*	-2.641	-0.073*	-3.730	0.011	0.911
NONBANKINCOME	0.001	0.081	0.056*	3.132	0.147*	9.412	0.001	0.119
NONBANKACTIVITY(TOTAL)	-0.164*	-5.899	-0.288*	-6.125	-0.389*	-9.781	-0.094*	-4.195
Δ PROB(NONBANKACTIVITY)	-0.038		-0.057		-0.068		-0.019	
COMPLEXITY(TOTAL)	-0.690*	-21.171	-0.110*	-1.939	0.029	0.594	0.086*	2.669
Δ PROB(COMPLEXITY)	-0.168		-0.021		0.005		0.017	
SIZE & COMPLEXITY(TOTAL)	-1.723*	-36.714	-1.761*	-11.510	-2.058*	-9.343	-1.714*	-4.511
Δ PROB(SIZE & COMPLEXITY)	-0.400		-0.409		-0.460		-0.402	
F-TEST SIZE & COMPLEXITY	254.205		80.068		158.826		141.384	
Num. Obs.	260,466		97,418		152,485		411,258	
Adj. R^2								
Pseudo R^2	0.076		0.060		0.073		0.177	
Subsample Mean of COLLAT	0.646		0.756		0.804		0.733	

* Statistically significant at the 5% level, two-sided

Note: Time dummies, $TIMEDUM_w$, w=2,...,32, included in regressions but not shown here.

Note: Pseudo-R2 were computed as 1-(LLF/LLI), where LLF is the log likelihood for the estimated model nd LLI is the Log likelihood when the model includes only a constant.

Table 5

Grouped Logit Regressions of the Probability that Dollar of Total Adjusted Assets Is Allocated to a Credit Availability Size Class

	ALL LOANS		CREDITAVAIL1		CREDITAVAIL2		CREDITAVAIL3		CREDITAVAIL4	
			$0 – $10,000		$10,001 – $25,000		$25,001 – $50,000		$50,001 – $100,000	
Variable	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats
INTERCEPT	-5.742*	-13.453	-5.971	-1.080	-71.588*	-8.190	-23.334*	-4.435	-23.422*	-4.754
COLLAT	0.189*	12.818	0.307*	7.196	0.026	0.653	0.007	0.176	-0.015	-0.387
COMMIT	0.056*	3.574	-0.312*	-5.623	-0.187*	-4.222	-0.037	-1.020	-0.365*	-10.416
PARTIC	-0.205*	-9.906	-0.131	-0.687	2.937*	4.998	1.652*	2.769	-1.413*	-5.362
PRIME	-0.011	-0.728	0.255*	7.912	0.119*	3.526	0.096*	2.848	0.056	1.710
DEMAND	-0.189*	-10.631	-0.598*	-8.346	-0.014	-0.273	-0.395*	-7.518	-0.363*	-7.701
FLOAT	0.069*	4.884	0.009	0.233	-0.206*	-5.958	-0.242*	-7.457	-0.073*	-2.335
LNDURATION	-0.028*	-4.154	0.274*	11.960	0.296*	15.677	0.377*	21.971	0.347*	21.714
1/2 LNDURATION^2	0.028*	3.408	0.090*	2.525	0.078*	2.777	0.157*	6.695	0.167*	7.938
LOANSIZE	0.411*	7.861	0.722	0.551	13.903*	7.593	3.477*	3.323	3.402*	3.664
1/2 LOANSIZE^2	-0.026*	-7.658	-0.105	-0.676	-1.424*	-7.425	-0.295*	-2.826	-0.281*	-3.206
T1RAT	12.867*	12.029	7.803	1.314	10.495*	3.942	13.096*	6.692	7.628*	5.383
1/2 T1RAT^2	-32.412*	-2.503	-36.129	-0.676	44.791	1.380	25.758	0.787	18.430	0.779
TOTRAT	1.228	1.035	-6.203	-0.954	-16.373*	-5.726	-8.097*	-3.768	-6.837*	-4.918
1/2 TOTRAT^2	38.791*	2.983	32.685	0.610	-80.263*	-2.452	-24.764	-0.758	-22.136	-0.946
LEVRAT	-17.461*	-21.274	-1.483	-1.212	1.894	1.749	-6.563*	-5.691	0.828	0.744
1/2 LEVRAT^2	26.673*	2.697	-16.043	-1.702	-9.676	-1.528	15.510	1.917	-6.316	-0.850
Δ LEV	-2.764*	-10.014	-0.066	-0.060	0.175	0.172	-0.179	-0.184	0.271	0.233
1/2 Δ LEV^2	-2.015*	-3.413	1.767	0.722	0.067	0.073	0.050	0.050	0.070	0.068
NPFRAT	-1.069	-1.356	9.696*	5.508	14.453*	8.606	2.943	1.767	4.350*	2.635
1/2 NPFRAT^2	-22.394	-1.400	-86.088*	-3.301	-139.662*	-5.801	-27.860	-1.127	-16.984	-0.651
OREORAT	16.207*	10.178	9.125*	3.351	15.621*	6.446	6.898*	2.652	9.001*	3.557
1/2 OREORAT^2	-780.668*	-8.688	-295.736*	-4.433	-233.736*	-4.834	-165.866*	-3.176	-211.900*	-4.080
CRERAT	-1.128*	-5.748	0.024	0.048	0.162	0.318	-0.770	-1.555	2.041*	4.876
1/2 CRERAT^2	-0.259	-0.303	-3.529	-1.899	-2.566	-1.427	2.569	1.481	-7.706*	-5.629
WCLASSRAT	-5.366*	-4.585	0.248	0.060	3.127	0.851	10.213*	2.860	8.886*	2.586
1/2 WCLASSRAT^2	316.258*	8.202	44.897	0.552	-140.745*	-1.966	-123.832	-1.766	-390.050*	-4.159
NOCLASS	0.087*	2.177	0.274	1.770	0.123	0.905	-0.072	-0.584	0.320*	3.177
CAMEL2	0.081*	5.256	-0.091*	-2.415	-0.057	-1.670	-0.057	-1.711	-0.054	-1.769
CAMEL3	0.138*	7.245	-0.016	-0.261	0.096	1.682	0.065	1.158	0.075	1.515
CAMEL4	0.136*	4.870	0.106	0.983	-0.107	-1.200	-0.196*	-2.240	0.062	0.779
CAMEL5	-0.176*	-3.363	-0.183	-1.334	0.323*	2.726	0.313*	3.061	0.070	0.629
NOCAMEL	0.041	0.990	-0.151	-0.950	0.041	0.291	0.101	0.794	-0.251*	-2.354
OCC	0.147*	12.175	-0.172*	-3.747	-0.224*	-6.013	-0.022	-0.612	0.012	0.365
FDIC	0.611*	25.486	0.145*	2.976	0.210*	5.115	0.212*	5.206	0.311*	7.925
HERF	0.316*	4.057	2.226*	15.334	1.985*	14.323	1.930*	14.140	0.562*	3.930
SHARE	0.638*	13.632	-0.718*	-6.960	-0.588*	-6.114	-1.080*	-11.265	0.154	1.739
STGROW	1.144*	2.194	4.312*	5.389	-0.570	-0.631	2.029*	2.219	2.406*	2.760
STUNEMP	1.691*	4.498	-0.199	-0.239	-1.564	-1.941	0.812	1.060	0.150	0.197
MSA	0.337*	8.194	-0.266*	-6.973	-0.138*	-3.895	-0.014	-0.375	-0.103*	-3.083

Additional parameters on next page

Table 5 (continued)

Grouped Logit Regressions of the Probability that a Dollar of Total Adjusted Assets Is Allocated to a Credit Availability Size Class

	ALL LOANS		CREDITAVAIL1		CREDITAVAIL2		CREDITAVAIL3		CREDITAVAIL4	
			$0 – $10,000		$10,001 – $25,000		$25,001 – $50,000		$50,001 – $100,000	
Variable	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats
					SIZE AND COMPLEXITY VARIABLES					
MEDBANK	0.268	1.433	-0.730*	-20.753	-0.490*	-12.044	-0.651*	-15.099	-0.310*	-6.972
LARGEBANK	0.417*	2.243	-1.809*	-32.625	-1.214*	-24.512	-1.393*	-27.337	-0.880*	-17.438
HUGEBANK	0.313	1.672	-3.093*	-25.161	-2.325*	-28.467	-2.256*	-29.126	-1.886*	-27.758
Δ PROB(HUGEBANK)	0.047		-0.009		-0.011		-0.011		-0.013	
BHC	0.232*	8.197	0.058	1.611	-0.051	-1.303	0.099*	2.632	-0.191*	-5.316
MULTILEVELBHC	0.146*	13.848	-0.102*	-2.159	0.206*	5.768	0.216*	6.653	0.089*	3.017
PUBLICLYTRADED	-0.170*	-14.648	-0.176*	-4.462	-0.009	-0.273	0.172*	5.579	0.006	0.206
MULTILAYERS(TOTAL)	0.209*	6.669	-0.220*	-3.339	0.146*	2.667	0.487*	9.331	-0.096*	-1.971
Δ PROB(MULTILAYERS)	0.030		-0.002		0.002		0.008		-0.001	
MULTIBANKBHC	-0.197*	-10.074	-0.281*	-6.264	0.050	1.348	-0.038	-1.045	0.072*	2.067
MULTISTATEBHC	0.120*	8.469	0.216*	4.556	0.081*	2.238	0.054	1.602	-0.102*	-3.332
BRANCH100	-0.108*	-9.681	-0.550*	-10.178	-0.503*	-12.958	-0.492*	-13.419	-0.311*	-9.572
MULTIBANKUNITS(TOTAL)	-0.185*	-9.956	-0.615*	-8.571	-0.372*	-7.026	-0.476*	-9.390	-0.341*	-7.538
Δ PROB(MULTIBANKUNITS)	-0.024		-0.004		-0.004		-0.005		-0.005	
SECTION20SUB	-0.435*	-38.265	0.263*	2.982	-0.229*	-3.600	-0.062	-1.100	-0.007	-0.142
FOREIGNOFFICES	-0.217*	-20.388	-0.133	-1.715	-0.213*	-3.913	-0.120*	-2.624	-0.103*	-2.627
NONBANKASSETS	-0.057*	-6.589	0.388*	10.392	0.339*	11.735	0.151*	5.522	0.152*	6.286
DERIVATIVES	0.140*	10.119	-0.424*	-7.039	-0.293*	-7.881	-0.392*	-10.877	-0.113*	-3.742
NONBANKINCOME	-0.048*	-5.328	-0.381*	-9.425	-0.252*	-8.166	-0.340*	-11.686	-0.326*	-12.714
NONBANKACTIVITY(TOTAL)	-0.617*	-26.961	-0.287*	-2.190	-0.648*	-6.914	-0.762*	-8.860	-0.397*	-5.219
Δ PROB(NONBANKACTIVITY)	-0.068		-0.002		-0.006		-0.007		-0.005	
COMPLEXITY(TOTAL)	-0.594*	-16.831	-1.122*	-7.400	-0.873*	-8.655	-0.751*	-8.157	-0.834*	-10.208
Δ PROB(COMPLEXITY)	-0.066		-0.006		-0.007		-0.007		-0.009	
SIZE & COMPLEXITY(TOTAL)	-0.281	-1.490	-4.215*	-25.701	-3.198*	-27.771	-3.007*	-29.649	-2.719*	-30.950
Δ PROB(SIZE & COMPLEXITY)	-0.035		-0.009		-0.012		-0.012		-0.015	
F-TEST SIZE & COMPLEXITY	244.446		223.213		223.437		219.407		194.876	
Num. Obs.	9,800		7,443		7,714		7,211		7,175	
Adj. R^2	0.583		0.625		0.601		0.592		0.589	
Subsample Mean of $Prob_k$	0.162		0.009		0.012		0.013		0.016	

* Statistically significant at the 5% level, two-sided

Note: Time dummies, $TIMEDUM_w$, w=2,...,32, included in regressions but not shown here.

Table 5 (continued)

Grouped Logit Regressions of the Probability that a Dollar of Total Adjusted Assets Is Allocated to a Credit Availability Size Class

	CREDITAVAIL1-4		CREDITAVAIL5		CREDITAVAIL6		CREDITAVAIL7	
	$0 – $100,000		$100,001 – $250,000		$250,001 – $1,000,000		$1,000,000+	
Variable	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats
INTERCEPT	-7.895*	-2.898	-17.326*	-4.736	-17.751*	-7.149	-7.921*	-7.924
COLLAT	-0.103*	-2.801	0.112*	3.181	0.135*	4.192	0.158*	8.573
COMMIT	-0.633*	-20.419	-0.278*	-9.604	-0.337*	-12.640	0.171*	7.934
PARTIC	-1.377*	-4.261	-0.650*	-3.831	-0.177*	-2.238	-0.143*	-5.702
PRIME	0.153*	5.005	0.103*	3.231	0.211*	6.906	-0.043*	-2.205
DEMAND	-0.259*	-6.799	-0.144*	-3.546	-0.012	-0.338	-0.222*	-9.507
FLOAT	-0.183*	-6.187	-0.168*	-5.524	-0.159*	-5.464	0.097*	5.468
LNDURATION	0.235*	15.554	0.246*	17.398	0.184*	13.229	0.000	0.006
1/2 LNDURATION^2	0.224*	10.611	0.142*	7.575	0.021	1.145	0.025*	2.472
LOANSIZE	1.011	1.899	2.138*	3.305	2.218*	5.536	0.602*	7.325
1/2 LOANSIZE^2	-0.096	-1.842	-0.151*	-2.642	-0.159*	-4.889	-0.036*	-6.872
T1RAT	10.312*	7.857	6.122*	5.664	8.349*	5.422	12.202*	7.803
1/2 T1RAT^2	-0.912	-0.042	59.450*	3.023	41.252*	2.070	-25.345	-1.359
TOTRAT	-7.776*	-5.534	-2.136	-1.891	-0.527	-0.413	1.890	1.078
1/2 TOTRAT^2	0.711	0.033	-58.145*	-2.965	-27.214	-1.443	34.366	1.832
LEVRAT	-0.971	-1.116	-7.413*	-3.395	-7.532*	-7.322	-19.941*	-12.872
1/2 LEVRAT^2	1.076	0.204	1.974	0.073	33.507*	5.438	-32.826	-1.651
Δ LEV	1.135	1.337	-0.793	-1.956	-2.396*	-6.923	-0.855	-1.715
1/2 Δ LEV^2	0.869	1.155	-0.290	-0.171	-2.090*	-5.382	2.249*	1.979
NPFRAT	5.169*	3.854	-2.014	-1.362	-1.488	-1.009	-0.339	-0.321
1/2 NPFRAT^2	-17.790	-0.870	86.897*	3.732	97.584*	3.790	-35.242	-1.609
OREORAT	3.553	1.639	-6.871*	-2.469	0.306	0.094	18.000*	8.542
1/2 OREORAT^2	-145.611*	-2.867	26.042	0.278	-12.425	-0.085	-840.974*	-6.843
CRERAT	1.999*	5.261	1.651*	4.552	1.372*	3.677	-1.661*	-6.390
1/2 CRERAT^2	-8.035*	-6.245	-6.471*	-5.489	-5.904*	-4.418	1.833	1.588
WCLASSRAT	9.988*	3.685	5.173	1.646	-3.841	-1.400	-6.807*	-4.469
1/2 WCLASSRAT^2	-211.191*	-3.625	-63.792	-0.785	15.011	0.207	362.838*	7.135
NOCLASS	0.144	1.644	0.071	0.874	0.021	0.288	0.113*	2.155
CAMEL2	-0.059*	-2.347	0.001	0.033	0.078*	2.926	0.096*	4.726
CAMEL3	0.013	0.323	-0.029	-0.657	0.036	0.921	0.167*	6.695
CAMEL4	-0.122	-1.845	0.091	1.286	0.015	0.219	0.169*	4.675
CAMEL5	0.146	1.728	0.182	1.775	-0.101	-0.970	-0.069	-0.985
NOCAMEL	-0.158	-1.711	-0.212*	-2.381	-0.185*	-2.342	0.039	0.714
OCC	-0.078*	-2.936	-0.045	-1.588	-0.131*	-5.153	0.142*	8.951
FDIC	0.274*	8.815	0.257*	7.445	0.139*	3.918	0.770*	23.508
HERF	1.524*	13.020	0.499*	3.646	-0.311*	-2.194	0.167	1.634
SHARE	-0.311*	-4.124	-0.224*	-2.584	0.059	0.667	0.828*	13.381
STGROW	2.500*	3.252	-0.357	-0.344	0.022	0.023	1.358*	2.019
STUNEMP	-1.900*	-3.075	0.208	0.305	3.199*	4.703	1.518*	3.073
MSA	-0.045	-1.561	0.138*	3.818	0.085*	1.967	0.371*	6.399

Additional parameters on next page

Table 5 (continued)

Grouped Logit Regressions of the Probability that a Dollar of Total Adjusted Assets Is Allocated to a Credit Availability Size Class

	CREDITAVAIL1-4		CREDITAVAIL5		CREDITAVAIL6		CREDITAVAIL7	
	$0 – $100,000		$100,001 – $250,000		$250,001 – $1,000,000		$1,000,000+	
Variable	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats	Coeffs	t-stats
				SIZE AND COMPLEXITY VARIABLES				
MEDBANK	-0.179*	-4.682	-0.202*	-3.572	-0.061	-0.645	0.244	0.318
LARGEBANK	-0.722*	-16.542	-0.964*	-15.768	-0.551*	-5.746	0.557	0.728
HUGEBANK	-1.770*	-30.299	-1.643*	-23.228	-1.228*	-12.158	0.440	0.574
Δ PROB(HUGEBANK)	-0.032		-0.018		-0.024		0.060	
BHC	-0.061*	-2.017	0.0601	1.724	0.090*	2.354	0.263*	6.754
MULTILEVELBHC	0.115*	4.677	0.085*	3.459	0.109*	4.991	0.141*	10.090
PUBLICLYTRADED	0.036	1.543	-0.009	-0.381	-0.043	-1.877	-0.165*	-10.779
MULTILAYERS(TOTAL)	0.090*	2.197	0.136*	3.120	0.156*	3.545	0.238*	5.529
Δ PROB(MULTILAYERS)	0.003		0.003		0.005		0.031	
MULTIBANKBHC	0.050	1.753	-0.088*	-2.718	-0.0827*	-2.560	-0.247*	-9.571
MULTISTATEBHC	-0.009	-0.368	-0.024	-0.874	-0.062*	-2.354	0.133*	7.225
BRANCH100	-0.307*	-11.900	-0.154*	-5.444	0.010	0.383	-0.101*	-6.946
MULTIBANKUNITS(TOTAL)	-0.266*	-7.208	-0.265	-6.880	-0.135*	-3.591	-0.215*	-8.768
Δ PROB(MULTIBANKUNITS)	-0.009		-0.005		-0.004		-0.023	
SECTION20SUB	-0.037	-0.904	-0.020	-0.473	-0.344*	-9.119	-0.426*	-29.276
FOREIGNOFFICES	-0.122*	-3.706	0.056	1.656	-0.0894*	-3.181	-0.209*	-15.193
NONBANKASSETS	0.188*	9.237	0.114*	5.482	0.059*	3.067	-0.067*	-5.959
DERIVATIVES	-0.190*	-7.396	-0.114*	-4.455	-0.063*	-2.701	0.163*	8.865
NONBANKINCOME	-0.308*	-14.446	-0.251*	-11.707	-0.196*	-10.408	-0.031*	-2.624
NONBANKACTIVITY(TOTAL)	-0.468*	-7.448	-0.215*	-3.310	-0.633*	-11.216	-0.569*	-19.150
Δ PROB(NONBANKACTIVITY)	-0.014		-0.004		-0.016		-0.054	
COMPLEXITY(TOTAL)	-0.643*	-9.494	-0.344*	-4.755	-0.612*	-9.528	-0.546*	-11.530
Δ PROB(COMPLEXITY)	-0.018		-0.006		-0.015		-0.052	
SIZE & COMPLEXITY(TOTAL)	-2.413*	-31.424	-1.987*	-23.011	-1.840*	-16.542	-0.106	-0.139
Δ PROB(SIZE & COMPLEXITY)	-0.035		-0.019		-0.028		-0.012	
F-TEST SIZE & COMPLEXITY	271.852		191.658		129.334		147.539	
Num. Obs.	9,536		7,254		6,861		6,106	
Adj. R^2	0.533		0.598		0.484		0.614	
Subsample Mean of $Prob_k$	0.039		0.022		0.034		0.136	

* Statistically significant at the 5% level, two-sided

Note: Time dummies, $TIMEDUM_w$, w=2,...,32, included in regressions but not shown here.