# Assessing the Profitability and Riskiness of Small Business Lenders in the Banking Industry

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for

SBA
Office of Advocacy

under contract number SBAHQ-01-R-0005

Release Date: May 2003

# ACKNOWLEDGMENTS

The present report would not have been possible without the generous support of the U.S. Small Business Administration. In this regard, we would like to thank Dr. Charles Ou, Senior Economist, for technical advice and council that have served to enhance the quality and significance of the research. Another important contributor to this research is Dr. Robert Berney, Chief Economist, on leave from Washington State University, who was instrumental in developing the ideas for initiating this research. Mr. Alan Montgomery, a staff member in the Mays Business School at Texas A&M University, provided expert computer assistance throughout the project. Finally, we have benefited from the comments of other members of the Small Business Administration research staff, as well as colleagues across the country.

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# Assessing the Profitability and Riskiness of Small Business Lenders in the Banking Industry

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## *Executive Summary*

Small banks have traditionally been the largest supplier of credit to small business firms in the United States. In recent years there has been concern that changes in the banking industry, including consolidation via mergers and acquisitions, internet banking, and deregulation allowing new combinations of banks and other financial service companies, will adversely affect small banks and associated small business lending.

The importance of the relationship between bank consolidation and small business lending is due to the fact that most small firms cannot access public credit markets and so must rely upon bank credit. In this regard, small firms tend to be higher risk than most other forms of lending, e.g., home loans, business loans to larger firms, auto loans, etc. Banks can overcome this risk barrier to credit by establishing a relationship with small borrowers and thereby obtaining inside or private information that lowers the riskiness of providing credit to small firms. While building relationships with small business firms tends to reduce credit risk for small bank lenders, this specialized lending expertise is not transferable to other forms of bank credit, such as mortgage credit, consumer credit, and agricultural credit. Of course, specialized lenders trade off expertise against diversification in their asset portfolios. According to modern portfolio theory, by investing in different types of loans, the risk of the loan portfolio can be reduced, such that profit per unit risk is increased.

In this paper, which is funded by the U.S. Small Business Administration (contract no. SBAHQ-01-R-0005), we test two alternative research hypotheses concerning how small business lending affects bank profitability per unit risk. The *specialization hypothesis* argues for higher profitability as banks increasingly focus on small business lending, whereas the *diversification hypothesis* asserts that profitability will decrease. Since it is reasonable to believe that bank consolidation will result in larger, more diversified organizations and fewer numbers of small, specialized lenders, evidence in favor of the specialization hypothesis would imply lower credit supplies to small business firms. Alternatively, evidence in favor the diversification hypothesis would imply higher credit supplies from large banks as they grow in the years ahead and, in turn, higher credit supplies for small business firms in the future. If small business lending has no effect on bank profitability, neither of these research hypotheses can be accepted. In this case the implication to small business credit supplies would be neutral, with little or no long-run expected impact of bank consolidation on small business loan volume, all else the same.

To assess the profitability and riskiness of small business lenders in the U.S. banking industry, we conduct a variety of empirical tests. Small business loans are defined to be less than

$250,000, as reported on the Call Reports of Income and Condition. Data is collected for individual banks from Call Reports of Income and Condition for the period 1994-2001. To compare how small business lending differentially affects the financial performance of small and large banks, we group banks according to the following five different asset sizes: (1) less than $100 million (very small), (2) $100-$300 million (small), (3) $300-$500 million (medium), (4) $500 million - $3 billion (large), and (5) greater than $3 billion (very large). Empirical analyses are divided into two parts: (1) univariate and multivariate tests that focus on how small business lending affects banks' rate of return on assets (ROA), and (2) efficient frontier analyses that focus on how small business lending affect banks' rate of return on equity (ROE) and associated capital risk. Our empirical results can be summarized as follows:

- While univariate tests for differences in bank profitability using ROA among banks tend to support the diversification hypotheses, further tests holding various bank risks constant in the multivariate tests generally fail to accept either research hypothesis. An exception to this overall finding is that small business lending did significantly lower the profitability of very small banks under $100 million in size during our sample period. Also, we did find some weak evidence that small business lending lowered the profitability of larger banks in more recent years, which is probably due to the associated economic slowdown. We conclude from these results that for very small banks the specialization hypothesis cannot be accepted and that the diversification hypothesis is accepted. For the other four larger size bank groups neither of these two research hypotheses is supported, as small business lending normally had no effect on bank profitability.

  Additional regression analyses using time series data were performed in which the standard deviation of the return on assets (ROA) was employed as a measure of total risk. This risk measure avoids the potential error of omission inherent in selecting specific risk variables in the cross-sectional regression analyses. In sum, we find that small business lending generally has no effect on bank profitability using ROA as the dependent variable, although marginal negative effects are possible among very small or very large banks in line with the diversification hypothesis. Unlike small business lending, increased large business and real estate lending tended to support the diversification hypothesis, while increased consumer and agricultural lending tended to support the specialization hypothesis.

- Efficient frontiers for different types of specialized lenders are estimated to comparatively examine whether small business lenders are diversified. Specialized lenders are defined as banks in the top decile in the U.S. banking industry for a particular loan area, including small business, large business, real estate, consumer, and agricultural lending. Other samples of balanced lenders and a random sample of lenders are constructed also. Quarterly return on equity (ROE) data is collected from Call Reports for the period 1994-2001. Using a mean-variance optimization program, we compute efficient frontiers and probabilities of failure for each of the six types of lenders by bank size group. In sum, we find that small banks that are specialized small business lenders are well diversified and relatively low risk compared to other types of specialized lenders as well as balanced lenders. Larger banks have sufficient volumes of large business loans to likewise achieve a high level of diversification and lower risk. Surprisingly, large banks over $500 million in assets that specialized in small business loans had the lowest risk and high levels of diversification relative to other loan areas.

Further results indicate that consumer lending is a high return but high risk portfolio strategy for most bank size groups. And, smaller banks tend to have lower failure risk than larger banks. From this evidence, consistent with the cross-sectional univariate and regression analyses, we infer that small business lending tends to lower bank profitability to some degree but that bank risk is commensurately reduced, not only for small banks but for large banks also. Therefore, we conclude that these results support the specialization hypothesis, as small business lenders had higher equity rates of returns per unit risk that balanced banks. Also, the low probabilities of failure among small business lenders suggests that the benefits of specialization outweigh potential costs.

Are small business lenders more profitable than other banks? Our results appear to be dependent on the definition of profit employed. Using the rate of return on assets as the profit measure, we conclude that there is no effect after taking into account bank risk, which means that neither the specialization and diversification hypotheses hold. Some evidence was found in favor of the diversification hypothesis among very small banks. However, using efficient frontier analyses that focus on the rate of return on equity, we do find that small business lenders reap benefits from specialization, particularly in terms of reducing failure risk. One way to interpret these findings is that small business lending normally does not have a negative effect on bank profitability – either neutral or positive effects are the norm. If larger, more diversified organizations are the future of the banking industry, small business lending can play a positive role in terms of contributing to diversification and the reduction of bank failure risk. As such, despite the on-going consolidation movement in the U.S. banking industry, banks likely will continue to play a central role in the provision of small business credit.

# I. Introduction

Small banks have traditionally been the largest supplier of credit to small business firms in the United States [see Kolari and Zardkoohi (1986, 1997) and Jayaratne and Wolken (1999)]. In recent years there has been concern that changes in the banking industry, including consolidation via mergers and acquisitions, internet banking, and deregulation allowing new combinations of banks and other financial service companies, will adversely affect small banks and associated small business lending [e.g., see Berger and Udell (1995), Peek and Rosengren (1998), Ely and Robinson (2001), and Keeton (2001)]. Recognizing these trends, in 1993 the four bank regulatory agencies made changes in supervisory policy to allow banks to place greater weight on "character" (as opposed to financial strength based on accounting statements) when making loans to small business firms [see Hooks and Opler (1994)].

However, other research has found no reason to believe that small business credit would be affected by banking consolidation. Strahan and Weston (1997) reported evidence that consolidation among small banks leads to an increase in small business lending. Berger, Saunders, Scalise, and Udell (1997) reported similar findings in response to small bank mergers. Also, they found that small business lending may increase as bank size and complexity increases. These results contradict concerns that small business firms would not be able to access credit from large banking institutions; indeed, they surmised that small business credit supplies could increase in response to banking deregulation due to greater lending per dollar of assets in the banking industry. Other work by Jayaratne and Wolken (1999) reported that small business firms did not have greater access to credit in areas with many small banks. Moreover, Craig and João Cabral dos Santos (1998) did not find any clear relationship between small business lending and mergers and acquisitions in the banking industry. In sum, studies are mixed on the question

of whether small business firms will experience problems in obtaining adequate credit supplies from banks in the future.

The importance of the relationship between bank consolidation and small business lending rests in the fact that most small firms rely upon bank credit due to the lack of access to public credit markets through debt issues. In this regard, small firms tend to be higher risk than most other forms of lending, e.g., home loans, business loans to larger firms, auto loans, etc. Banks can overcome this risk barrier to credit by establishing a relationship with small borrowers and thereby obtaining inside or private information that lowers the riskiness of providing credit to small firms [see Petersen and Rajan (1994) and Berger and Udell (1995)]. While building relationships with small business firms tends to reduce credit risk for small bank lenders, this specialized lending expertise is not transferable to other forms of bank credit, such as mortgage credit, consumer credit, and agricultural credit. Due to the lack of substitutable labor (i.e., managerial) inputs and loan information inputs across different areas of lending, many banks specialize in selected types of credit. Of course, specialized lenders trade off expertise against diversification in their asset portfolios. According to modern portfolio theory, by investing in different types of loans, the risk of the loan portfolio can be reduced, such that profit per unit risk is increased.

In this paper we test two alternative research hypotheses concerning how small business lending affects bank profitability per unit risk. The *specialization hypothesis* argues for higher profitability as banks increasingly focus on small business lending, whereas the *diversification hypothesis* asserts that profitability will decrease. Since it is reasonable to believe that bank consolidation will result in larger, more diversified organizations and fewer numbers of small, specialized lenders [see Samolyk (1994)], evidence in favor of the specialization hypothesis

would imply lower credit supplies to small business firms. Alternatively, evidence in favor of the diversification hypothesis would imply higher credit supplies from large banks as they grow in the years ahead and, in turn, higher credit supplies for small business firms in the future. If small business lending has no effect on bank profitability, neither of these research hypotheses can be accepted. In this case the implication to small business credit supplies would be neutral, with little or no long-run expected impact of bank consolidation on small business loan volume, all else the same.

To assess the profitability and riskiness of small business lenders in the U.S. banking industry, we conduct a variety of empirical tests. Small business loans are defined to be less than $250,000, as reported on the Call Reports of Income and Condition. Data is collected for individual banks from Call Reports for the period 1994-2001. To compare how small business lending differentially affects the financial performance of small and large banks, we group banks according to the following five different asset sizes: (1) less than $100 million (very small), (2) $100-$300 million (small), (3) $300-$500 million (medium), (4) $500 million - $3 billion (large), and (5) greater than $3 billion (very large). Empirical analyses are divided into two parts: (1) univariate and multivariate tests that focus on how small business lending affects banks' rate of return on assets (ROA), and (2) efficient frontier analyses that focus on how small business lending affect banks' rate of return on equity (ROE) and associated capital risk. Multivariate tests are comprised of both cross-sectional and time series regression analyses. Efficient frontiers are estimated for different types of specialized lenders to comparatively examine whether small business lenders are diversified. Specialized lenders are defined as banks in the top decile in the U.S. banking industry for a particular loan area, including small business, large business, real estate, consumer, and agricultural lending. Other samples of balanced

lenders and a random sample of lenders are constructed also. Quarterly return on equity data is collected from Call Reports for the period 1994-2001. Using a mean-variance optimization program, we compute efficient frontiers and probabilities of failure for each of the six types of lenders by bank size group.

In sum, our empirical results indicate that the effect of small business on bank profitability depends on the definition of profit. If the rate of return on assets is used, after taking into account bank risk, there is generally no profit effect or a possible negative effect among small banks. Using the rate of return on equity, a positive profit effect is found due to lowering of failure risk. We conclude that small business lending normally has neutral or positive effects on bank profitability. As such, it is likely that on-going consolidation in the banking industry will have little or no effect on the provision of credit to the small business sector.

The next section overviews related empirical and theoretical literature. Section III describes our research methodology, including data and empirical models. Section IV reports and discusses our empirical results. Section V gives the summary and conclusion.

## II. Related Literature

Small business loans are no doubt riskier than large business loans due to the greater likelihood that small firms will fail and subsequently default on their outstanding debt. Banks can mitigate this higher loan risk and earn fair profits by forming relationships with small business firms that enable them to closely monitor small firm borrowers and flexibly renegotiate contractual terms as needed to increase payment probabilities [see Berlin (1994)]. For these reasons banks will tend to specialize in a particular credit area to take advantage of management expertise. Alternatively, in order to reduce risk and thereby increase the profitability of small business lending, banks can diversify into other loan areas. In this way losses in one area of

lending can be offset by gains in other areas, which tends to smooth profits and reduce risk. We next review selected empirical studies that have attempted to examine how specializing in small business loans affects bank profitability. We also review relevant theoretical studies.

## A. Empirical Studies

Kimball (1997) has compared small banks specializing in small business loans less than $100,000 with a matched sample of small banks with low levels of small business lending. Most of these banks were located in small towns with populations less than 15,000. Small business lending banks had 40 percent or more of their assets in small business loans as of both June 1995 and June 1996. Semi-annual comparisons for the period December 1991 to June 1996 of the two bank groups' asset portfolios, liability structures, revenues and expenses, profit rates, standard deviation of profit rates, and probabilities of insolvency were reported. Relative to the control group of diversified small banks, specialized small business lenders tended to have higher pre-tax returns and higher volatility of these returns, higher levels of non-interest expense and provisions for loan losses, higher growth rates, lower capital to asset ratios, higher proportions of local deposits to total liabilities, and higher probabilities of insolvency in most periods.

Another study by Kolari, Berney, and Ou (1997) compared small business lending banks' profitability and risk to other banks based on June 1994 and June 1995 accounting data. All insured U.S. banks were stratified into deciles by the proportion of total assets devoted to small business loans less than $250,000. Banks were further grouped according to asset size: less than $100 million, $100-$300 million, $300-$500 million, $500 billion-$3 billion, and greater than $3 billion. Univariate t-tests and multiple regression analyses showed that small business loans tended to increase bank profitability even after adjusting for risk. This result was robust to alternative profit measures, including the return on assets, net interest margin, net interest margin

adjusted for loan and lease losses, and return on equity. Also, small business lenders tended to have higher risk in terms of credit risk, capital risk, liquidity risk, and funding risk compared to banks with little or no small business lending. The multivariate analyses revealed that, holding risk factors constant, small business lending either had a neutral or positive effect on small banks' profitability.

Previous work by Liang and Savage (1990) examined specialized nonbank lenders in bank holding companies, including commercial finance, mortgage banking, consumer finance, and leasing. These specialized lenders tended to have higher but more variable return on assets (ROA) and higher capital ratios than their more diversified bank counterparts. Also, using ROA and its variability, in addition to the equity to assets ratio, the authors estimated probabilities of insolvency and found that nonbank specialized lenders had higher failure chances than diversified bank lenders.

Related work by Eisenbeis and Kwast (1991) compared different types of specialized bank lenders in the area of real estate (i.e., low-risk residential mortgages, high-risk commercial real estate, and very risky real estate development) to a control group of diversified banks. Banks were required to have at least 40 percent of their assets in real estate loans in at least one year between 1978 and 1988 to be included in the sample. They found that specialized real estate lenders tended to have higher proportions of loans to assets, lower loan losses, high non-interest expenses, and a lower probability of insolvency than more diversified banks. These results favor the specialization hypothesis.

Another study by Laderman, Schmidt, and Zimmerman (1991) found that asset diversification of agricultural and nonagricultural lenders increased after statewide branching was permitted. They concluded that intrastate branching enabled banks to spread asset risks and

thereby reduce the probability of failure in the banking industry. Consistent with Laderman et al., work by Hughes, Lang, Mester, and Moon (1996) indicated that an increase in geographic expansion by bank holding companies tended to lower failure risk (or increase aggregate bank safety).

Other studies on specialized lenders by Sinkey and Nash (1993, 1996) examined credit card banks from the mid-1980s to the mid-1990s. These banks held at least 75 percent of assets in credit card loans. When compared to a control group of diversified banks, the results closely paralleled those of Liang and Savage in support of the diversification hypothesis.

A recent study by Acharya, Hasan, and Saunders (2002) examined how specialization versus diversification affected the return and risk of 105 Italian banks in the period 1993-1999. The authors collected data on individual bank loan exposures to 23 different industries, six economic sectors (e.g., households, nonfinancial corporations, etc.), and three geographical regions (i.e., Italy, European Union, and other countries). Diversification was measured using a Hirschman-Herfindahl Index (HHI) computed as the sum of squared loans in a category divided by total loans for all categories. Returns are measured as the return on assets and return on equity, both computed from balance sheet data, as well as the annual stock return and market model residual return after taking into account beta risk with respect to the overall Italian stock market. Risk was measured as doubtful and nonperforming loans/total assets, the standard deviation of this ratio, and the standard deviation of annual stock returns. Control variables were asset size, equity capital ratio, number of branch offices/total assets, and number of employees/total assets. In general, consistent with the specialization hypothesis, they found that bank return was lower and risk was higher among banks with higher industrial loan diversification than other banks. This negative diversification effect was greater among high risk

banks. Sectoral diversification was only negative among high risk banks. And, geographical diversification did increase returns among low risk banks. The authors concluded that there appears to be diseconomies of diversification for some banks. They also observed that their findings are consistent with DeLong (2001), who found that focusing mergers in terms of financial activities and geography tended to improve economic performance more than diversifying mergers.

Thus, the empirical evidence is mixed with regard to whether or not specialized lenders are riskier than more diversified lenders. While specialized lenders tend to be relatively more aggressive, it is not clear that their returns per unit risk are higher than diversified bank lenders. Given that diversification is a risk-reducing concept in modern portfolio theory, the low risk of some specialized lenders, such as real estate lenders in the Eisenbeis and Kwast study and small business lenders in some periods in the Kimball study, remains a puzzle. Also, the higher profitability of small business lenders after controlling for risk factors in Kolari, Berney, and Ou is similarly inconsistent with portfolio theory.

## B. Theoretical Studies

There are a number of motivations for banks to diversify (or not specialize). As observed by Klein and Saidenberg (1997), agency theory posits that managers can be expected to diversify to increase job their security, compensation, corporate control, or empire [e.g., see Amihud (1981) and Born, Eisenbeis, and Harris (1988)]. Also, an economic motivation is that product and market diversification should help to reduce firm-specific risk of failure [(e.g., see Saunders, Strock, and Travlos (1990)]. However, this motivation is mitigated to some degree by the separation principle that shareholders can reproduce bank level diversification by purchasing shares in different kinds of banks. In our opinion a countervailing force in the banking industry

that diminishes the application of the separation principle is regulatory pressure to decrease failure risk. Capital requirements and supervisory procedures in banking are intended to lower failure risk. Finally, diversification may well yield economies of scope from offering a diverse array of financial services that lower operating costs and attract customers.

Recent theoretical work by Winton (1999) has sought to re-examine the debate concerning whether banks should diversify or specialize their lending activities. It is well known that diversification tends to reduce the chance of bank failure due to the reduction in variance of loan returns. However, according to Winton, there are several potential problems inherent in diversification. First, given the bank has limited human resources, diversification means that credit is provided in economic and geographic areas outside the bank's home base. This expanded lending responsibility can diminish the quality of loan monitoring. Since delegated monitoring is central to the existence of banks and makes them "special" relative to other lenders by virtue of their access to private (inside) information about borrowing firms [see Diamond, (1984), Fama (1980, 1985), Sharpe (1990), Rajan (1992), and others), weaker monitoring in diversified banks could be a critical factor affecting loan portfolio quality. Second, the bank likely will lend in areas that have a high downside risk to sector or geographic downturns. An implication of this problem is that diversification is most beneficial among banks with only moderate downside risk. Third, diversification may require increased size and added management to handle the broader risk exposure of the bank. On the other hand, specialization allows the bank to focus loans in its areas of expertise, thereby contributing to more effective loan monitoring.

Winton further argued that increasing competition in the banking industry should favor increased specialization. Contrary to the conventional wisdom that, given low profit margins,

the best strategy is to reduce risk via diversification, his analyses suggest specialization is an attractive lending strategy due to "winner's curse" problems (i.e., banks entering markets with established banks face increased adverse selection difficulties as well as expert local monitoring of credit risk). In his words, "Loan monitoring improves returns not only by increasing best-case outcomes but by reducing the frequency and severity of worst-case outcomes … diversification that lessens monitoring effectiveness may *increase* the frequency and severity of worst-case outcomes, increasing failure probability …" (Winton, 1999, p. 3). He inferred that diversified banks likely require higher capital levels to absorb potentially higher credit losses than specialized banks. Also, he recommended that future empirical studies should consider the impact of diversification and specialization on loan return distributions.

# III. Research Methodology

We seek to examine how bank specialization in small business lending affects bank profits per unit risk. As discussed in the previous section, there are two opposing views in this regard. The specialization hypothesis implies increasing profits per unit risk attributable to small business lending. The benefits of specialization include management expertise, high quality monitoring of borrowers, and minimization of diseconomies of scope that raises operating costs. On the other hand, the diversification hypothesis implies decreasing profits per unit risk from specialization. Modern portfolio theory would predict that a diversified loan portfolio reaps the benefit of reduced risk and, holding profit constant, offers a higher profit per unit risk. Which of these two hypotheses is supported in the case of small business lending? In this section we describe a variety of empirical tests that seek to answer this question.

Small business lending is defined here as all commercial loans under $250,000. Because there is a strong correlation between business size and loan size, we believe that loans under

$250,000 are most representative of small business loans (i.e., loans under $1,000,000 would no doubt contain many loans made to large firms, and loans under $100,000 would not capture larger loans to small business firms).

Our analyses are divided into two parts. The first part employs numerous measures of bank profits and risk to allow a comprehensive cross-sectional and time series evaluation of the effects of small business lending on bank performance during the period 1994-2001. Here we seek to extend previous work by Kolari, Berney, and Ou (1997), who reported univariate and multivariate analyses of U.S. commercial banks for the years 1994 and 1995. Like Kolari et al., data are collected from the June Call Reports of Income and Condition for all insured U.S. commercial banks (i.e., only the mid-year report contains data on the outstanding small business loans held by banks). However, in this study we expand the analyses to data covering the period 1994-2001, which will enable us to gain insight into the long-run relationship between small business lending and bank profit. Also, unlike their study, we report analyses of the time series relationship between these two focal variables using quarterly data during our expanded sample period.

## A. Univariate and Regression Analyses.

Table 1-1 defines the dependent and independent variables, which replicate those in Kolari et al., with the exception of DIVERS. All data are deflated to 1994 dollars using the urban Consumer Price Index (CPI-U). Also, all figures are domestic to exclude U.S. bank activities in foreign countries.

Univariate t-tests compare the means of different financial ratios for banks with high ratios of small business lending to total assets-- e.g., top decile, deciles eight or nine, and deciles eight to ten -- to banks with low ratios of small business lending to total assets -- e.g., bottom

decile, deciles two and three, and deciles one to three, respectively. Since the relationship between small business lending and bank profit and risk measures can differ across size groups (e.g., small banks emphasize relationship lending, while large banks make greater use of arms-length lending via credit scoring), we break down the analyses by bank asset size as follows: (1) less than $100 million (very small), (2) $100-$300 million (small), (3) $300-$500 million (medium), (4) $500 million - $3 billion (large), and (5) greater than $3 billion (very large). We next discuss each of the variables in Table 1-1.

The rate of return on assets (ROA) is the most commonly used measure of profit in the banking industry. ROA is the "bottom line" and shows how profitably bank management has utilized each dollar of assets under its control. Profit in the present context is net income after taxes, including gains and losses on securities and other extraordinary items. Another measure of profit is the net interest margin (NIM). NIM indicates the average "spread" between interest earnings and interest expenses per dollar of total assets. Banks price their spread to reflect risk. Higher risk loans (for example) have higher spreads than lower risk loans to compensate for higher loan losses and higher operating costs on riskier loans.

The last profit ratio is the rate of return on equity (ROE). This measure is most relevant to shareholders, who are concerned about the profitability of their investment (per unit risk) in the bank. Holding ROA constant, ROE can be increased by using more debt to finance bank assets and thereby lowering equity capital, which is known as *financial leverage*. Of course, financial leverage also increases the failure risk of the bank, as the equity cushion to absorb unexpected losses is reduced. Thus, financial leverage involves a trade off between ROE and risk, all else the same.

The risk measures in the present study reflect different dimensions of the on- and off-balance sheet risk of banks. All the measures will be calculated per dollar of total assets. Loan and lease losses net of recoveries to total assets (LOSS) is the most often cited indicator of bank risk. Since most banks obtain most of their earnings from the loan portfolio, controlling *credit risk* is critical to survival and profitability.

Total equity capital to total assets (EQUITY), referred to as a measure of overall leverage by regulators, represents the ownership stake of shareholders in the bank. As mentioned above, equity is a key risk measure because it serves as a cushion to absorb unexpected losses. If bank equity falls close to zero, federal regulators can close the institution. Clearly, higher equity ratios reduce perceived bank *capital* risk.

Over the last decade, the ratio of off-balance sheet activities to total assets (OFFBAL) has dramatically increased in the banking industry, especially among multi-billion dollar banks. These off-balance sheet services (as well as others) enable banks to earn service revenue and enhance their relationships with clients. However, while they help reduce clients' risks, they increase the *off-balance sheet risk* exposure of the bank.

The next risk measure is inversely related to risk -- namely, the ratio of total securities to total assets (SECURITIES). By definition, increasing the securities ratio decreases the ratio of total loans to assets and thereby reduces bank *liquidity risk* (i.e., securities act as a secondary reserve for meeting liquidity needs of banks).

The extent to which banks use purchased funds as a proportion of total assets (PURCHASED) is another measure of risk. Deregulation of interest rates on deposits has increased the use of purchased funds by banks and, consequently, their ability to change their *funding risk*.

Three additional variables are included as control measures in the multivariate regression analyses -- that is, market structure (or market risk), bank size, and loan portfolio diversification. Market structure is proxied by the well-known Herfindahl index (HHI). Regarding the latter variable, HHI is the sum of squared ratios of the total assets of the ith bank to the aggregate total assets of all banks in the SMSA for urban areas or county for other areas. Bank size is simply measured by total assets (ASSETS). Finally, our diversification (DIVERS) measure is the HHI of the loan portfolio (i.e., the sum of squared ratios of a loan category/total loans for business loans, real estate loans, consumer loans, and agricultural loans). It is important to hold constant loan diversification to focus on how small business lending per se affects bank profit.

Most important to this part of the proposed study, small business lending activity is calculated as the ratio of small commercial and industrial and commercial real estate loans less than $250,000 to total assets (SMALLBUS). Generally speaking, it is reasonable to believe that individual small business loans are riskier than loans to larger firms. Smaller firms are less well diversified, have less access to capital and liquidity, and have more limited management resources than larger firms. Of course, the problem for banks is to price the spread (above funding costs) on small business loans fairly to reflect their incremental risk and costs. In the proposed study we will examine the relationship of small business lending to the aforementioned profit and risk variables.

For comparative purposes we also conduct analyses of specialized lending in large business lending, real estate lending, consumer lending, and agricultural lending. The rationale for examining other loan categories is to determine if small business lending affects bank profitability differently from other lending specializations. The bottom of Table 1-1 gives the definitions of these loan specializations.

One drawback of the univariate analyses of bank profitability is that risk is not held constant. To hold risk constant we estimate multiple regression models of the following form:

$$ROA = f(SMALLBUS, \text{risk variables}, \text{control variables}). \quad (1)$$

Cross-sectional analyses are run for each year from 1994 to 2001 and for each bank asset size group. We chose ROA due its widespread usage as a measure of management performance. ROE is an alternative profit measure but is directly affected by the capital levels of banks. If small business lenders hold higher equity capital than other banks, the results would be biased in favor of finding lower profitability for small business lenders per the diversification hypothesis.

While cross-sectional analyses on an annual basis for the sample period provides some temporal perspective on how small business lending has affected bank profitability, we more fully examine the long-run relationship between our focal variables by utilizing time series regression models. These models take the following general form:

$$\text{Mean } ROA_t = f(\text{Mean } SMALLBUS_t, \text{Standard deviation of } ROA_t), \quad (2)$$

where the dependent variable is the mean ROA for banks in a particular size group, the independent variables are the mean small business lending (SMALLBUS) and standard deviation of ROA and for banks in a particular size group, and all data are computed quarterly from 1994 to 2001 (n = 32). Because SMALLBUS is only available in June of each year (n = 8), we ran one regression equation with annual SMALLBUS data and another equation with spline fitted quarterly values of SMALLBUS (n = 32), or ESTMEAN(SBL). If the two models yield similar results, we will infer that the small sample bias in the former model was less serious than otherwise.

Another source of bias in the time series regressions could be collinearity between mean small business lending and the standard deviation of ROA for individual banks. As banks

increase their specialization in small business loans, it is reasonable to believe that their lending risk would increase, thereby increasing SIGMA(ROA). To control for this endogeneity, we also ran two-stage least squares of the regression models discussed above. In the first-stage mean small business loans are regressed on SIGMA(ROA), where the residual represents small business lending not associated with bank risk, or RESIDUAL(SBL). In the second stage RESIDUAL(SBL) and SIGMA(ROA) are regressed on mean ROA for each bank, wherein the former two variables are orthogonal to one another with no collinearity. This two-stage procedure enables a clearer test of how small business lending affects bank profitability over time.

## B. Efficient Frontier Tests of Loan Specialization and Bank Risk.

The second part of our analyses extends previous studies of specialized lenders in banking by employing modern portfolio analysis methods to assess the riskiness and profitability of banks specializing in small business lending to other banks specializing in large business, real estate, agriculture, and consumer loans. A mean-variance optimization procedure is used to estimate the efficient frontier for bank loan portfolios. Rather than using banks' stock rates of return, due to the lack of stock price data for most banks (with the exception of multi-billion dollar banks), we use quarterly rates of return on equity from balance sheet and income statement data for various specialized lenders during the sample period 1994-2001. Specialized lenders are banks in the top decile among all insured U.S. banks in a particular lending area, including small business, large business, real estate, consumer, and agricultural loans (see Table 1-1). In larger bank asset size groups we relaxed this constraint to include banks in deciles six to nine in order to gather sufficient observations for a particular type of specialized lender (as discussed in the empirical results section). Additionally, a group of diversified banks with a balanced loan

portfolio was added to the analyses. These banks were in deciles four to six in all loan areas for a given year. While they are diversified in terms of their loan portfolio, it is possible that they are less diversified overall than a particular type of specialized lender, who could take advantage of geographic diversification or diversification within a loan category to reduce risk. The balanced lender group enables us to determine if the source of diversification benefits to specialized lenders is attributable to loan diversification versus geographic or other means of diversification. Finally, a random sample (n = 75) of banks for each size group is selected. Like the balanced lenders, this bank group is a control group against which to compare other specialized lenders.

Earlier work by Blair and Heggestad (1978) developed a portfolio theory of bank investment. They assumed that banks purchase a portfolio of assets with known (subjective) probability distributions, seek to maximize the expected utility of uncertain profits, are risk-averse, do not have riskless assets available due to interest rate risk, and fail when losses on assets exceed capital. From Chebychev's theorem, the probability of uncertain asset earnings (X) for a bank falling below its capital (C) is at most equal to the probability of X being less than k standard deviations from E(X). More specifically,

$$\Pr\{X < [E(X) - k\,\sigma]\} \leq 1/k^2. \qquad (3)$$

Re-writing equation (3) in terms of the rate of return on equity capital [see Koehn and Santomero (1980)],

$$\Pr\{X/C < [E(X)/C - k\,\sigma/C]\} \leq 1/k^2. \qquad (4)$$

Since at bankruptcy $-X = -C$ (or $(C - X = 0$ net worth), $-C = E(X) - k\,\sigma$. Dividing by C and solving for k, $k = [E(X)/C + 1]/(\sigma/C)$. Substituting k into equation (4),

$$\Pr[E(X)/C < -1] \leq (\sigma/C)^2/[E(X)/C + 1]^2, \qquad (5)$$

which implies that the probability of bankruptcy is higher per unit of capital the lower the level of expected asset earnings and the larger the variability of such earnings [see also Haubrich (1998)].

Figure 1 illustrates the efficient frontier of risky assets available to the small banks. The point D represents a diversified bank, whereas points SBL, LBL, RE, AG, and CS represent banks specializing in small business loans, large business loans, real estate loans, agricultural loans, and consumer loans, respectively. The efficient frontier is based on optimal weighted average combinations of the specialized banks. Samples of diversified banks (i.e., the balanced bank and random sample bank groups) will be added to the analyses to examine their location in risk and return space. The slope of lines A and B equals the square root of the reciprocal of the probability of bank failure in equation (5). The lower the slope of this line, the higher the probability of bank failure would be. At least in theory, specialized banks should have lower slopes than diversified banks, as depicted in Figure 1. However, empirical evidence is needed to determine if this theoretical relationship holds in practice. As discussed in the previous section, some evidence exists in the empirical literature for specialized lenders earning higher returns per unit risk than diversified lenders in the banking industry.

To our knowledge, no other studies have pursued the above analyses with mean-variance optimization methods that solve for the efficient frontier. Hughes, Lang, Mester, and Moon (1996) take a theoretical approach similar to Figure 1, but rather than estimating the efficient frontier, they estimate a best-practice, risk-return frontier for bank equity via maximum-likelihood regression techniques. Subsequently, they compare the expected equity return, efficiency, and safety of banking organizations by regressing these measures on different variables that proxy geographic diversification. We propose to compute the efficient frontier for

banks in different size groups and then evaluate the diversification of each specialized lender by comparing their probability of failure to that obtained for a hypothetical bank with equal expected rate of return. To do this we simply compare the specialized lender in risk-return space to a bank located on the efficient frontier with equal expected rate of return on equity. According to modern portfolio theory, diversification does not affect profit rates; instead, it reduces the risk per unit profit of a lender (or investor). Our portfolio analyses enable comparisons between different types of specialized and diversified lenders. In this way we can assess the extent to which small business lenders are diversified relative to other specialized lenders. Data inputs for the computation of the efficient frontiers for each of the five bank asset size groups are the mean quarterly rates of return on equity from 1994 to 2000 (n = 32) for each of six categories of lenders (i.e., small business, large business, real estate, consumer, agricultural, and diversified lenders).

# IV. Empirical Results

## A. Univariate and Regression Analyses

***Cross-sectional univariate results.*** Tables 2-1 to 2-9 report the univariate tests of how small business lending affects banks' profit and risk measures. Results are broken down by the decile grouping of banks in terms of small business lending (i.e., banks in decile 10 make the most small business loans as a proportion of total assets in the banking industry). Also, results are averaged over the sample period 1994-2001.

Casual inspection of Table 2-1 suggests that the average bank rates of return on assets (ROA) decline as small business lending increases. T-tests for mean differences between decile groupings of banks demonstrate that this relationship is highly significant (at the one percent level) in most cases across the five bank size groups and overall for all banks. This relationship

is less evident for the net interest margin (NIM) profit measure. As shown in Table 2-2, for very small and small banks NIM significantly increases as small business lending increases, but the opposite relationship is found for medium, large, and very large banks. In Table 2-3 the results for ROE confirm the ROA findings – that is, especially for very small banks, small business lending tends to lower bank profitability. Because these tests do not control for differences in bank risk, no definitive inferences about how small business lending affect bank profitability can be made at this point.

Table 2-4 gives the mean small business lending for each decile and bank size group. It is interesting to observe that banks in the highest decile devoted about 20 percent of their total assets to small business lending. This result was true for all bank size groups. Other percentage holdings of small business loans for each decile are similar across bank size groups. Thus, we infer that, contrary to the common argument that small businesses are forced to rely on small banks for their credit needs, large banks play an important role in the provision of credit to the small business sector.

Tables 2-5 to 2-9 summarize the findings for the risk variables. In brief, they reveal that very small banks specializing in small business loans experience significantly (at the one percent level) higher loan losses than other banks. This finding likely explains their lower ROA and ROE profit performance despite higher NIMs (or interest rate earnings). These results run counter to the theoretical notion that specialized lenders will have lower credit risk due to management expertise and higher quality credit monitoring. Larger banks tended to have lower loan losses as small business lending increased. This trend could be due to their greater use of credit scoring to select only borrowers with higher probabilities of loan repayment. Nonetheless, this lower loss rate among large, specialized small business lenders did not translate into higher

ROA profitability (as discussed above). Given that their net interest earnings were lower as small business lending increased, these results imply that small business lending was associated with lower ROA profitability for large banks due to low interest margins, rather than high loan losses.

Table 2-7 reports differences in the degree of diversification (DIVERS) among banks with different exposures to small business lending and asset size. Again, DIVERS is a HHI measure of loan portfolio concentration in business, real estate, consumer, and agricultural loans. The higher the DIVERS index, the less diversified (or more concentrated) the loan portfolio. Among the very small and small banks, loan diversification significantly (at the one percent level) decreases as small business lending increases, which is likely due to the increasing concentration of such loans. For larger banks an opposite pattern occurs, as the DIVERS index tends to decrease as small business lending increases, particularly for large and very large billion dollar banks. For these banks it appears that small business lending enhances their loan diversification. The significant t statistics (i.e., most at the one percent level) confirm this benefit for large banks.

Tables 2-8 to 2-10 give the univariate results for the securities, off-balance sheet assets, and purchased funds as a proportion of total assets, respectively. Very small, small, and medium sized banks tend to have significantly (at least at the five percent level) lower securities ratios as their small business lending increases. This trend means that small business credit supplies are funded in part by lowered asset liquidity. Of course, small business loans earn much higher rates of returns than most securities held by banks, which are mainly federal and state debt instruments. For large and very large banks there is no clear relationship between small business lending and securities investments. Hence, large banks fund small firm credit by other means

than using asset financing. This result is not surprising due to the fact that large banks typically utilize liability management to fund the asset side of their balance sheets.

According to the results in Table 2-9, it is interesting that all size banks have significantly (at the one percent level in most cases) lower off-balance sheet exposures as small business lending increases. It is likely that banks with large off-balance sheet activities are more wholesale market-oriented than other retail market-oriented banks with greater investments in small business loans. Table 2-10 shows that large and very large banks have significantly (at least at the five percent level) lower levels of purchased funds as small business lending increases. This trend is consistent with the more retail-oriented nature of small business lenders. An exception is the very smallest banks under $100 million in assets. As small business lending increases, purchased funds increase also. Since all very small banks are retail in orientation, this result means that these banks not only fund increased small business lending using asset liquidity (i.e., lower securities ratios as discussed above) but increased purchased funds. Thus, very small banks use both asset and liability management approaches of meeting local demand for small business credit by firms in their communities.

***Cross-sectional regression results***. Tables 3-1 to 3-8 report the multivariate regression findings for the years 1994 to 2001, respectively. Results are given for each of the five asset size groups in each year. About one-half of the adjusted $R^2$ values exceed 20 percent, with some values exceeding 50 percent. With the exception of only two out of 40 models, the overall F statistics are highly significant (at the one percent level). We infer that goodness of fit is fairly good in the multivariate regression models.

Focusing on the small business loans/total asset variable, small business lending significantly (at least at the five percent level) lowered ROA profitability for very small banks

under $100 million in assets in all years from 1994 to 1998. After controlling for bank risk, size, market concentration, and diversification, small business lending had no effect on bank profitability for other bank size groups. For other bank sizes the estimated coefficient for the small business loan variable is mixed in sign and insignificant in these years. This trend for very small banks continued in 1999 and 2001; however, in 1999 and 2000 medium sized banks and in 2001 large banks also exhibited significantly (at least at the five percent level) lower profitability as small business lending increased. Thus, we infer that, while small business lending only negatively affected very small banks during most of the 1990s, it occasionally had an adverse impact on larger banks' profitability in more recent years. This trend probably is associated with the economic slowdown over the past few years.

The results for other variables in the regression models are peripheral to the purpose of the present study but offer some insights into the determinants of bank profitability. The most consistently significant (at least at the 10 percent level) variables that tend to increase bank profits are lower loan losses, higher off-balance sheet activities, and higher equity capital. While the results for the former two variables are not surprising, the higher profitability of banks with greater capital levels runs counter the common intuition that banks lower equity ratios have lower costs of capital and, in turn, higher profitability. Apparently, higher profit banks have the earnings to build up their capital levels. Another variable worth mentioning is significantly higher profits associated with increased specialization (i.e., higher DIVERS values) from 1994 to 1997 and again in 2001. However, in the years 1998, 1999, and 2000 loan specialization significantly decreased profitability for a number of bank size groups. These results suggest that there is no clear relationship between diversification and bank profitability during the sample period. Finally, HHI is significant in most years for very small and small banks. Higher banking

market concentration tended to increase bank profitability, which could be explained by possibly lower competition in markets dominated by a relatively few large banks.

In general, holding risk and control variables constant, the cross-sectional regression results indicate that small business lending has no effect on bank profitability. One exception is that profitability was significantly lower among very small banks as small business lending increased. Also, there is weak evidence that larger banks have experienced some reduction in profitability due to small business lending in recent years in response to the economic slowdown. Thus, for very small banks the results do not support the specialization hypothesis and favor the diversification hypothesis, which would predict lowered profitability from loan specialization. For large banks neither of the research hypotheses is supported, as small business lending normally had no effect on bank profitability.

***Time series regression results***. Tables 4-1 to 4-4 show the single equation regression results with mean ROA for each bank size group as the dependent variable and SIGMA(ROA), the one-year Treasury bill rate of interest (TBILL), and mean small business lending, or MEAN(SBL), as the independent variables. Quarterly Call Report data are used for the period 1994-2001; however, MEAN(SBL) is a mid-year figure. Due to the small sample size for MEAN(SBL), as discussed previously, these regression models are rerun with spline fitted quarterly estimates of mean small business lending for each bank size group, or ESTMEAN(SBL). Tables 4-5 and 4-6 contain the spline fitted small business lending results. In all cases Durbin-Watson tests indicated that serial correlation was insignificant in these regression models.

Table 4-1 demonstrates that SIGMA(ROA) is a good proxy for bank risk in the time series regression models. The adjusted $R^2$ values are around 20 percent for very small and small

banks but as high as 62 percent for medium sized banks and 69 percent for very large multi-billion dollar banks. Thus, as size increases, mean ROAs of banks are more closely related to the volatility of ROAs. The strength of this relationship is consistent with financial theory – namely, higher expected profits are required as compensation for higher total risk. Relevant to the present research, because this risk measure captures all bank risks, it avoids the potential error of omission in the previous cross-sectional regression analyses.

Table 4-2 adds TBILL to the regression model but in most cases the adjusted $R^2$ values decrease and in no models is this variable significant. This variable was added in an effort to control for changes in banks' ROA due to interest rate levels. It is well known that interest rates are a factor in explaining bank stock returns. While the financial market may well incorporate interest rates into assessments of bank stock performance, it does not appear that it is important to banks' accounting profits as measured by ROA.

Table 4-3 presents the findings for MEAN(SBL). Here we see that small business lending significantly decreases bank profitability for very small and very large banks. For other bank size groups the estimated regression coefficient for MEAN(SBL) is negative but not significant. We infer from these findings that small business lending tends to have a negative influence on bank profitability and that the magnitude of this adverse impact can be large at times. These results were unchanged by adding TBILL to the equation (see Table 4-4). However, when quarterly spline fitted values of mean small business lending are used instead of mid-year values, as shown in Tables 4-5 and 4-6, ESTMEAN(SBL) has a negative estimated coefficient in all except the medium bank size group but none of these estimates is significant. Thus, small business lending tends to decrease bank profitability but not significantly from a

statistical standpoint. These results are consistent for the most part with the cross-sectional regression findings.

One problem in the above analyses is that small business lending is highly correlated with the standard deviation of ROA, or SIGMA(ROA). The estimated correlation coefficients for MEAN(SBL) with ESTMEAN(SBL) and SIGMA(ROA) are 0.45 and 0.51, respectively, which are both statistically different from zero (at the one percent level). To address this problem we ran two-stage regression versions of the previous models. The results for the first-stage regression in Table 4-7 show that there is a strong statistical relationship between MEAN(SBL) and SIGMA(ROA). The residual from this regression model, or RESIDUAL(SBL), is used as an independent variable in the second-stage regression. In general, after orthogonalizing the independent variables, the results for how small business lending affects bank profitability are unchanged. As shown in Tables 4-9 and 4-10 using quarterly spline fitted small business loan data, the results are no different than without the two-stage regression procedure. As before, we infer that small business lending has only marginal negative effects on bank profitability.

***Other loan specializations and bank profitability*?** Appendices A to D give the univariate and regression results in which small business loans is replaced with large business loans over $250,000, real estate, consumer, and agricultural loans. These results can be summarized as:

<u>Large business loans and bank profitability (Appendix A: Tables A-1 to A-11)</u>

- Univariate tests for the period 1994-2001 indicate that relatively high levels of large business lending significantly *decreased bank ROAs*.
- Cross-sectional regression models run in each year from 1994 to 2001 are consistent with the univariate results for the most part, albeit to a lesser extent as the significance of large business lending in the models was sporadic but estimated regression coefficients are negative in most cases.

- Time series two-stage regressions support the univariate results, with negative and significant estimated coefficients for residual large business lending in the very small banks' and very large banks' models and negative but insignificant results for other bank size groups.

Real estate loans and bank profitability (Appendix B: Tables B-1 to B-10)

- Univariate tests for the period 1994-2001 indicate that relatively high levels of real estate lending significantly *decreased bank ROAs*.
- Cross-sectional regression models run in each year from 1994 to 2001 are consistent with the univariate results in most years, with many estimated regression coefficient for real estate loans significant and negative in sign. In the years 1996-1998 larger banks exhibited higher profitability with increased levels of real estate lending, but this trend was reversed in a number of other years.
- Time series two-stage regressions weakly support the univariate and cross-sectional regression results, with all estimated coefficients for residual real estate loans negative but not significant, except for a negative and significant finding for very large multi-billion dollar banks.

Consumer loans and bank profitability (Appendix C: Tables C-1 to C-11)

- Univariate tests for the period 1994-2001 indicate that relatively high levels of consumer lending significantly *increased bank ROAs*.
- Cross-sectional regression models run in each year from 1994 to 2001 are consistent with the univariate results in most years, with many estimated regression coefficient for consumer loans significant and positive in sign. In the years 1996-1998 larger banks exhibited lower profitability with increased levels of consumer lending, but this trend was reversed in a number of other years.
- Time series two-stage regressions weakly support the univariate and cross-sectional regression results, with all estimated coefficients for residual real estate loans positive but not significant, except for a positive and significant finding for very large multi-billion dollar banks.

Agricultural loans and bank profitability (Appendix D: Tables D-1 to D-11)

- Univariate tests for the period 1994-2001 indicate mixed results, with relatively high levels of large business lending significantly *increased* bank ROAs for very small, small, and very large banks but significantly *decreased* bank ROAs for medium sized banks.
- Cross-sectional regression models run in each year from 1994 to 2001 consistently show that most estimated regression coefficients for agricultural loans are significant and positive in sign for very small and small banks but insignificant and positive in sign for larger bank size groups.
- Time series two-stage regressions do not support the univariate and cross-sectional regression results, with all estimated coefficients for agricultural loans negative but not significant.

## B. Efficient Frontier Tests of Loan Specialization and Bank Risk

Here we report the results for efficient frontiers computed from quarterly rates of return on equity (ROE) data collected from banks' Call Reports. Six categories of specialized lenders are employed: (1) agricultural lenders, (2) balanced (or diversified) lenders, (3) large business lenders (greater than $250,000 loan concentrations), (4) consumer lenders, (5) real estate lenders, (6) small business lenders (less than $250,000 loan concentrations), and (7) random sample lenders (n = 75 banks for a particular size group). For very small and small banks we define specialized lenders are those banks in the top decile in the population with regard to the ratio of specialized loans as a proportion of total assets. For medium, large, and very large banks we used the ninth and tenth deciles of the loan ratios in order to obtain adequate sample sizes of banks, with the exception of small business loans and agricultural loans in which the definition of specialized lenders was relaxed to deciles six to ten. Analyses are performed by bank size group.

The diversification hypothesis implies that specialized lenders will lie beneath the efficient frontier. Alternatively, the specialization hypothesis argues that banks with loan portfolios concentrated in a particular area earn higher returns per unit risk and, therefore, will lie on or near the efficient frontier.

Figure 2 graphically illustrates the efficient frontier for very small banks with less than $100 million in total assets. The figure shows the location of each type of lender relative to the efficient frontier. Assuming an intercept of –1, a ray from –1 to each of the six categories of specialized lenders can be visualized. As mentioned before, the slope the ray can be used to compute the probability of bankruptcy for a particular type of specialized lender.

Table 5-1 contains the results for the slope and probability of failure (in percent) for each of the five bank size groups, with results for very small banks in panel A. The "lender type" columns give the results for a line drawn through the point marked in Figure 2 for a type of lender (i.e., line B in Figure 1), while "efficient frontier" columns report the results for a line connecting a hypothetical bank with similar expected ROE that is fully diversified and lies on the efficient frontier (i.e., line A in Figure 1). Two probabilities of failure are shown for each type of lender. The difference between these two probabilities of failure represents the increase in failure risk due to being a particular type of lender.

Among very small banks, small business lenders had the highest sloped line and lowest probability of failure compared to the five other types of lenders. The probability of failure was only 0.050 percent or a failure rate of about five banks out of 10,000 (i.e., there were between 8,000 and 11,000 banks in our sample period). They also had the lowest average quarterly ROE. Hence, small business lenders had lower risk and return compared to other types of lenders. Also, they are not far from the efficient frontier, as the decrease in probability of failure due to lying on the efficient frontier is only 0.0036. These results indicate that very small banks specializing in small business loans are well diversified.

Using two standard deviations of ROE to provide a 95 percent confidence interval for lines A and B in Figure 1 (i.e., about 0.046 and 0.047, respectively, for very small banks), it is obvious that these two lines are not significantly different from another (i.e., this confidence interval approach is similar to the Gibbons, Ross, and Shanken (1989) test to determine if a benchmark portfolio is efficient). Indeed, visual inspection of these data in panel A of Table 5-1 makes clear that, for all seven types of lenders, there is no significant difference between expected failure rates. While efficient frontier diversification is not statistically significant for

specialized, balanced, and random sample lenders, it is possible that expected failure rate differences are economically significant.

This interpretation of the results is also pertinent to the differences between the slopes of the six lines through the six different loan portfolios (i.e., the lender type slopes in panel A of Table 5-1). The highest risk and return lenders among very small banks were consumer-oriented banks. These banks had failure rates of about 10 banks out of 10,000, which is almost twice the failure risk of small business lenders. Consumer banks lie on the efficient frontier and represent the right most point of the frontier. This means that they have the highest expected return among portfolios on the efficient frontier. Other types of lenders had failure rates between those for small business lenders and consumer lenders and were less well diversified in terms of larger differences in the slopes of lines A and B (or horizontal distances between the loan portfolio and efficient frontier). Notice that balanced and random sample lenders were not necessarily more fully diversified than other specialized lenders. As such, we infer that the major source of diversification benefits is not lending across different types of loans per se; instead, geographic, economic sector, and perhaps idiosyncratic differences among borrowers are more important sources of loan portfolio diversification.

Similar patterns are evident for large and very large banks (see Figures 5 and 6 and panels D and E in Table 5-1, respectively). That is, small business lenders (consumer lenders) are the lowest (highest) risk and return loan portfolios and are the most diversified lenders in the sense of having loan portfolios close to the efficient frontier. However, large banks also were very efficient large business lenders. Turning to small banks (see Figure 3 and panel B of Table 5-1), real estate and large business lenders are the highest risk in terms of failure probability among different types of lenders but now consumer lenders are the lowest risk, with failure rates

of about 10 banks out of 10,000. Notice also that agricultural, balanced, and random sample lenders had low expected failure rates similar to consumer lenders. For medium sized banks large business lenders are lowest in risk and consumer lenders are again the highest risk (see Figure 4 and panel C of Table 5-1). Small business lenders appear to have average risk among different kinds of small and medium sized banks.

Interestingly, as shown in Table 5-1, very large multi-billion dollar banks tend to have the highest lender type probabilities of failure in the range of 14 to 22 banks per 10,000 banks. This range is higher than the riskiest very small or small bank with assets under $300 million. We infer that small banks are fairly well diversified relative to large banks. Relatedly, our results contradict the popular notion that large banks are more diversified and lower risk than small banks. It is likely that small banks obtain substantial diversification benefits by providing loans to a variety of types of small business firms and other small borrowers. Simply increasing the size of individual loans does not necessarily offer diversification benefits to large banks.

Our finding of a salient small business lending effect on bank failure risk is consistent with Diamond's (1984) argument that, as the number of loans (or projects) increases, the weak law of numbers implies that diversification increases by virtue of adding risks. Haubrich (1998) has pointed out that diversification achieved via adding risks in bank lending is different than diversification attributable to subdividing risks in a mutual fund [see also Winton (1997)]. In banking the sheer number of loans can provide a diversification effect. Since even small banks can have many small business loans, they can reap diversification benefits that lower their probability of failure.

In sum, small banks under $300 million in assets specializing in small business loans are well diversified and relatively low risk compared to other types of specialized lenders as well as

diversified lenders (i.e., balanced bank and random sample bank groups). Larger banks have sufficient volumes of large business loans to likewise achieve a high level of diversification and lower risk. Surprisingly, large banks over $500 million in assets that specialized in small business loans had the lowest risk and high levels of diversification relative to other loan areas. Our results indicate that consumer lending is a high return but high risk portfolio strategy for most bank size groups. And, smaller banks tend to have lower failure risk than larger banks. From this evidence, consistent with the cross-sectional univariate and regression analyses, we infer that small business lending tends to lower bank profitability to some degree but that bank risk is commensurately reduced, not only for small banks but for large banks also. It has long been recognized that small banks tend to have lower returns on capital than larger banks [e.g., see Gallick (1976)]. Our results clearly show that this low capital return is explained by low capital risk associated with small business lending.

Which research hypotheses do the efficient frontier analyses of rates of return on equity support? The diversification hypothesis would argue that specialized lenders lie well below the efficient frontier. Contrary to this hypothesis, small business lenders tend to lie on or near the efficient frontier for most bank size groups. The specialization hypothesis would argue that small business lenders earn higher returns per unit risk than other banks that do not specialize. Our results confirm this relationship compared to balanced and random sample lenders that do not concentrate their loan portfolio in a particular loan area. Also, small business lenders tended to have the lowest probabilities of failure compared to other specialized lenders. Thus, we infer that specialized small business lending allows banks to reap *equity profit* benefits by enhancing asset diversification and therein reducing risk.

# V. Summary and Conclusions

This paper has examined the question of how small business lending affects bank profitability. Small business loans were defined to be less than $250,000, as reported on the Call Reports of Income and Condition. Data was collected for the period 1994-2001 for all U.S. insured commercial banks. Results were broken down by the following bank size groups: (1) less than $100 million (very small), (2) $100-$300 million (small), (3) $300-$500 million (medium), (4) $500 million - $3 billion (large), and (5) greater than $3 billion (very large).

Two opposing views exist in terms of the theoretical effects of specialized lending on bank profitability. The specialization hypothesis argues that banks that focus their loan activities in a particular area take advantage of management expertise, quality loan monitoring, and lower diseconomies of scope that lower operating costs. This hypothesis would predict higher profitability among banks specializing in small business loans. Alternatively, the diversification hypothesis is grounded in modern portfolio theory, which implies that holding a variety of different types of loans will reduce risk and, holding profit constant, increase profits per unit risk. This hypothesis would predict that banks specializing in small business loans will lose risk-reducing benefits of diversification and, therefore, have lower profitability.

Our empirical analyses were divided into two parts: (1) univariate and multivariate tests that focus on how small business lending affects banks' rate of return on assets (ROA), and (2) efficient frontier analyses that focus on how small business lending affect banks' rate of return on equity (ROE) and associated capital risk. Univariate tests for differences in bank profitability using ROA among banks suggests that increasing loan exposure in the area of small business loans tends to reduce profitability. At least for smaller banks, the main reason for lower profitability appears to be greater loan losses as small business lending increases. For larger

banks lower profitability is not explained by higher loan losses on small business loans; instead, lower net interest margins associated with small business lending reduce profitability. We also find that for smaller banks increasing small business lending tends to reduce their loan diversification but for large banks the opposite is true. Hence, large banks that are active small business lenders gain diversification benefits. Finally, we found that the top decile of small business lenders had around 20 percent of their total assets devoted to small business credit. This finding indicates that large banks are a major supplier of credit funding to the small business sector.

An important caveat relevant to the univariate analyses is that risk is not held constant. While those results tend to support the diversification hypothesis that argues for lowered profitability from loan specialization, no inferences are possible concerning profit per unit of risk for small business lenders. For this reason we ran multiple regression models that hold constant a variety of different bank risks and control variables. In general, we found small business lending had no effect on bank profitability using ROA as the dependent variable. One exception to this overall finding is that small business lending did significantly lower the profitability of very small banks under $100 million in size. Also, we did find some weak evidence that small business lending lowered the profitability of larger banks in more recent years, which is probably due to the economic slowdown.

Further time series regression analyses were performed using the standard deviation of the return on assets (ROA) as a measure of total risk. This measure avoids the potential error of omission inherent in selecting specific risk variables in the cross-sectional regression analyses. We found that this risk measure is strongly correlated with the level of ROA using quarterly data for the period 1994-2001, especially as bank size increases. In these analyses a potential

drawback is the unavailability of quarterly data for small business loans. Based on limited mid-year small business loan data, we found that very small and very large banks had significantly lower profitability as small business lending increased, and other bank size groups had a negative but insignificant estimated regression coefficient for the small business loan variable. To partially overcome the problem of only annual small business data, we developed a quarterly series for the small business loan variable by means of a spline fitted regression over time. The results using this data series indicated that small business lending was negatively but not significantly related to bank profitability for all bank size groups. Placing more weight on the spline fitted small business loan results, we infer that small business lending generally has no effect on bank profitability as measured by ROA, although marginal negative effects are possible among very small or very large banks.

Is bank profitability affected by other areas of loan specialization? We repeated the univariate and regression analyses discussed above for small business lending for large business loans over $250,000, real estate loans, consumer loans, and agricultural loans. For large business loans and real estate loans we found that the results tended to support the diversification hypothesis, as bank profitability was significantly lowered in numerous cases as lending in these areas increased. The results for consumer lending and agricultural lending were quite different. These loan areas tended to boost profitability, with agricultural lending more likely to have a positive and significant effect on very small and small banks. Consequently, the specialization hypothesis is supported. Hence, unlike similar results for small business loans, other areas of loan specialization had significant positive or negative effects on bank profits.

Are specialized small business lenders diversified? To address this question we collected quarterly Call Report return on equity (ROE) data for different specialized lenders (defined as

banks in the top decile in the U.S. banking industry for a particular loan area) as well as samples of diversified lenders (i.e., balanced bank and random sample bank groups) over the period 1994-2001. Using mean-variance optimization methods, we derived efficient frontiers and probabilities of failure for each of six types of lenders by bank size group. We found that small banks under $300 million in assets that are specialized small business lenders are well diversified and relatively low risk compared to other types of specialized lenders as well as balanced and random sample lenders. Larger banks have sufficient volumes of large business loans to likewise achieve a high level of diversification and lower risk. Surprisingly, large banks over $500 million in assets that specialized in small business loans had the lowest risk and high levels of diversification relative to other loan areas. We infer that this diversification effect associated with small business lending for both small and large banks is due to the weak law of large numbers as proposed by Diamond and others. Our results also indicate that consumer lending is a high return but high risk portfolio strategy for most bank size groups. And, smaller banks tend to have lower failure risk than larger banks. From this evidence, consistent with the cross-sectional univariate and regression analyses, we infer that small business lending tends to lower bank profitability to some degree but that bank risk is commensurately reduced, not only for small banks but for large banks also. We interpret these equity profit analyses tend to support the specialization hypothesis, as small business lenders had higher equity rates of returns per unit risk than diversified lenders. Also, the low probabilities of failure among small business lenders suggests that the benefits of specialization outweigh potential costs.

Are small business lenders more profitable than other banks? Our results appear to be dependent on the definition of profit employed. Using the rate of return on assets as the profit measure, we conclude that there is no effect after taking into account bank risk, which means that

neither the specialization and diversification hypotheses holds. Some evidence was found in favor of the diversification hypothesis among very small banks. However, using efficient frontier analyses focusing on the rate of return on equity, we do find that small business lenders reap benefits from specialization, particularly in terms of reducing failure risk. One way to interpret these findings is that small business lending normally does not have a negative effect on bank profitability – either neutral or positive effects are the norm. If larger, more diversified organizations are the future of the banking industry, small business lending can play a positive role in terms of contributing to diversification and the reduction of bank failure risk. As such, despite the on-going consolidation movement in the U.S. banking industry, banks likely will continue to play a central role in the provision of small business credit.

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## Table 1-1

## Definitions of Variables

| | |
|---|---|
| **Profitability**: | |
| ROA | Rate of return on assets, or net income after taxes to total assets |
| NIM | Net interest margin, or interest income minus interest expenses to total assets |
| ROE | Rate of return on equity, or net income after taxes to total equity |
| **Risk and Other Control Variables**: | |
| LOSS | Loan and lease losses minus recoveries to total assets |
| EQUITY | Tier l (core) capital, or total equity to total assets |
| OFFBAL | Total off-balance sheet activities to total assets |
| SECURITIES | Total securities to total assets |
| PURCHASED | Purchased funds, or large time deposits plus other borrowed money to total assets |
| HHI | Herfindahl index for county or SMSA in which bank is located |
| ASSETS | Total assets |
| DIVERS | A diversification measure using HHI (i.e., the sum of squared ratios of a loan category/total loans for business loans, real estate loans, consumer loans, and agricultural loans). |
| **Lending Specialization:** | |
| SMALLBUS | Small business loans (commercia l and industrial loans and commercial real estate loans under $250,000) to total assets |
| LARGEBUS | Large business loans (commercial and industrial loans and commercial real estate loans more than $250,000) to total assets |
| REALESTATE | Total real estate loans excluding small business real estate loans under $250,000 to total assets |
| CONSUMER | Total consumer loans to total assets |
| AGLOAN | Total agricultural loans to total assets |

## Table 2-1

## Average Rates of Return on Assets (ROA) for U.S. Commercial Banks in the Period June 1994-June 2001: Means and t-Tests for Decile Rankings by Small Business Lending Activity and Bank Asset Size Groups (in percent)

| | Assets in Millions | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <$100 | | $100-$300 | | $300-$500 | | $500-$3000 | | >$3000 | | All Banks | |
| Decile | Mean | n | Mean | n | Mean | n | Mean | n | Mean | n | Mean | n |
| 1 | 0.61 | 6632 | 0.75 | 447 | 1.02 | 23 | 0.91 | 38 | 1.95 | 8 | 0.63 | 7148 |
| 2-3 | 0.66 | 12228 | 0.71 | 1759 | 1.07 | 105 | 1.29 | 151 | 0.84 | 54 | 0.68 | 14297 |
| 4-7 | 0.61 | 12825 | 0.59 | 8644 | 0.66 | 2295 | 0.64 | 3442 | 0.68 | 1387 | 0.62 | 28593 |
| 8-9 | 0.43 | 6857 | 0.60 | 5806 | 0.62 | 1029 | 0.61 | 580 | 0.69 | 25 | 0.52 | 14297 |
| 10 | 0.43 | 4848 | 0.59 | 2053 | 0.23 | 162 | 0.68 | 82 | 0.69 | 4 | 0.48 | 7149 |
| All | 0.58 | 43390 | 0.61 | 18709 | 0.66 | 3614 | 0.66 | 4293 | 0.70 | 1478 | 0.60 | 71484 |

**t-Tests for Mean Differences**[ab]

| | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| Decile Comparisons | <$100 | $100-$300 | $300-$500 | $500-$3000 | >$3000 | All Banks |
| 1 vs. 10 | 10.37*** | 2.55** | 1.41 | 1.96* | na | 9.12*** |
| 2 and 3 vs. 8 and 9 | 11.46*** | 6.78*** | 3.58*** | 2.83*** | 1.03 | 9.42*** |
| 1, 2, 3 vs. 8, 9, 10 | 14.82*** | 6.66*** | 3.85*** | 3.08*** | 2.02** | 12.43*** |

[a]Not available (na) due to small sample sizes.

[b]Asterisks indicate the level of significance: *--.10, **--.05, and ***--.01.

## Table 2-2

## Average Net Interest Margins (NIM) for U.S. Commercial Banks in the Period June 1994-June 2001: Means and t-Tests for Decile Rankings by Small Business Lending Activity and Bank Asset Size Groups (in percent)

| | Assets in Millions | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <$100 | | $100-$300 | | $300-$500 | | $500-$3000 | | >$3000 | | All Banks | |
| Decile | Mean | n | Mean | n | Mean | n | Mean | n | Mean | n | Mean | n |
| 1 | 2.11 | 6632 | 2.11 | 447 | 3.22 | 23 | 2.92 | 38 | 3.70 | 8 | 2.12 | 7148 |
| 2-3 | 2.08 | 12228 | 2.13 | 1759 | 2.45 | 105 | 3.08 | 151 | 3.26 | 54 | 2.10 | 14297 |
| 4-7 | 1.96 | 12825 | 1.99 | 8644 | 2.01 | 2295 | 2.00 | 3442 | 1.95 | 1387 | 1.98 | 28593 |
| 8-9 | 2.10 | 6857 | 2.12 | 5806 | 2.09 | 1029 | 2.08 | 580 | 1.91 | 25 | 2.11 | 14297 |
| 10 | 2.26 | 4848 | 2.25 | 2053 | 2.21 | 162 | 2.25 | 82 | 2.54 | 4 | 2.25 | 7149 |
| All | 2.07 | 43390 | 2.08 | 18709 | 2.06 | 3614 | 2.06 | 4293 | 2.01 | 1478 | 2.07 | 71484 |

**t-Tests for Mean Differences**[ab]

| | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| Decile Comparisons | <$100 | $100-$300 | $300-$500 | $500-$3000 | >$3000 | All Banks |
| 1 vs. 10 | -14.76*** | -4.01*** | 2.23** | 1.72* | na | -14.36*** |
| 2 and 3 vs. 8 and 9 | -1.61 | 0.11 | 2.49** | 5.41*** | 6.65*** | -0.39 |
| 1, 2, 3 vs. 8, 9, 10 | -7.98*** | -1.66* | 3.32*** | 5.70*** | 6.19*** | -5.67*** |

[a]Not available (na) due to small sample sizes.

[b]Asterisks indicate the level of significance: *--.10, **--.05, and ***--.01.

## Table 2-3

## Average Rates of Return on Equity (ROE) for U.S. Commercial Banks in the Period June 1994-June 2001: Means and t-Tests for Decile Rankings by Small Business Lending Activity and Bank Asset Size Groups (in percent)

| | Assets in Millions | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <$100 | | $100-$300 | | $300-$500 | | $500-$3000 | | >$3000 | | All Banks | |
| Decile | Mean | n | Mean | n | Mean | n | Mean | n | Mean | n | Mean | n |
| 1 | 5.66 | 6632 | 7.05 | 447 | 9.02 | 23 | 8.86 | 38 | 18.68 | 8 | 5.79 | 7148 |
| 2-3 | 5.86 | 12228 | 6.50 | 1759 | 7.90 | 105 | 10.50 | 151 | 6.69 | 54 | 6.00 | 14297 |
| 4-7 | 5.05 | 12825 | 5.94 | 8644 | 6.95 | 2295 | 7.39 | 3442 | 8.01 | 1387 | 5.90 | 28593 |
| 8-9 | 4.86 | 6857 | 6.31 | 5806 | 7.32 | 1029 | 7.10 | 580 | 8.38 | 25 | 5.72 | 14297 |
| 10 | 4.31 | 4848 | 7.56 | 2053 | 7.25 | 162 | 7.37 | 82 | 6.06 | 4 | 5.35 | 7149 |
| All | 5.26 | 43390 | 6.31 | 18709 | 7.11 | 3614 | 7.47 | 4293 | 8.02 | 1478 | 5.82 | 71484 |

**t-Tests for Mean Differences**[ab]

| | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| Decile Comparisons | <$100 | $100-$300 | $300-$500 | $500-$3000 | >$3000 | All Banks |
| 1 vs. 10 | 2.82*** | -0.69 | 1.35 | 1.37 | na | 1.14 |
| 2 and 3 vs. 8 and 9 | 5.23*** | 0.86 | 1.20 | 1.56 | -1.43 | 9.42* |
| 1, 2, 3 vs. 8, 9, 10 | 5.03*** | -0.09 | 1.72* | 1.73* | 0.15 | 2.00** |

[a]Not available (na) due to small sample sizes.

[b]Asterisks indicate the level of significance: *--.10, **--.05, and ***--.01.

## Table 2-4

## Average Small Business Loans/Total Assets (SMALLBUS) for U.S. Commercial Banks in the Period June 1994-June 2001: Means and t-Tests for Decile Rankings by Small Business Lending Activity and Bank Asset Size Groups (in percent)

| | Assets in Millions | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <$100 | | $100-$300 | | $300-$500 | | $500-$3000 | | >$3000 | | All Banks | |
| Decile | Mean | n | Mean | n | Mean | n | Mean | n | Mean | n | Mean | n |
| 1 | 0.00 | 6632 | 0.00 | 447 | 0.00 | 23 | 0.00 | 38 | 0.00 | 8 | 0.00 | 7148 |
| 2-3 | 0.00 | 12228 | 0.00 | 1759 | 0.00 | 105 | 0.00 | 151 | 0.00 | 54 | 0.00 | 14297 |
| 4-7 | 4.03 | 12825 | 5.39 | 8644 | 5.83 | 2295 | 5.04 | 3442 | 2.88 | 1387 | 4.65 | 28593 |
| 8-9 | 12.37 | 6857 | 12.16 | 5806 | 11.87 | 1029 | 11.58 | 580 | 11.41 | 25 | 12.21 | 14297 |
| 10 | 21.05 | 4848 | 19.52 | 2053 | 19.35 | 162 | 20.13 | 82 | 20.81 | 4 | 20.55 | 7149 |
| All | 5.50 | 43390 | 8.40 | 18709 | 7.95 | 3614 | 5.99 | 4293 | 2.95 | 1478 | 6.36 | 71484 |

**t-Tests for Mean Differences**[ab]

| | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| Decile Comparisons | <$100 | $100-$300 | $300-$500 | $500-$3000 | >$3000 | All Banks |
| 1 vs. 10 | -292.18*** | -230.57*** | -44.47*** | -19.77*** | na | -358.92*** |
| 2 and 3 vs. 8 and 9 | -573.49*** | -528.10*** | -224.59*** | -172.79*** | -31.66*** | -824.66*** |
| 1, 2, 3 vs. 8, 9, 10 | -312.57*** | -306.56*** | -122.38*** | -71.57*** | -16.61*** | -435.94*** |

[a]Not available (na) due to small sample sizes.

[b]Asterisks indicate the level of significance: *--.10, **--.05, and ***--.01.

## Table 2-5

## Average Total Equity/Total Assets (EQUITY) for U.S. Commercial Banks in the Period June 1994-June 2001: Means and t-Tests for Decile Rankings by Small Business Lending Activity and Bank Asset Size Groups (in percent)

| | Assets in Millions | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <$100 | | $100-$300 | | $300-$500 | | $500-$3000 | | >$3000 | | All Banks | |
| Decile | Mean | n | Mean | n | Mean | n | Mean | n | Mean | n | Mean | n |
| 1 | 11.28 | 6632 | 10.51 | 447 | 11.48 | 23 | 11.47 | 38 | 9.95 | 8 | 11.23 | 7148 |
| 2-3 | 12.28 | 12228 | 11.52 | 1759 | 13.71 | 105 | 13.02 | 151 | 14.82 | 54 | 12.21 | 14297 |
| 4-7 | 12.56 | 12825 | 10.00 | 8644 | 9.53 | 2295 | 9.01 | 3442 | 8.53 | 1387 | 10.92 | 28593 |
| 8-9 | 10.61 | 6857 | 9.16 | 5806 | 8.69 | 1029 | 8.89 | 580 | 8.33 | 25 | 9.81 | 14297 |
| 10 | 10.19 | 4848 | 8.89 | 2053 | 8.66 | 162 | 9.81 | 82 | 13.03 | 4 | 9.78 | 7149 |
| All | 11.71 | 43390 | 9.78 | 18709 | 9.38 | 3614 | 9.18 | 4293 | 8.77 | 1478 | 10.87 | 71484 |

**t-Tests for Mean Differences**[ab]

| | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| **Decile Comparisons** | **<$100** | **$100-$300** | **$300-$500** | **$500-$3000** | **>$3000** | **All Banks** |
| 1 vs. 10 | 8.98*** | 5.54*** | 2.20** | 1.22 | na | 13.62*** |
| 2 and 3 vs. 8 and 9 | 15.67*** | 13.62*** | 5.21*** | 5.73*** | 4.84*** | 28.06*** |
| 1, 2, 3 vs. 8, 9, 10 | 18.39*** | 11.32*** | 5.61*** | 5.87*** | 3.98*** | 30.99*** |

[a]Not available (na) due to small sample sizes.

[b]Asterisks indicate the level of significance: *--.10, **--.05, and ***--.01.

## Table 2-6

## Average Loan and Lease Losses Minus Recoveries/Total Assets (LOSS): for U.S. Commercial Banks in the Period June 1994-June 2001: Means and t-Tests for Decile Rankings by Small Business Lending Activity and Bank Asset Size Groups (in percent)

| | Assets in Millions | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <$100 | | $100-$300 | | $300-$500 | | $500-$3000 | | >$3000 | | All Banks | |
| Decile | Mean | n | Mean | n | Mean | n | Mean | n | Mean | n | Mean | n |
| 1 | 0.04 | 6632 | 0.06 | 447 | 0.43 | 23 | 0.56 | 38 | 1.14 | 8 | 0.05 | 7148 |
| 2-3 | 0.06 | 12228 | 0.12 | 1759 | 0.36 | 105 | 0.96 | 151 | 1.84 | 54 | 0.09 | 14297 |
| 4-7 | 0.05 | 12825 | 0.08 | 8644 | 0.10 | 2295 | 0.12 | 3442 | 0.21 | 1387 | 0.08 | 28593 |
| 8-9 | 0.06 | 6857 | 0.06 | 5806 | 0.07 | 1029 | 0.10 | 580 | 0.14 | 25 | 0.06 | 14297 |
| 10 | 0.07 | 4848 | 0.08 | 2053 | 0.07 | 162 | 0.21 | 82 | 1.05 | 4 | 0.08 | 7149 |
| All | 0.06 | 43390 | 0.08 | 18709 | 0.10 | 3614 | 0.15 | 4293 | 0.27 | 1478 | 0.07 | 71484 |

**t-Tests for Mean Differences**[ab]

| | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| **Decile Comparisons** | **<$100** | **$100-$300** | **$300-$500** | **$500-$3000** | **>$3000** | **All Banks** |
| 1 vs. 10 | -7.50*** | -2.07** | 2.52** | 2.40** | na | -7.73*** |
| 2 and 3 vs. 8 and 9 | 0.23 | 4.37*** | 3.57*** | 7.66*** | 9.76*** | 6.00*** |
| 1, 2, 3 vs. 8, 9, 10 | -3.64*** | 3.73*** | 4.25*** | 8.12*** | 8.17*** | 1.90* |

[a]Not available (na) due to small sample sizes.
[b]Asterisks indicate the level of significance: *--.10, **--.05, and ***--.01.

## Table 2-7

## Average Asset Diversification (DIVERS) for U.S. Commercial Banks in the Period June 1994-June 2001: Means and t-Tests for Decile Rankings by Small Business Lending Activity and Bank Asset Size Groups (in percent)

Assets in Millions

| | <$100 | | $100-$300 | | $300-$500 | | $500-$3000 | | >$3000 | | All Banks | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Decile** | **Mean** | **n** | **Mean** | **n** | **Mean** | **n** | **Mean** | **n** | **Mean** | **n** | **Mean** | **n** |
| 1 | 12.60 | 6632 | 14.78 | 447 | 36.86 | 23 | 40.67 | 38 | 97.58 | 8 | 13.06 | 7148 |
| 2-3 | 13.86 | 12228 | 17.27 | 1759 | 25.57 | 105 | 42.90 | 151 | 86.93 | 54 | 14.95 | 14297 |
| 4-7 | 15.33 | 12825 | 19.01 | 8644 | 21.00 | 2295 | 21.40 | 3442 | 20.54 | 1387 | 17.88 | 28593 |
| 8-9 | 18.87 | 6857 | 22.13 | 5806 | 23.56 | 1029 | 23.43 | 580 | 25.23 | 25 | 20.73 | 14297 |
| 10 | 21.35 | 4848 | 24.49 | 2053 | 25.12 | 162 | 25.05 | 82 | 33.67 | 4 | 22.38 | 7149 |
| All | 15.73 | 43390 | 20.32 | 18709 | 22.14 | 3614 | 22.67 | 4293 | 23.50 | 1478 | 17.83 | 71484 |

**t-Tests for Mean Differences**[ab]

| | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| **Decile Comparisons** | **<$100** | **$100-$300** | **$300-$500** | **$500-$3000** | **>$3000** | **All Banks** |
| 1 vs. 10 | -52.34*** | -14.70*** | 1.53 | 2.51** | na | -56.41*** |
| 2 and 3 vs. 8 and 9 | -34.84*** | -13.29*** | 0.67 | 6.00*** | 9.53*** | -43.67*** |
| 1, 2, 3 vs. 8, 9, 10 | -59.15*** | -18.61*** | 1.35 | 6.56*** | 9.90*** | -66.73*** |

[a]Not available (na) due to small sample sizes.

[b]Asterisks indicate the level of significance: *--.10, **--.05, and ***--.01.

## Table 2-8

## Average Total Securities/Total Assets (SECURITIES) for U.S. Commercial Banks in the Period June 1994-June 2001: Means and t-Tests for Decile Rankings by Small Business Lending Activity and Bank Asset Size Groups (in percent)

| | Assets in Millions | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <$100 | | $100-$300 | | $300-$500 | | $500-$3000 | | >$3000 | | All Banks | |
| Decile | Mean | n | Mean | n | Mean | n | Mean | n | Mean | n | Mean | n |
| 1 | 35.45 | 6632 | 38.19 | 447 | 24.72 | 23 | 23.43 | 38 | 11.81 | 8 | 35.50 | 7148 |
| 2-3 | 31.54 | 12228 | 32.26 | 1759 | 25.86 | 105 | 22.59 | 151 | 5.35 | 54 | 31.39 | 14297 |
| 4-7 | 31.13 | 12825 | 30.53 | 8644 | 27.62 | 2295 | 25.88 | 3442 | 19.66 | 1387 | 29.48 | 28593 |
| 8-9 | 24.55 | 6857 | 23.53 | 5806 | 22.22 | 1029 | 20.54 | 580 | 17.92 | 25 | 23.79 | 14297 |
| 10 | 18.52 | 4848 | 18.36 | 2053 | 17.97 | 162 | 17.87 | 82 | 8.64 | 4 | 18.45 | 7149 |
| All | 29.46 | 43390 | 27.37 | 18709 | 25.58 | 3614 | 24.87 | 4293 | 19.04 | 1478 | 28.22 | 71484 |

**t-Tests for Mean Differences**[ab]

| | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| **Decile Comparisons** | **<$100** | **$100-$300** | **$300-$500** | **$500-$3000** | **>$3000** | **All Banks** |
| 1 vs. 10 | 69.89*** | 25.06*** | 1.29 | 1.21 | na | 76.86*** |
| 2 and 3 vs. 8 and 9 | 34.91*** | 22.75*** | 2.11** | 0.89 | -6.26*** | 47.44*** |
| 1, 2, 3 vs. 8, 9, 10 | 69.49*** | 32.31*** | 2.37** | 1.24 | -5.12*** | 81.63*** |

[a]Not available (na) due to small sample sizes.

[b]Asterisks indicate the level of significance: *--.10, **--.05, and ***--.01.

## Table 2-9

## Average Off-Balance Sheet Activities/Total Assets (OFFBAL) for U.S. Commercial Banks in the Period June 1994-June 2001: Means and t-Tests for Decile Rankings by Small Business Lending Activity and Bank Asset Size Groups (in percent)

| | Assets in Millions | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <$100 | | $100-$300 | | $300-$500 | | $500-$3000 | | >$3000 | | All Banks | |
| Decile | Mean | n | Mean | n | Mean | n | Mean | n | Mean | n | Mean | n |
| 1 | 64.07 | 6632 | 20.15 | 447 | 152.99 | 23 | 301.63 | 38 | 419.34 | 8 | 63.27 | 7148 |
| 2-3 | 330.30 | 12228 | 54.69 | 1759 | 285.57 | 105 | 382.20 | 151 | 582.33 | 54 | 297.56 | 14297 |
| 4-7 | 135.44 | 12825 | 47.99 | 8644 | 37.65 | 2295 | 35.58 | 3442 | 73.49 | 1387 | 86.13 | 28593 |
| 8-9 | 9.25 | 6857 | 11.68 | 5806 | 14.62 | 1029 | 18.92 | 580 | 31.35 | 25 | 11.05 | 14297 |
| 10 | 10.71 | 4848 | 14.31 | 2053 | 16.97 | 162 | 37.37 | 82 | 129.85 | 4 | 12.26 | 7149 |
| All | 145.57 | 43390 | 32.99 | 18709 | 38.10 | 3614 | 47.91 | 4293 | 93.39 | 1478 | 103.73 | 71484 |

**t-Tests for Mean Differences**[ab]

| | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| Decile Comparisons | <$100 | $100-$300 | $300-$500 | $500-$3000 | >$3000 | All Banks |
| 1 vs. 10 | 2.21** | 1.02 | 2.63** | 3.00*** | na | 2.27** |
| 2 and 3 vs. 8 and 9 | 3.17*** | 2.54** | 2.38** | 5.57*** | 11.47*** | 3.31*** |
| 1, 2, 3 vs. 8, 9, 10 | 3.43*** | 12.37*** | 2.63*** | 6.28*** | 10.98*** | 3.57*** |

[a]Not available (na) due to small sample sizes.

[b]Asterisks indicate the level of significance: *--.10, **--.05, and ***--.01.

## Table 2-10

## Average Purchased Funds/Total Assets (PURCHASED) for U.S. Commercial Banks in the Period June 1994-June 2001: Means and t-Tests for Decile Rankings by Small Business Lending Activity and Bank Asset Size Groups (in percent)

| Assets in Millions | <$100 | | $100-$300 | | $300-$500 | | $500-$3000 | | >$3000 | | All Banks | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Decile** | **Mean** | **n** | **Mean** | **n** | **Mean** | **n** | **Mean** | **n** | **Mean** | **n** | **Mean** | **n** |
| 1 | 62.66 | 6632 | 65.25 | 447 | 71.35 | 23 | 76.93 | 38 | 84.82 | 8 | 62.95 | 7148 |
| 2-3 | 63.22 | 12228 | 65.60 | 1759 | 68.29 | 105 | 75.70 | 151 | 83.69 | 54 | 63.76 | 14297 |
| 4-7 | 63.78 | 12825 | 66.01 | 8644 | 68.85 | 2295 | 73.09 | 3442 | 74.46 | 1387 | 66.50 | 28593 |
| 8-9 | 63.99 | 6857 | 65.30 | 5806 | 68.35 | 1029 | 71.28 | 580 | 76.49 | 25 | 65.16 | 14297 |
| 10 | 63.48 | 4848 | 65.18 | 2053 | 68.02 | 162 | 70.16 | 82 | 82.47 | 4 | 64.16 | 7149 |
| All | 63.45 | 43390 | 65.64 | 18709 | 68.67 | 3614 | 72.92 | 4293 | 74.91 | 1478 | 65.09 | 71484 |

**t Tests for Mean Differences**[ab]

| | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| **Decile Comparisons** | **<$100** | **$100-$300** | **$300-$500** | **$500-$3000** | **>$3000** | **All Banks** |
| 1 vs. 10 | -4.20*** | 0.15 | 0.93 | 2.57** | na | - 7.04*** |
| 2 and 3 vs. 8 and 9 | -5.06*** | 1.14 | -0.04 | 2.75*** | 3.69*** | -11.56*** |
| 1, 2, 3 vs. 8, 9, 10 | -6.28*** | 1.13 | 0.43 | 3.48*** | 3.54*** | -13.50*** |

[a]Not available (na) due to small sample sizes.
[b]Asterisks indicate the level of significance: *--.10, **--.05, and ***--.01.

## Table 3-1

## Rate of Return on Assets (ROA) and Small Business Lending in 1994: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions <$100 (n=7,187) | $100-$300 (n=2,081) | $300-$500 (n=370) | $500-$3,000 (n=451) | >$3,000 (n=181) |
|---|---|---|---|---|---|
| INTERCEPT | 0.002 | -0.003 | -0.007 | 0.004 | -0.006 |
| | (2.39**) | (-1.96**) | (-2.71***) | (2.44**) | (-1.60) |
| LOSS | -0.668 | -0.924 | -0.594 | -0.267 | 0.07 |
| | (-14.00***) | (-14.65***) | (-5.10***) | (-3.86***) | (0.47) |
| EQUITY | 0.029 | 0.049 | 0.058 | 0.015 | 0.101 |
| | (14.94***) | (11.11***) | (5.81***) | (2.34**) | (5.15***) |
| OFFBAL | 0.0001 | 0.0006 | 0.002 | 0.0008 | 0.002 |
| | (18.97***) | (1.89*) | (6.27***) | (6.39***) | (5.48***) |
| SECURITIES | -0.004 | 0.009 | 0.003 | -0.001 | 0.001 |
| | (-4.08***) | (0.47) | (1.26) | (-0.93) | (0.34) |
| PURCHASED | 0.002 | 0.004 | 0.003 | 0.00003 | 0.006 |
| | (1.348) | (5.77***) | (1.38) | (0.02) | (1.27) |
| SMALLBUS | -0.008 | -0.0002 | 0.005 | -0.003 | -0.012 |
| | (-5.29***) | (-0.08) | (0.80) | (-0.49) | (-0.57) |
| HHI | 0.001 | 0.002 | 0.0005 | 0.002 | 0.0002 |
| | (1.68*) | (2.88***) | (0.49) | (1.61) | (0.08) |
| ASSETS | 0.0000 | 0.0000 | 0.0000 | -0.0000 | 0.0000 |
| | (6.46***) | (1.45) | (0.01) | (-0.48) | (0.41) |
| DIVERS | -0.001 | 0.022 | 0.006 | 0.004 | 0.001 |
| | (-0.62) | (10.04***) | (2.03**) | (2.25**) | (0.30) |
| Overall F | 116.39*** | 54.76*** | 15.91*** | 12.554*** | 16.01*** |
| Adjusted $R^2$ | 0.1263 | 0.1866 | 0.2661 | 0.1874 | 0.4274 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
SMALLBUS = commercial and industrial loans and commercial real estate loans less than $250,000/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table 3-2

## Rate of Return on Assets (ROA) and Small Business Lending in 1995: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| | Assets in Millions | | | | |
|---|---|---|---|---|---|
| **Independent Variables[b]** | **<$100 (n=6,563)** | **$100-$300 (n=2,149)** | **$300-$500 (n=396)** | **$500-$3,000 (n=466)** | **>$3,000 (n=194)** |
| INTERCEPT | 0.005 | 0.007 | 0.007 | 0.003 | 0.004 |
| | (5.30***) | (7.56***) | (3.39***) | (1.72*) | (1.37) |
| LOSS | -0.699 | -0.502 | -0.083 | -0.075 | -0.667 |
| | (-13.84***) | (-13.54***) | (-0.89) | (-1.09) | (-8.77***) |
| EQUITY | 0.017 | 0.011 | 0.038 | 0.015 | 0.044 |
| | (10.58***) | (5.36***) | (6.43***) | (2.13**) | (2.95***) |
| OFFBAL | 0.0003 | 0.003 | 0.001 | 0.001 | 0.002 |
| | (33.68***) | (24.00***) | (16.10***) | (12.60***) | (7.65***) |
| SECURITIES | 0.002 | 0.0007 | -0.002 | -0.001 | 0.004 |
| | (2.37**) | (0.85) | (-1.35) | (-0.36) | (1.30) |
| PURCHASED | -0.006 | -0.005 | -0.007 | 0.001 | -0.007 |
| | (-5.78***) | (-4.63***) | (-2.98***) | (0.44) | (-1.98**) |
| SMALLBUS | -0.004 | 0.0005 | 0.0001 | 0.007 | 0.013 |
| | (-2.52**) | (0.35) | (-0.03) | (1.32) | (0.875) |
| HHI | 0.001 | 0.001 | -0.0002 | 0.001 | -0.001 |
| | (1.77*) | (3.82***) | (-0.30) | (1.26) | (-0.39) |
| ASSETS | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| | (4.45***) | (0.92) | (0.77) | (0.20) | (2.18**) |
| DIVERS | 0.011 | 0.002 | -0.001 | -0.001 | 0.009 |
| | (7.49***) | (1.80*) | (-0.68) | (-0.40) | (4.96***) |
| Overall F | 205.26*** | 98.97*** | 55.79*** | 27.69*** | 17.52*** |
| Adjusted $R^2$ | 0.2188 | 0.2909 | 0.5546 | 0.3401 | 0.4338 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
SMALLBUS = commercial and industrial loans and commercial real estate loans less than $250,000/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table 3-3

## Rate of Return on Assets (ROA) and Small Business Lending in 1996: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| | Assets in Millions | | | | |
|---|---|---|---|---|---|
| **Independent Variables[b]** | **<$100 (n=5,955)** | **$100-$300 (n=2,280)** | **$300-$500 (n=385)** | **$500-$3,000 (n=491)** | **>$3,000 (n=191)** |
| INTERCEPT | 0.006 | 0.004 | 0.004 | 0.005 | 0.009 |
| | (5.55***) | (3.68***) | (2.11**) | (2.42**) | (3.01***) |
| LOSS | -0.628 | -0.284 | -0.106 | -0.125 | 0.057 |
| | (-11.02***) | (-8.61***) | (-1.76*) | (-2.18**) | (0.68) |
| EQUITY | 0.016 | 0.027 | 0.049 | 0.008 | -0.012 |
| | (8.60***) | (12.14***) | (9.19***) | (0.97) | (-1.37) |
| OFFBAL | 0.0001 | 0.0004 | 0.001 | 0.001 | 0.0003 |
| | (27.19***) | (16.56***) | (2.88***) | (7.95***) | (1.31) |
| SECURITIES | 0.0014 | -0.0006 | -0.003 | -0.001 | 0.003 |
| | (0.86) | (-0.64) | (-1.76*) | (-0.64) | (1.16) |
| PURCHASED | -0.006 | 0.001 | -0.004 | 0.0002 | -0.005 |
| | (-4.40***) | (-1.15) | (-2.20**) | (0.09) | (-1.28) |
| SMALLBUS | -0.011 | 0.002 | 0.004 | 0.010 | 0.0102 |
| | (-6.35***) | (1.00) | (0.95) | (1.60) | (0.73) |
| HHI | 0.0005 | 0.002 | 0.001 | 0.001 | -0.0001 |
| | (1.02) | (4.28***) | (1.93*) | (0.74) | (-0.06) |
| ASSETS | 0.0000 | 0.0000 | 0.0000 | -0.0000 | 0.0000 |
| | (6.34***) | (1.35) | (1.16) | (-0.60) | (1.06) |
| DIVERS | 0.0051 | -0.0002 | -0.002 | -0.0004 | 0.003 |
| | (2.71***) | (-0.16) | (-1.07) | (-0.28) | (1.43) |
| Overall F | 134.62*** | 60.21*** | 14.09*** | 9.69*** | 1.60 |
| Adjusted $R^2$ | 0.1680 | 0.1895 | 0.2342 | 0.1373 | 0.0273 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
SMALLBUS = commercial and industrial loans and commercial real estate loans less than $250,000/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table 3-4

## Rate of Return on Assets (ROA) and Small Business Lending in 1997: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions | | | | |
|---|---|---|---|---|---|
| | **<$100 (n=5,508)** | **$100-$300 (n=2,346)** | **$300-$500 (n=391)** | **$500-$3,000 (n=525)** | **>$3,000 (n=181)** |
| INTERCEPT | 0.009 | 0.003 | 0.006 | 0.0003 | 0.0116 |
| | (5.20***) | (3.56***) | (3.51***) | (0.15) | (3.24***) |
| LOSS | -0.595 | -0.072 | -0.120 | -0.037 | -0.048 |
| | (-7.40***) | (-2.48**) | (-1.66**) | (-0.65) | (-0.68) |
| EQUITY | -0.001 | 0.021 | 0.030 | 0.054 | -0.001 |
| | (-0.48) | (10.07***) | (6.50***) | (9.11***) | (-0.05) |
| OFFBAL | 0.00004 | 0.0001 | 0.001 | 0.0005 | 0.0004 |
| | (24.01***) | (4.26***) | (12.05***) | (4.56***) | (1.99**) |
| SECURITIES | -0.004 | 0.001 | -0.002 | -0.002 | -0.002 |
| | (-2.20**) | (1.67*) | (-1.36) | (1.19) | (-0.66) |
| PURCHASED | -0.004 | -0.001 | -0.004 | 0.001 | -0.007 |
| | (-2.07**) | (-0.83) | (-2.39**) | (0.36) | (-1.64) |
| SMALLBUS | -0.013 | -0.002 | -0.002 | 0.006 | -0.003 |
| | (-5.10***) | (-1.61) | (-0.60) | (1.05) | (-0.20) |
| HHI | 0.001 | 0.0004 | 0.001 | 0.001 | 0.002 |
| | (1.24) | (1.11) | (1.47) | (0.76) | (1.53) |
| ASSETS | 0.0000 | 0.0000 | 0.0000 | -0.0000 | 0.0000 |
| | (5.21***) | (2.08**) | (0.85) | (-0.05) | (1.09) |
| DIVERS | -0.002 | 0.005 | 0.0003 | -0.002 | 0.00003 |
| | (-0.80) | (5.61***) | (0.20) | (-1.23) | (0.01) |
| Overall F | 73.11*** | 21.55*** | 52.68*** | 27.08*** | 1.59 |
| Adjusted $R^2$ | 0.1054 | 0.0731 | 0.5433 | 0.3089 | 0.0283 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
SMALLBUS = commercial and industrial loans and commercial real estate loans less than $250,000/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table 3-5

## Rate of Return on Assets (ROA) and Small Business Lending in 1998: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| | Assets in Millions | | | | |
|---|---|---|---|---|---|
| **Independent Variables[b]** | **<$100 (n=5,105)** | **$100-$300 (n=2,379)** | **$300-$500 (n=439)** | **$500-$3,000 (n=549)** | **>$3,000 (n=171)** |
| INTERCEPT | 0.002 | 0.005 | -0.002 | 0.0012 | 0.010 |
| | (0.99) | (6.26***) | (-0.97) | (0.22) | (2.50**) |
| LOSS | -0.437 | -0.169 | -0.538 | -0.8678 | 0.107 |
| | (-8.11***) | (-7.15***) | (-8.46***) | (-6.08***) | (1.35) |
| EQUITY | 0.011 | 0.036 | 0.091 | 0.049 | 0.019 |
| | (3.63***) | (15.46***) | (17.59***) | (2.81***) | (1.98**) |
| OFFBAL | 0.00004 | 0.001 | 0.0003 | 0.001 | 0.001 |
| | (18.00***) | (25.57***) | (5.24***) | (1.86***) | (3.21***) |
| SECURITIES | -0.002 | 0.002 | -0.006 | -0.014 | -0.007 |
| | (-0.92) | (1.98**) | (-2.93***) | (-2.50**) | (-1.82*) |
| PURCHASED | -0.002 | -0.008 | 0.007 | 0.013 | -0.0002 |
| | (0.71) | (-7.92***) | (2.68***) | (1.80*) | (-0.07) |
| SMALLBUS | -0.011 | 0.0001 | -0.00004 | -0.026 | -0.014 |
| | (-3.36***) | (0.06) | (-0.01) | (-1.48) | (-0.77) |
| HHI | 0.002 | 0.0002 | 0.00001 | -0.0003 | 0.003 |
| | (2.19**) | (0.53) | (0.01) | (-0.11) | (1.46) |
| ASSETS | 0.0000 | 0.0000 | -0.0000 | -0.0000 | 0.0000 |
| | (4.91***) | (4.34***) | (-0.80) | (0.59) | (-0.90) |
| DIVERS | -0.008 | 0.006 | -0.004 | -0.021 | -0.004 |
| | (-2.40**) | (5.64***) | (-1.73*) | (-3.56***) | (-1.71*) |
| Overall F | 53.98*** | 133.37*** | 58.004*** | 7.52*** | 3.76*** |
| Adjusted $R^2$ | 0.0854 | 0.3337 | 0.5389 | 0.0966 | 0.1266 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
SMALLBUS = commercial and industrial loans and commercial real estate loans less than $250,000/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table 3-6

## Rate of Return on Assets (ROA) and Small Business Lending in 1999: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| | Assets in Millions | | | | |
|---|---|---|---|---|---|
| **Independent Variables[b]** | **<$100 (n=4,714)** | **$100-$300 (n=2,422)** | **$300-$500 (n=500)** | **$500-$3,000 (n=564)** | **>$3,000 (n=177)** |
| INTERCEPT | 0.004 | 0.003 | -0.006 | 0.013 | 0.0126 |
| | (1.47) | (3.17***) | (-1.65*) | (1.88*) | (2.19**) |
| LOSS | -0.220 | -0.5604 | -0.537 | -0.7127 | 0.039 |
| | (-1.71*) | (-13.81***) | (-11.54***) | (-4.87***) | (0.37) |
| EQUITY | -0.004 | 0.017 | 0.100 | 0.027 | -0.018 |
| | (-0.97) | (6.35***) | (15.44***) | (1.49) | (-1.64) |
| OFFBAL | 0.0002 | 0.0001 | 0.0004 | -0.0004 | 0.001 |
| | (36.91***) | (6.50***) | (6.30***) | (-1.36) | (5.34***) |
| SECURITIES | 0.004 | 0.008 | -0.004 | -0.020 | 0.007 |
| | (1.54) | (7.19***) | (-1.58) | (-3.34***) | (2.01**) |
| PURCHASED | -0.006 | -0.007 | 0.006 | 0.004 | -0.010 |
| | (-1.74*) | (-5.95***) | (1.71*) | (0.51) | (-1.60) |
| SMALLBUS | -0.019 | 0.0019 | -0.012 | -0.017 | 0.006 |
| | (-4.32***) | (0.63) | (-1.88*) | (-1.09) | (0.30) |
| HHI | 0.001 | 0.001 | 0.002 | -0.002 | 0.0003 |
| | (1.01) | (2.38**) | (1.69*) | (-0.64) | (0.13) |
| ASSETS | 0.0000 | 0.0000 | 0.0000 | -0.0000 | 0.0000 |
| | (5.46***) | (1.45) | (0.06) | (-1.13) | (0.56) |
| DIVERS | 0.005 | 0.011 | 0.005 | -0.019 | 0.014 |
| | (1.13) | (8.93***) | (1.62) | (-3.10***) | (4.55***) |
| Overall F | 161.64*** | 52.94*** | 54.54*** | 4.76*** | 11.78*** |
| Adjusted $R^2$ | 0.2347 | 0.1618 | 0.4908 | 0.0566 | 0.3541 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
SMALLBUS = commercial and industrial loans and commercial real estate loans less than $250,000/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table 3-7

## Rate of Return on Assets (ROA) and Small Business Lending in 2000: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| | Assets in Millions | | | | |
|---|---|---|---|---|---|
| **Independent Variables[b]** | **<$100 (n=4,378)** | **$100-$300 (n=2,518)** | **$300-$500 (n=538)** | **$500-$3,000 (n=581)** | **>$3,000 (n=187)** |
| INTERCEPT | 0.029 | 0.003 | 0.001 | 0.007 | 0.011 |
| | (1.30) | (4.39***) | (0.39) | (2.00**) | (1.59) |
| LOSS | -0.898 | -0.190 | -0.324 | -0.269 | -0.433 |
| | (-1.69**) | (-25.15***) | (-5.80***) | (-4.49***) | (-3.53***) |
| EQUITY | 0.117 | 0.033 | 0.020 | 0.042 | 0.002 |
| | (3.85***) | (15.28***) | (4.57***) | (6.32***) | (0.14) |
| OFFBAL | 0.0003 | 0.0001 | 0.001 | 0.0004 | 0.0004 |
| | (5.50***) | (8.00***) | (8.91***) | (5.01***) | (1.68*) |
| SECURITIES | -0.009 | 0.002 | -0.002 | -0.004 | -0.004 |
| | (-0.42) | (2.56**) | (-0.77) | (-1.33) | (-1.10) |
| PURCHASED | 0.053 | -0.004 | 0.004 | -0.001 | -0.006 |
| | (-1.98**) | (-4.57***) | (1.86*) | (-0.14) | (-0.79) |
| SMALLBUS | -0.03908 | -0.001 | -0.010 | -0.010 | -0.024 |
| | (-1.12) | (-0.54) | (-1.98**) | (-1.23) | (-1.98**) |
| HHI | -0.008 | 0.001 | 0.00045 | 0.001 | 0.002 |
| | (-0.80) | (2.31**) | (0.43) | (0.55) | (1.20) |
| ASSETS | 0.0000 | 0.0000 | 0.0000 | -0.0000 | 0.0000 |
| | (0.90) | (0.28) | (1.69*) | (-1.74*) | (-0.36) |
| DIVERS | -0.001 | 0.006 | -0.004 | -0.008 | 0.004 |
| | (-0.02) | (5.88***) | (-1.76*) | (-3.04***) | (1.24) |
| Overall F | 121.53*** | 121.11*** | 27.68*** | 16.94*** | 5.16*** |
| Adjusted $R^2$ | 0.2120 | 0.3004 | 0.3086 | 0.1980 | 0.1668 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
SMALLBUS = commercial and industrial loans and commercial real estate loans less than $250,000/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table 3-8

## Rate of Return on Assets (ROA) and Small Business Lending in 2001: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| | Assets in Millions | | | | |
|---|---|---|---|---|---|
| **Independent Variables[b]** | **<$100 (n=3,970)** | **$100-$300 (n=2,526)** | **$300-$500 (n=587)** | **$500-$3,000 (n=658)** | **>$3,000 (n=188)** |
| INTERCEPT | 0.004 | 0.004 | -0.007 | 0.008 | 0.015 |
| | (1.58) | (5.16***) | (-2.08**) | (3.62***) | (2.01**) |
| LOSS | -0.591 | -0.0174 | -0.232 | -0.010 | -0.247 |
| | (-5.76***) | (-0.68) | (-3.74***) | (-0.27) | (-2.62***) |
| EQUITY | -0.009 | 0.024 | 0.088 | 0.016 | 0.002 |
| | (-2.10**) | (10.82***) | (18.11***) | (3.70***) | (0.15) |
| OFFBAL | 0.0002 | 0.0000 | 0.0001 | 0.001 | 0.0003 |
| | (34.32***) | (8.12***) | (0.89) | (9.43***) | (1.34) |
| SECURITIES | 0.011 | 0.003 | 0.002 | 0.002 | -0.002 |
| | (4.12***) | (3.48***) | (0.61) | (1.16) | (-0.54) |
| PURCHASED | -0.008 | -0.006 | 0.0003 | -0.006 | -0.011 |
| | (-2.29**) | (-6.22***) | (0.10) | (-2.42**) | (-1.25) |
| SMALLBUS | -0.01508 | -0.002 | 0.001 | -0.011 | -0.002 |
| | (-3.47***) | (-1.01) | (0.21) | (-3.05***) | (-0.14) |
| HHI | -0.0000 | 0.0004 | 0.0004 | 0.001 | -0.001 |
| | (-0.01) | (1.34) | (0.41) | (1.70*) | (-0.54) |
| ASSETS | 0.0000 | 0.0000 | 0.0000 | -0.0000 | 0.0000 |
| | (3.93***) | (3.09***) | (0.86) | (-0.50) | (0.30) |
| DIVERS | 0.007 | 0.005 | 0.008 | 0.004 | 0.0003 |
| | (1.94*) | (5.07***) | (2.84***) | (2.14**) | (0.09) |
| Overall F | 153.88*** | 36.65*** | 55.85*** | 19.62*** | 3.54*** |
| Adjusted $R^2$ | 0.2574 | 0.1127 | 0.4568 | 0.2030 | 0.1086 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
SMALLBUS = commercial and industrial loans and commercial real estate loans less than $250,000/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table 4-1

## Mean Rate of Return on Assets and Standard Deviation of ROA: 1994-2001 Two-Stage Regression Analyses for U. S. Commercial Banks by Asset Size Group Using Quarterly Data (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| | **All sizes (n=31)** | **<$100 (n=31)** | **$100-$300 (n=31)** | **$300-$500 (n=31)** | **$500-$3,000 (n=31)** | **>$3,000 (n=31)** |
| INTERCEPT | 0.006 | 0.006 | 0.003 | 0.004 | 0.004 | 0.002 |
| | (8.93***) | (9.18***) | (2.87***) | (5.28***) | (4.51***) | (2.76***) |
| SIGMA(ROA) | 0.050 | 0.038 | 0.729 | 0.541 | 0.426 | 1.010 |
| | (2.77***) | (3.09***) | (5.33***) | (7.19***) | (4.30***) | (8.39***) |
| Overall F | 7.64*** | 9.54*** | 28.42*** | 51.69*** | 18.50*** | 70.44*** |
| Adjusted $R^2$ | 0.1765 | 0.2159 | 0.4694 | 0.6205 | 0.3608 | 0.6914 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

SIGMA(ROA) = standard deviation of ROAs for banks in each group and quarter.

## Table 4-2

## Mean Rate of Return on Assets and One-Year T-Bill Rates: 1994-2001 Two-Stage Regression Analyses for U. S. Commercial Banks by Asset Size Group Using Quarterly Data (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| | **All sizes (n=31)** | **<$100 (n=31)** | **$100-$300 (n=31)** | **$300-$500 (n=31)** | **$500-$3,000 (n=31)** | **>$3,000 (n=31)** |
| INTERCEPT | 0.006 | 0.006 | 0.002 | 0.002 | 0.004 | 0.002 |
| | (4.32***) | (4.34***) | (1.50) | (1.59) | (2.34**) | (1.77*) |
| SIGMA(ROA) | 0.050 | 0.038 | 0.732 | 0.563 | 0.428 | 1.010 |
| | (2.71**) | (3.03***) | (5.28***) | (7.44***) | (4.25***) | (8.25***) |
| TBILL | -0.017 | -0.017 | 0.036 | 0.101 | 0.033 | -0.002 |
| | (-0.19) | (-0.19) | (0.48) | (1.40) | (0.36) | (-0.03) |
| Overall F | 3.72** | 4.63** | 13.96*** | 27.65*** | 9.04*** | 34.05*** |
| Adjusted $R^2$ | 0.1491 | 0.1899 | 0.4554 | 0.6323 | 0.3417 | 0.6807 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

SIGMA(ROA) = standard deviation of ROAs for banks in each group and quarter

TBILL = one-year T-bill rate in each quarter.

## Table 4-3

## Mean Rate of Return on Assets and Mean Mid-Year Small Business Lending: 1994-2001 Regression Analyses for U. S. Commercial Banks by Asset Size Group Using Quarterly Data (t statistics in parentheses[a])

| | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| **Independent Variables[b]** | **All sizes (n=31)** | **<$100 (n=31)** | **$100-$300 (n=31)** | **$300-$500 (n=31)** | **$500-$3,000 (n=31)** | **>$3,000 (n=31)** |
| INTERCEPT | 0.017 | 0.019 | 0.006 | 0.005 | 0.011 | 0.012 |
| | (2.49**) | (3.09***) | (1.09) | (0.89) | (1.76*) | (2.73**) |
| SIGMA(ROA) | 0.064 | 0.052 | 0.735 | 0.541 | 0.457 | 1.084 |
| | (3.26***) | (3.92***) | (5.30***) | (7.07***) | (4.44***) | (9.21***) |
| MEAN(SBL) | -0.173 | -0.217 | -0.048 | -0.012 | -0.017 | -0.164 |
| | (-1.61) | (-2.20**) | (-0.58) | (-0.15) | (-1.07) | (-2.24**) |
| Overall F | 5.32** | 7.77*** | 14.06*** | 25.01*** | 9.86*** | 42.47*** |
| Adjusted $R^2$ | 0.2178 | 0.3040 | 0.4573 | 0.6077 | 0.3637 | 0.7279 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

SIGMA(ROA) = standard deviation of ROAs for banks in each group and quarter

MEAN(SBL) = mean small business loans less than $250,000 in each group and year (June data used for four quarters due to the unavailability of small business data on a quarterly basis).

## Table 4-4

## Mean Rate of Return on Assets and Mean Mid-Year Small Business Lending: 1994-2001 Regression Analyses for U. S. Commercial Banks by Asset Size Group Using Quarterly Data (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions: All sizes (n=31) | <$100 (n=31) | $100-$300 (n=31) | $300-$500 (n=31) | $500-$3,000 (n=31) | >$3,000 (n=31) |
|---|---|---|---|---|---|---|
| INTERCEPT | 0.017 | 0.020 | 0.007 | 0.006 | 0.012 | 0.013 |
| | (2.50**) | (3.13***) | (1.22) | (1.20) | (1.92*) | (2.89***) |
| SIGMA(ROA) | 0.064 | 0.052 | 0.742 | 0.569 | 0.476 | 1.104 |
| | (3.22***) | (3.90***) | (5.31***) | (7.43***) | (4.52***) | (9.27***) |
| TBILL | 0.042 | 0.057 | 0.065 | 0.127 | 0.091 | 0.073 |
| | (0.44) | (0.65) | (0.78) | (1.60) | (0.92) | (1.03) |
| MEAN(SBL) | -0.192 | -0.243 | -0.077 | -0.068 | -0.153 | -0.200 |
| | (-1.63) | (-2.25**) | (-0.84) | (-0.80) | (-1.36) | (-2.47**) |
| Overall F | 3.51** | 5.22*** | 9.45*** | 18.42*** | 6.82*** | 28.73*** |
| Adjusted $R^2$ | 0.1954 | 0.2899 | 0.4498 | 0.6277 | 0.3604 | 0.7285 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

SIGMA(ROA) = standard deviation of ROAs for banks in each group and quarter

TBILL = one-year T-bill rate in each quarter

MEAN(SBL) = mean small business loans less than $250,000 in each group and year (June data used for four quarters due to the unavailability of small business data on a quarterly basis).

## Table 4-5

## Mean Rate of Return on Assets and Estimated Quarterly Spline Fitted Small Business Lending: 1994-2001 Regression Analyses for U. S. Commercial Banks by Asset Size Group Using Quarterly Data (t statistics in parentheses[a])

| | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| **Independent Variables[b]** | **All sizes (n=31)** | **<$100 (n=31)** | **$100-$300 (n=31)** | **$300-$500 (n=31)** | **$500-$3,000 (n=31)** | **>$3,000 (n=31)** |
| INTERCEPT | 0.013 | 0.015 | -0.003 | 0.004 | 0.009 | 0.008 |
| | (1.73*) | (1.91*) | (-0.32) | (0.66) | (1.62) | (1.34) |
| SIGMA(ROA) | 0.059 | 0.046 | 0.732 | 0.542 | 0.466 | 1.009 |
| | (2.84***) | (3.28***) | (5.29***) | (7.00***) | (4.19***) | (8.37***) |
| ESTMEAN(SBL) | -0.108 | -0.017 | 0.068 | -0.002 | -0.077 | -0.184 |
| | (-0.92) | (-1.18) | (0.63) | (-0.02) | (-0.81) | (-0.95) |
| Overall F | 4.22** | 5.52*** | 14.13*** | 24.98*** | 9.47*** | 35.54*** |
| Adjusted $R^2$ | 0.1720 | 0.2258 | 0.4586 | 0.6074 | 0.3534 | 0.6903 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

SIGMA(ROA) = standard deviation of ROAs for banks in each group and quarter

ESTMEAN(SBL) = estimated mean small business loans less than $250,000 in each group and year (quarterly spline fitted data used based on annual June data).

## Table 4-6

## Mean Rate of Return on Assets and Estimated Quarterly Spline Fitted Small Business Lending: 1994-2001 Regression Analyses for U. S. Commercial Banks by Asset Size Group Using Quarterly Data (t statistics in parentheses[a])

| | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| **Independent Variables[b]** | **All sizes (n=31)** | **<$100 (n=31)** | **$100-$300 (n=31)** | **$300-$500 (n=31)** | **$500-$3,000 (n=31)** | **>$3,000 (n=31)** |
| INTERCEPT | 0.013 | 0.015 | -0.002 | 0.006 | 0.009 | 0.008 |
| | (1.69) | (1.89*) | (-0.24) | (0.95) | (1.67) | (1.33) |
| SIGMA(ROA) | 0.060 | 0.046 | 0.733 | 0.574 | 0.483 | 1.010 |
| | (2.80***) | (3.24***) | (5.21***) | (7.29***) | (4.20***) | (8.24***) |
| TBILL | 0.017 | 0.029 | 0.021 | 0.119 | 0.065 | 0.017 |
| | (0.17) | (0.31) | (0.25) | (1.51) | (0.68) | (0.23) |
| ESTMEAN(SBL) | -0.116 | -0.185 | 0.056 | -0.049 | -0.101 | -0.197 |
| | (-0.90) | (-1.18) | (0.48) | (-0.60) | (-0.99) | (-0.96) |
| Overall F | 2.73** | 3.60** | 9.14*** | 18.15*** | 6.35*** | 22.94*** |
| Adjusted $R^2$ | 0.1433 | 0.2008 | 0.4405 | 0.6240 | 0.3411 | 0.6798 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

SIGMA(ROA) = standard deviation of ROAs for banks in each group and quarter

TBILL = one-year T-bill rate in each quarter

ESTMEAN(SBL) = estimated mean small business loans less than $250,000 in each group and year (quarterly spline fitted data used based on annual June data).

## Table 4-7

## Mean Mid-Year Small Business Loans and Standard Deviation of ROA: 1994-2001 Two-Stage Regression Analyses for U. S. Commercial Banks by Asset Size Group Using Quarterly Data (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| | **All sizes (n=31)** | **<$100 (n=31)** | **$100-$300 (n=31)** | **$300-$500 (n=31)** | **$500-$3,000 (n=31)** | **>$3,000 (n=31)** |
| INTERCEPT | 0.062 | 0.062 | 0.063 | 0.064 | 0.061 | 0.061 |
| | (55.95***) | (58.16***) | (29.29***) | (37.97***) | (34.86***) | (30.69***) |
| SIGMA(ROA) | 0.082 | 0.062 | 0.115 | 0.004 | 0.292 | 0.454 |
| | (2.76***) | (2.92***) | (0.38) | (0.025) | (1.63) | (1.61) |
| Overall F | 7.64*** | 8.51*** | 0.14 | 0.00 | 2.66** | 2.58** |
| Adjusted $R^2$ | 0.1764 | 0.1950 | 0.0284 | 0.0333 | 0.0507 | 0.0486 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

SIGMA(ROA) = standard deviation of ROAs for banks in each group and quarter.

## Table 4-8

## Mean Rate of Return on Assets and Residual Mid-Year Small Business Lending: 1994-2001 Two-Stage Regression Analyses for U. S. Commercial Banks by Asset Size Group Using Quarterly Data (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| | **All sizes (n=31)** | **<$100 (n=31)** | **$100-$300 (n=31)** | **$300-$500 (n=31)** | **$500-$3,000 (n=31)** | **>$3,000 (n=31)** |
| INTERCEPT | 0.006 | 0.006 | 0.003 | 0.004 | 0.004 | 0.002 |
| | (9.17***) | (9.75***) | (2.84***) | (5.19***) | (4.52***) | (2.94***) |
| SIGMA(ROA) | 0.050 | 0.038 | 0.729 | 0.541 | 0.426 | 1.010 |
| | (2.84***) | (3.28***) | (5.27***) | (7.07***) | (4.31***) | (8.94***) |
| RESIDUAL(SBL) | -0.173 | -0.217 | -0.048 | -0.012 | -0.107 | -0.164 |
| | (-1.61) | (-2.19**) | (-0.58) | (-0.15) | (-1.07) | (-2.24**) |
| Overall F | 5.32** | 7.77*** | 14.06*** | 25.01*** | 9.86*** | 42.47*** |
| Adjusted $R^2$ | 0.2178 | 0.3040 | 0.4573 | 0.6077 | 0.3637 | 0.7279 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

SIGMA(ROA) = standard deviation of ROAs for banks in each group and quarter

RESIDUAL(SBL) = first-stage regression model residual for small business loans less than $250,000 in each group and year (June data used for four quarters due to the unavailability of small business data on a quarterly basis).

## Table 4-9

## Mean Estimated Quarterly Spline Fitted Small Business Loans and Standard Deviation of ROA: 1994-2001 Two-Stage Regression Analyses for U. S. Commercial Banks by Asset Size Group Using Quarterly Data (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| | **All sizes (n=31)** | **<$100 (n=31)** | **$100-$300 (n=31)** | **$300-$500 (n=31)** | **$500-$3,000 (n=31)** | **>$3,000 (n=31)** |
| INTERCEP | 0.062 | 0.054 | 0.084 | 0.078 | 0.055 | 0.029 |
| | (59.72***) | (68.67***) | (50.32***) | (44.54***) | (29.20***) | (36.92***) |
| SIGMA(ROA) | 0.090 | 0.049 | -0.037 | 0.142 | 0.521 | -0.004 |
| | (3.23***) | (3.12***) | (0.16) | (0.78) | (2.71**) | (-0.03) |
| Overall F | 10.45*** | 9.73*** | 0.02 | 0.61 | 7.37** | 0.00 |
| Adjusted $R^2$ | 0.2336 | 0.2197 | 0.0325 | 0.0126 | 0.1704 | 0.0333 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

SIGMA(ROA) = standard deviation of ROAs for banks in each group and quarter.

## Table 4-10

### Mean Rate of Return on Assets and Residual Estimated Quarterly Spline Fitted Small Business Lending: 1994-2001 Two-Stage Regression Analyses for U. S. Commercial Banks by Asset Size Group Using Quarterly Data (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| | **All sizes (n=31)** | **<$100 (n=31)** | **$100-$300 (n=31)** | **$300-$500 (n=31)** | **$500-$3,000 (n=31)** | **>$3,000 (n=31)** |
| INTERCEP | 0.006 | 0.006 | 0.003 | 0.004 | 0.004 | 0.002 |
| | (8.91***) | (9.24***) | (2.84***) | (5.19***) | (4.49***) | (2.76***) |
| SIGMA(ROA) | 0.050 | 0.038 | 0.729 | 0.541 | 0.426 | 1.009 |
| | (2.76***) | (3.11***) | (5.28***) | (7.07***) | (4.28***) | (8.38***) |
| RESIDUALEST(SBL) | -0.108 | -0.165 | -0.068 | -0.002 | -0.077 | -0.184 |
| | (-0.92) | (-1.18) | (0.63) | (-0.02) | (-0.81) | (-0.95) |
| Overall F | 4.22** | 5.52*** | 14.13*** | 24.98*** | 9.47*** | 35.54*** |
| Adjusted $R^2$ | 0.1720 | 0.2258 | 0.4586 | 0.6074 | 0.3534 | 0.6903 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

SIGMA(ROA) = standard deviation of ROAs for banks in each group and quarter

RESIDUAL(SBL) = first-stage regression model residual for quarterly spline fitted small business loans less than $250,000 in each group and year(quarterly spline fitted data used based on annual June data).

## Table 5-1

## Equity Return and Bank Risk by Bank Size and Lending Type

### A. Banks with Total Assets Less Than $100 Million

| Lender Type | Expected Equity Return | Lender Type Std. Dev. | Lender Type Slope | Lender Type Probability | Efficient Frontier Std. Dev. | Efficient Frontier Slope | Efficient Frontier Probability | Difference in Probability of Failure |
|---|---|---|---|---|---|---|---|---|
| Agricultural | 0.0690 | 0.0287 | 37.25 | 0.0721 | 0.0271 | 39.45 | 0.0642 | 0.0079 |
| Balanced Lender | 0.0651 | 0.0296 | 35.98 | 0.0772 | 0.0252 | 42.27 | 0.0559 | 0.0213 |
| Large Business Lenders | 0.0587 | 0.0286 | 37.02 | 0.0729 | 0.0231 | 45.83 | 0.0476 | 0.0253 |
| Consumer Lenders | 0.0702 | 0.0333 | 32.14 | 0.0968 | 0.0333 | 32.14 | 0.0968 | 0 |
| Real Estate Lenders | 0.0654 | 0.0305 | 34.93 | 0.0819 | 0.0253 | 42.11 | 0.0563 | 0.0256 |
| Small Business Lenders | 0.0519 | 0.0236 | 44.57 | 0.0503 | 0.0228 | 46.28 | 0.0467 | 0.0036 |
| Random Sample (n=75) | 0.0585 | 0.0260 | 40.71 | 0.0603 | 0.0230 | 46.02 | 0.0472 | 0.0131 |

### B. Banks with Total Assets Between $100-$300 Million

| Lender Type | Expected Equity Return | Lender Type Std. Dev. | Lender Type Slope | Lender Type Probability | Efficient Frontier Std. Dev. | Efficient Frontier Slope | Efficient Frontier Probability | Difference in Probability of Failure |
|---|---|---|---|---|---|---|---|---|
| Agricultural | 0.0822 | 0.0349 | 31.01 | 0.1040 | 0.0348 | 31.10 | 0.1034 | 0.0006 |
| Balanced Lender | 0.0787 | 0.0346 | 31.18 | 0.1029 | 0.0320 | 33.71 | 0.0880 | 0.0149 |
| Large Business Lenders | 0.0626 | 0.0377 | 28.19 | 0.1259 | 0.0296 | 36.22 | 0.0762 | 0.0497 |
| Consumer Lenders | 0.0792 | 0.0345 | 31.28 | 0.1022 | 0.0322 | 33.52 | 0.0890 | 0.0132 |
| Real Estate Lenders | 0.0815 | 0.0392 | 27.59 | 0.1314 | 0.0336 | 32.19 | 0.0965 | 0.0349 |
| Small Business Lenders | 0.0817 | 0.0362 | 29.88 | 0.1120 | 0.0337 | 32.10 | 0.0971 | 0.0149 |
| Random Sample (n=75) | 0.0783 | 0.0353 | 30.54 | 0.1071 | 0.0318 | 33.91 | 0.0870 | 0.1546 |

**Table 5-1, continued**

**C. Banks with Total Assets Between $300-$500 Million**

| Lender Type | Expected Equity Return | Lender Type Std. Dev. | Lender Type Slope | Lender Type Probability | Efficient Frontier Std. Dev. | Efficient Frontier Slope | Efficient Frontier Probability | Difference in Probability of Failure |
|---|---|---|---|---|---|---|---|---|
| Agricultural | 0.0879 | 0.0388 | 28.04 | 0.1272 | 0.0380 | 28.63 | 0.1220 | 0.0052 |
| Balanced Lender | 0.0825 | 0.0365 | 29.66 | 0.1137 | 0.0348 | 31.11 | 0.1033 | 0.0104 |
| Large Business Lenders | 0.0828 | 0.0348 | 31.11 | 0.1033 | 0.0348 | 31.11 | 0.1033 | 0 |
| Consumer Lenders | 0.0933 | 0.0462 | 23.66 | 0.1786 | 0.0462 | 23.66 | 0.1786 | 0 |
| Real Estate Lenders | 0.0885 | 0.0391 | 27.84 | 0.1290 | 0.0385 | 28.27 | 0.1251 | 0.0039 |
| Small Business Lenders | 0.0880 | 0.0382 | 28.48 | 0.1233 | 0.0381 | 28.56 | 0.1226 | 0.0007 |
| Random Sample (n=75) | 0.0874 | 0.0405 | 26.85 | 0.1387 | 0.0376 | 28.92 | 0.1196 | 0.0191 |

**D. Banks with Total Assets Between $500 Million - $3 Billion**

| Lender Type | Expected Equity Return | Lender Type Std. Dev. | Lender Type Slope | Lender Type Probability | Efficient Frontier Std. Dev. | Efficient Frontier Slope | Efficient Frontier Probability | Difference in Probability of Failure |
|---|---|---|---|---|---|---|---|---|
| Agricultural | 0.0927 | 0.0414 | 26.39 | 0.1435 | 0.0403 | 27.11 | 0.1360 | 0.0075 |
| Balanced Lender | 0.0876 | 0.0377 | 28.85 | 0.1202 | 0.0376 | 28.93 | 0.1195 | 0.0007 |
| Large Business Lenders | 0.0881 | 0.0385 | 28.26 | 0.1252 | 0.0378 | 28.79 | 0.1207 | 0.0045 |
| Consumer Lenders | 0.0962 | 0.0430 | 25.49 | 0.1539 | 0.0430 | 25.49 | 0.1539 | 0 |
| Real Estate Lenders | 0.0924 | 0.0403 | 27.11 | 0.1361 | 0.0402 | 27.17 | 0.1354 | 0.0007 |
| Small Business Lenders | 0.0861 | 0.0370 | 29.35 | 0.1161 | 0.0370 | 29.35 | 0.1161 | 0 |
| Random Sample (n=75) | 0.0861 | 0.0370 | 29.35 | 0.1161 | 0.0399 | 27.37 | 0.1335 | -0.0174 |

**Table 5-1, continued**

**E. Banks with Total Assets Greater Than $3 Billion**

| Lender Type | Expected Equity Return | Lender Type Std. Dev. | Lender Type Slope | Lender Type Probability | Efficient Frontier Std. Dev. | Efficient Frontier Slope | Efficient Frontier Probability | Difference in Probability of Failure |
|---|---|---|---|---|---|---|---|---|
| Agricultural | 0.1016 | 0.0461 | 23.90 | 0.1751 | 0.0447 | 24.64 | 0.1647 | 0.0104 |
| Balanced Lender | 0.1017 | 0.0478 | 23.05 | 0.1882 | 0.0448 | 24.59 | 0.1654 | 0.0228 |
| Large Business Lenders | 0.0941 | 0.0417 | 26.24 | 0.1453 | 0.0415 | 26.36 | 0.1439 | 0.0014 |
| Consumer Lenders | 0.1169 | 0.0520 | 21.48 | 0.2168 | 0.0520 | 21.48 | 0.2168 | 0 |
| Real Estate Lenders | 0.0976 | 0.0472 | 23.25 | 0.1849 | 0.0430 | 25.53 | 0.1535 | 0.0314 |
| Small Business Lenders | 0.0938 | 0.0417 | 26.23 | 0.1453 | 0.0415 | 26.36 | 0.1439 | 0.0014 |
| Random Sample (n=75) | 0.1006 | 0.0454 | 24.24 | 0.1702 | 0.0443 | 24.84 | 0.1620 | 0.0082 |

igure 1. Portfolio Analysis, Bank Investments, and the Probability of Bankruptcy

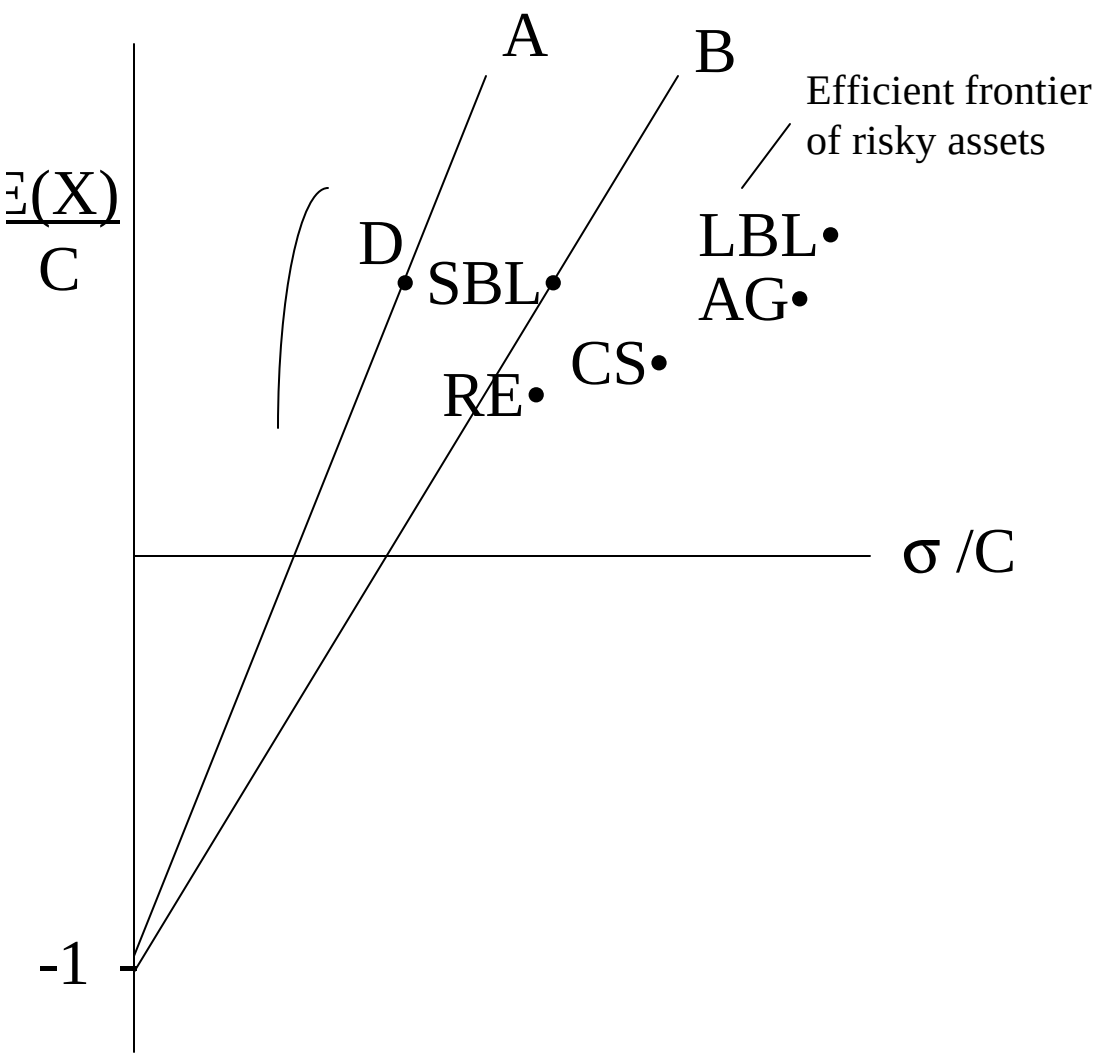
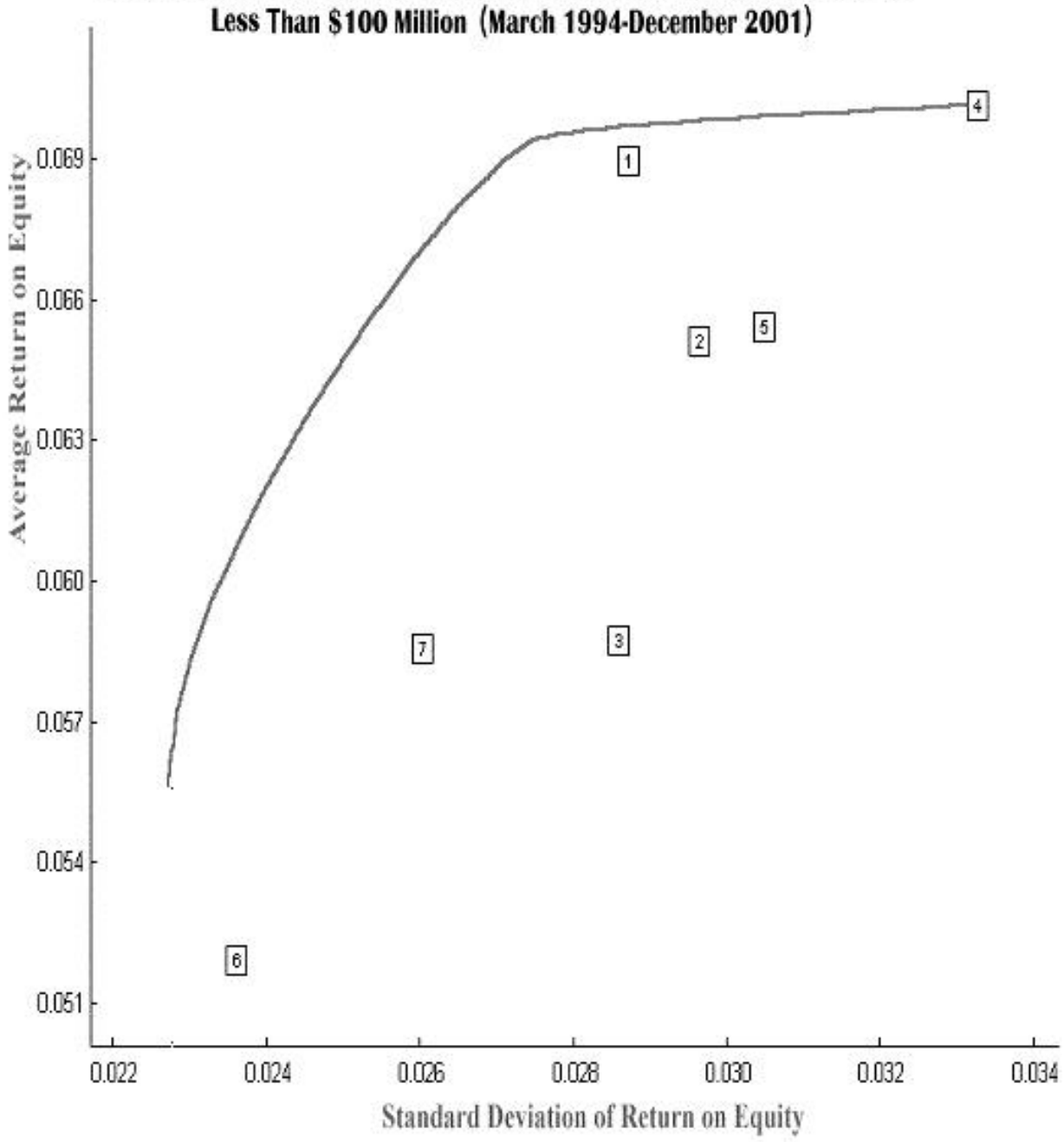
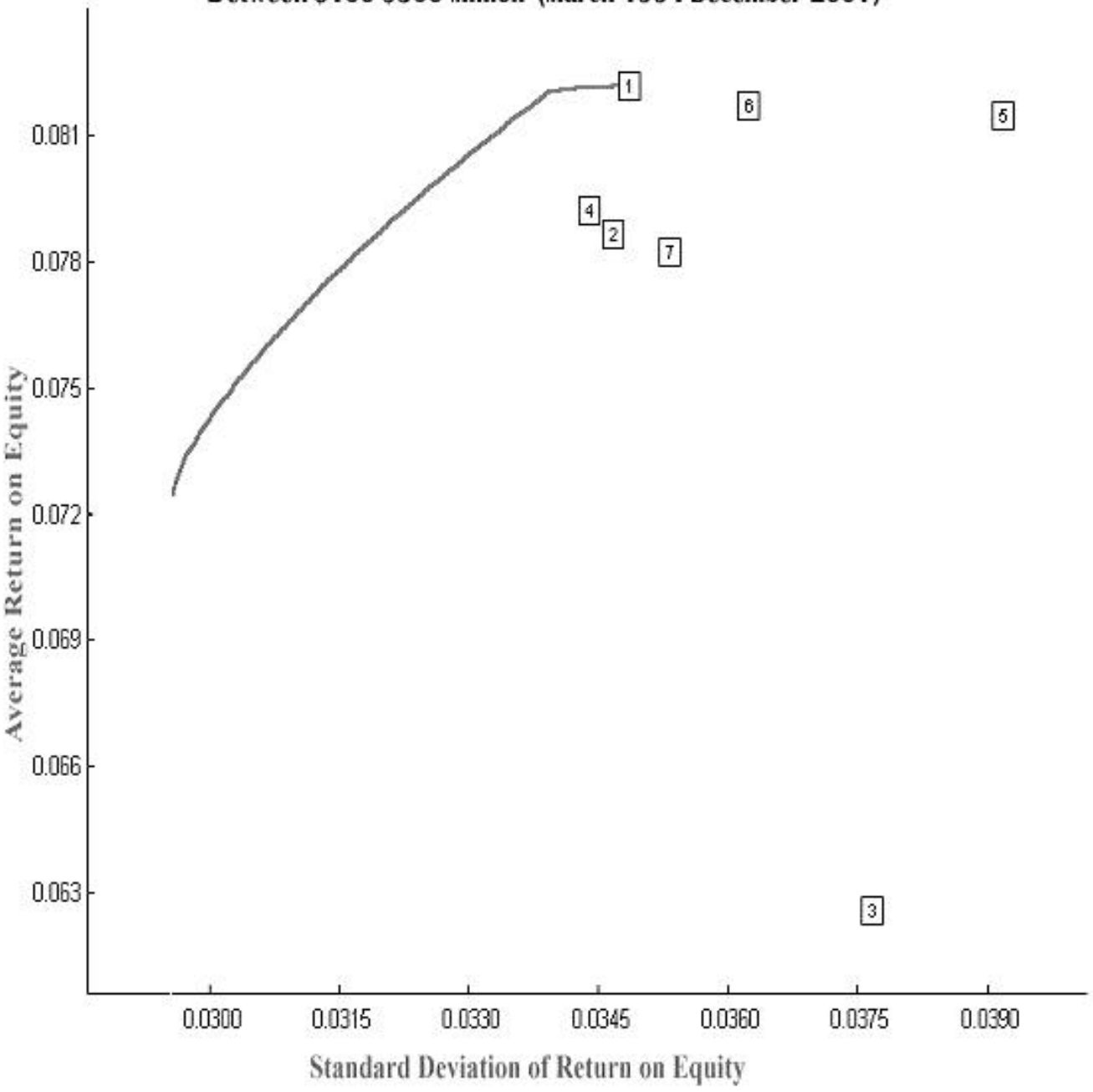


**Figure 2: Efficient Frontier of Return on Equity: Banks with Total Assets Less Than $100 Million (March 1994-December 2001)**



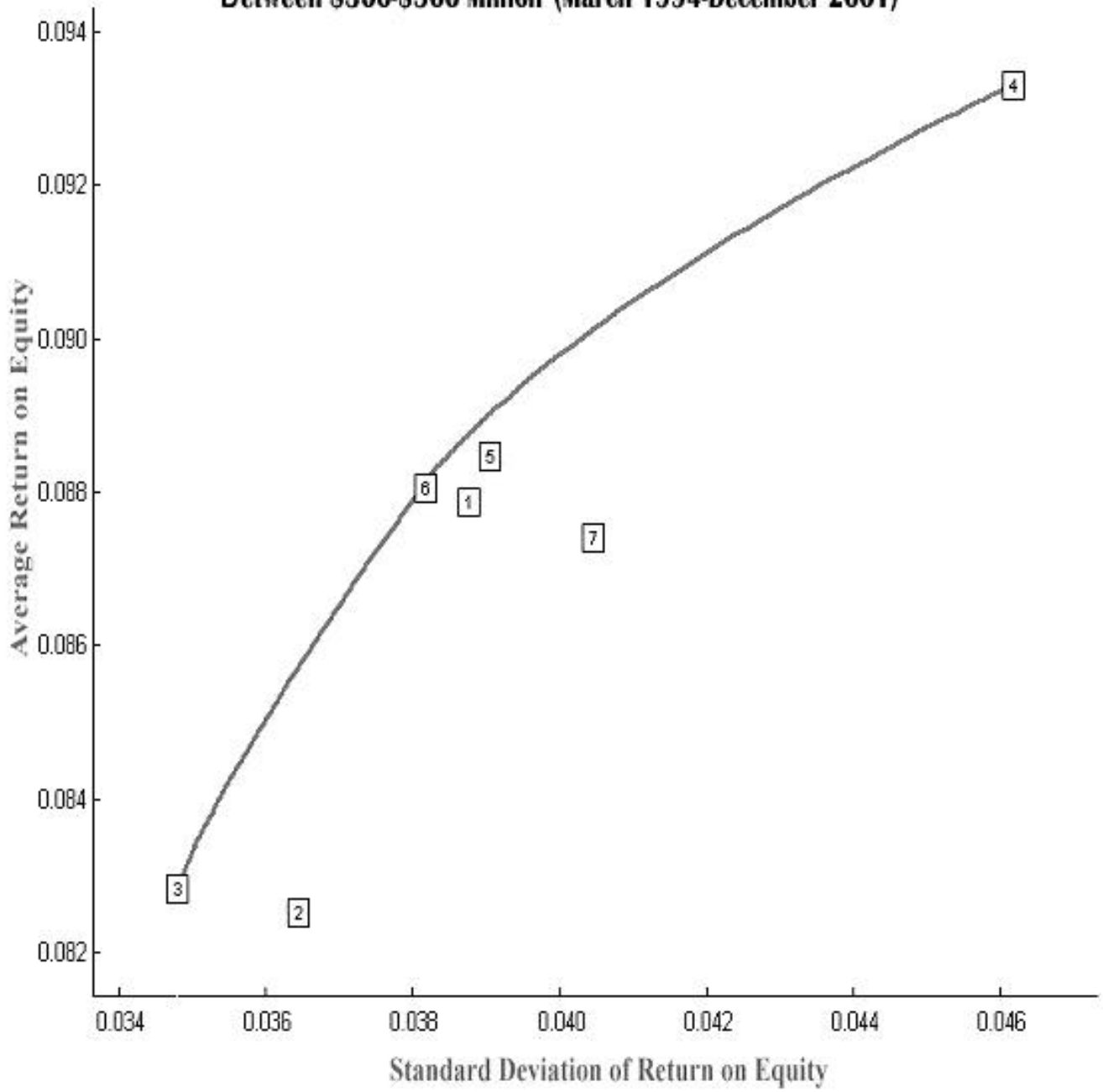

1 Agricultural Lenders
2 Balanced Lenders
3 Large Business Lenders >$250K
4 Consumer Lenders
5 Real Estate Lenders
6 Small Business Lenders <$250K
7 Random Sample (N=75)

**Figure 3: Efficient Frontier of Return on Equity: Banks with Total Assets Between $100-$300 Million (March 1994-December 2001)**




1 Agricultural Lenders
2 Balanced Lenders
3 Large Business Lenders >$250K
4 Consumer Lenders
5 Real Estate Lenders
6 Small Business Lenders <$250K
7 Random Sample (N=75)

**Figure 4: Efficient Frontier of Return on Equity: Banks with Total Assets Between $300-$500 Million (March 1994-December 2001)**




1 Agricultural Lenders
2 Balanced Lenders
3 Large Business Lenders >$250K
4 Consumer Lenders
5 Real Estate Lenders
6 Small Business Lenders <$250K
7 Random Sample (N=75)

**Figure 5: Efficient Frontier of Return on Equity: Banks with Total Assets Between $500 Million-$3 Billion (March 1994-December 2001)**

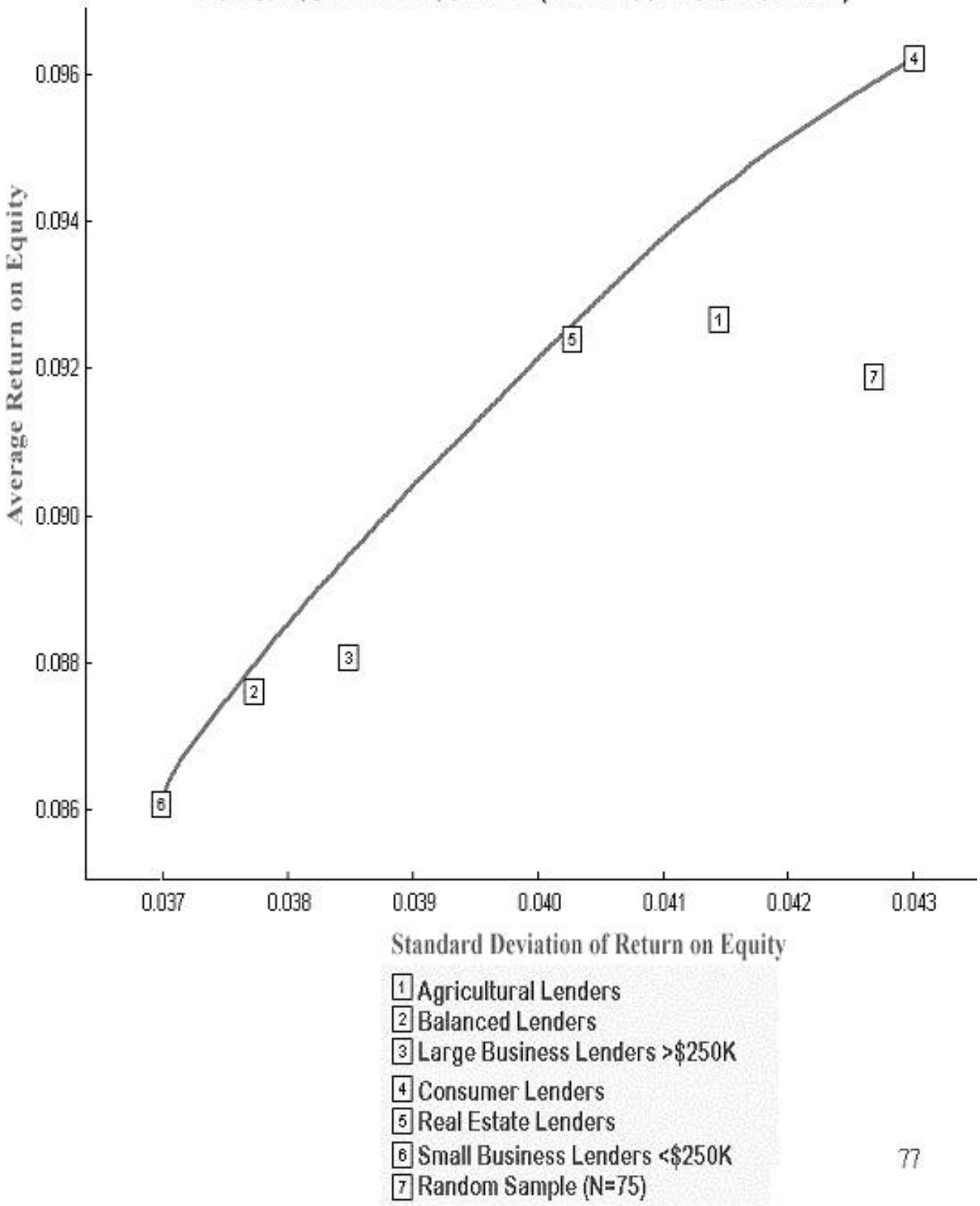
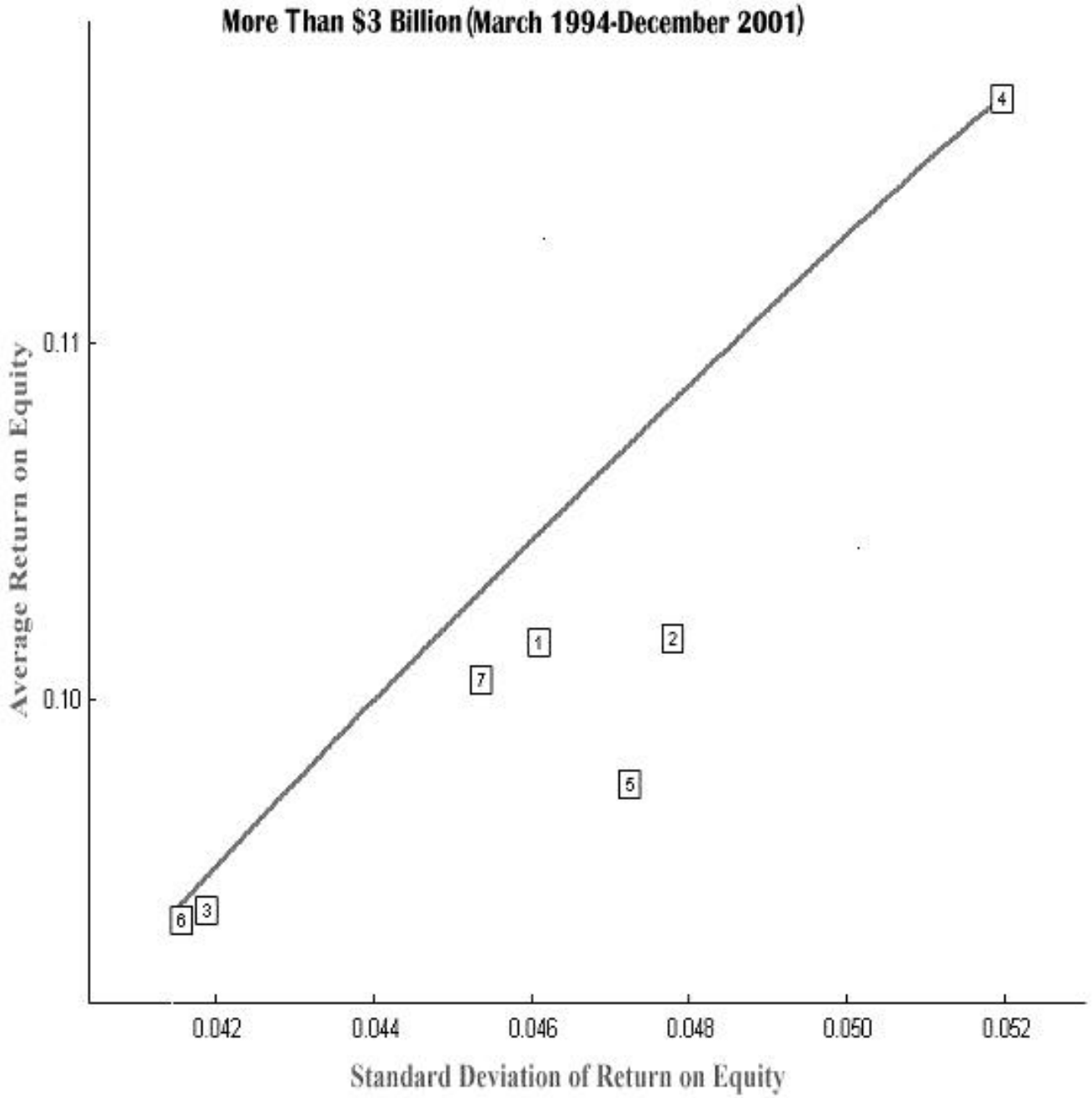


**Figure 6: Efficient Frontier of Return on Equity: Banks with Total Assets More Than $3 Billion (March 1994-December 2001)**



# APPENDIX A
# Large Business Lending and Bank Profitability

## Table A-1

### Average Rates of Return on Assets (ROA) for U.S. Commercial Banks in the Period June 1994-June 2001: Means and t-Tests for Decile Rankings by Large Business Lending Activity and Bank Asset Size Groups (in percent)

| | Assets in Millions | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <$100 | | $100-$300 | | $300-$500 | | $500-$3000 | | >$3000 | | All Banks | |
| Decile | Mean | n | Mean | n | Mean | n | Mean | n | Mean | n | Mean | n |
| 1 | 1.04 | 5242 | 0.77 | 1324 | 1.42 | 182 | 1.26 | 264 | 1.07 | 136 | 1.01 | 7148 |
| 2-3 | 0.51 | 8494 | 0.61 | 4474 | 0.65 | 717 | 0.64 | 543 | 0.92 | 68 | 0.56 | 14296 |
| 4-7 | 0.53 | 16967 | 0.60 | 7991 | 0.62 | 1597 | 0.62 | 1747 | 0.66 | 290 | 0.56 | 28592 |
| 8-9 | 0.52 | 8857 | 0.57 | 3238 | 0.59 | 751 | 0.64 | 1060 | 0.66 | 390 | 0.55 | 14296 |
| 10 | 0.43 | 3829 | 0.57 | 1680 | 0.62 | 367 | 0.60 | 679 | 0.62 | 594 | 0.51 | 7149 |
| All | 0.58 | 43389 | 0.61 | 18707 | 0.66 | 3614 | 0.66 | 4293 | 0.70 | 1478 | 0.60 | 71481 |

**t-Tests for Mean Differences**[ab]

| | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| Decile Comparisons | <$100 | $100-$300 | $300-$500 | $500-$3000 | >$3000 | All Banks |
| 1 vs. 10 | 2.92*** | 5.08*** | 5.18*** | 4.16*** | 4.40*** | 3.29*** |
| 2 and 3 vs. 8 and 9 | -1.18 | 3.87*** | 2.87*** | 0.21 | 2.60** | 1.11 |
| 1, 2, 3 vs. 8, 9, 10 | 2.75*** | 6.30*** | 5.53*** | 4.07*** | 5.06*** | 3.36*** |

[a]Not available (na) due to small sample sizes.

[b]Asterisks indicate the level of significance: *--.10, **--.05, and ***--.01.

## Table A-2

## Rate of Return on Assets (ROA) and Large Business Lending in 1994: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| | Assets in Millions | | | | |
|---|---|---|---|---|---|
| **Independent Variables[b]** | **<$100 (n=7,187)** | **$100-$300 (n=2,081)** | **$300-$500 (n=370)** | **$500-$3,000 (n=451)** | **>$3,000 (n=181)** |
| INTERCEPT | 0.001 | -0.002 | -0.006 | 0.004 | -0.003 |
| | (1.58) | (-1.09) | (-2.42**) | (2.79***) | (-0.80) |
| LOSS | -0.670 | -0.913 | -0.602 | -0.271 | 0.084 |
| | (-13.99***) | (-14.43***) | (-5.14***) | (-3.91***) | (0.57) |
| EQUITY | 0.029 | 0.049 | 0.057 | 0.016 | 0.093 |
| | (15.17***) | (11.21***) | (5.74***) | (2.54**) | (4.69***) |
| OFFBAL | 0.000 | 0.001 | 0.002 | 0.001 | 0.002 |
| | (18.97***) | (2.07**) | (6.32***) | (6.44***) | (5.35***) |
| SECURITIES | -0.003 | 0.006 | 0.002 | -0.002 | -0.002 |
| | (-3.52***) | (4.10***) | (0.76) | (-1.35) | (-0.62) |
| PURCHASED | 0.002 | -0.004 | 0.009 | 0.000 | 0.006 |
| | (1.87*) | (-2.03**) | (3.15***) | (0.08) | (1.26) |
| LARGEBUS | -0.003 | -0.002 | -0.001 | -0.003 | -0.009 |
| | (-1.35) | (-0.58) | (-0.27) | (-1.38) | (-1.98**) |
| HHI | 0.001 | 0.002 | 0.001 | 0.001 | -0.001 |
| | (2.27**) | (3.04***) | (0.62) | (1.33) | (-0.72) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (5.43***) | (1.15) | (-0.05) | (-0.20) | (0.42) |
| DIVERS | -0.002 | 0.019 | 0.005 | 0.004 | -0.000 |
| | (-1.06) | (8.39***) | (1.56) | (1.93*) | (-0.16) |
| Overall F | 113.02*** | 52.95*** | 15.70*** | 12.81*** | 16.75*** |
| Adjusted $R^2$ | 0.1230 | 0.1835 | 0.2634 | 0.1907 | 0.4392 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
LARGEBUS = commercial and industrial loans and commercial real estate loans greater than $250,000/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table A-3

## Rate of Return on Assets (ROA) and Large Business Lending in 1995: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions <$100 (n=6,563) | $100-$300 (n=2,149) | $300-$500 (n=396) | $500-$3,000 (n=466) | >$3,000 (n=194) |
|---|---|---|---|---|---|
| INTERCEPT | 0.004 | 0.007 | 0.007 | 0.004 | 0.004 |
| | (4.78***) | (8.40***) | (3.87***) | (2.67***) | (1.38) |
| LOSS | -0.704 | -0.499 | -0.079 | -0.077 | -0.669 |
| | (-13.90***) | (-13.45***) | (-0.86) | (-1.13) | (-8.79) |
| EQUITY | 0.018 | 0.011 | 0.037 | 0.015 | 0.045 |
| | (11.02***) | (5.36***) | (6.45***) | (2.10**) | (3.01***) |
| OFFBAL | 0.000 | 0.003 | 0.001 | 0.001 | 0.002 |
| | (33.57***) | (23.99***) | (16.23***) | (12.56***) | (7.51***) |
| SECURITIES | 0.002 | 0.000 | -0.003 | -0.002 | 0.004 |
| | (1.89*) | (0.01) | (-1.79*) | (-1.16) | (1.32) |
| PURCHASED | -0.005 | -0.005 | -0.006 | 0.001 | -0.007 |
| | (-4.91***) | (-4.45***) | (-2.97***) | (0.46) | (-2.04**) |
| LARGEBUS | 0.005 | -0.000 | -0.004 | -0.004 | 0.001 |
| | (2.70***) | (-0.07) | (-1.53) | (-1.59) | (0.22) |
| HHI | 0.001 | 0.001 | 0.000 | 0.001 | 0.000 |
| | (1.99**) | (3.76***) | (0.09) | (1.24) | (0.10) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (4.34***) | (0.90) | (0.81) | (0.25) | (1.99**) |
| DIVERS | 0.009 | 0.001 | -0.002 | -0.002 | 0.009 |
| | (6.40***) | (0.74) | (-1.11) | (-1.11) | (4.76***) |
| Overall F | 202.61*** | 98.56*** | 56.40*** | 27.85*** | 17.32*** |
| Adjusted $R^2$ | 0.2166 | 0.2901 | 0.5573 | 0.3415 | 0.4309 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
LARGEBUS = commercial and industrial loans and commercial real estate loans greater than $250,000/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table A-4

## Rate of Return on Assets (ROA) and Large Business Lending in 1996: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions <$100 (n=5,955) | $100-$300 (n=2,279) | $300-$500 (n=385) | $500-$3,000 (n=491) | >$3,000 (n=191) |
|---|---|---|---|---|---|
| INTERCEPT | 0.005 | 0.004 | 0.005 | 0.007 | 0.009 |
| | (4.38***) | (4.35***) | (2.66***) | (3.57***) | (3.01***) |
| LOSS | -0.624 | -0.283 | -0.113 | -0.138 | 0.055 |
| | (-10.88***) | (-8.59***) | (-1.87*) | (-2.42**) | (0.67) |
| EQUITY | 0.017 | 0.027 | 0.049 | 0.007 | 0.012 |
| | (8.96***) | (12.13***) | (9.20***) | (0.89) | (-1.39) |
| OFFBAL | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 |
| | (27.17***) | (16.56***) | (2.85***) | (7.82***) | (1.16) |
| SECURITIES | 0.002 | -0.001 | -0.004 | -0.002 | 0.003 |
| | (1.76**) | (-1.24) | (-2.13**) | (-1.25) | (1.03) |
| PURCHASED | -0.005 | -0.001 | -0.004 | -0.000 | 0.005 |
| | (-3.60***) | (-1.18) | (-2.28**) | (-0.19) | (-1.34) |
| LARGEBUS | 0.001 | 0.000 | -0.001 | -0.003 | 0.001 |
| | (0.54) | (0.09) | (-0.44) | (-1.08) | (-0.31) |
| HHI | 0.001 | 0.002 | 0.001 | 0.001 | 0.000 |
| | (1.58) | (4.18***) | (1.93*) | (0.94) | (0.18) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (5.21*** | (1.32) | (1.075) | (-0.78) | (0.86) |
| DIVERS | 0.003 | -0.001 | -0.003 | -0.001 | 0.003 |
| | (1.94*) | (-0.71) | (-1.46) | (-0.68) | (1.26) |
| Overall F | 129.05*** | 60.14*** | 14.10*** | 9.51*** | 1.54 |
| Adjusted $R^2$ | 0.1621 | 0.1893 | 0.2344 | 0.1350 | 0.0246 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
LARGEBUS = commercial and industrial loans and commercial real estate loans greater than $250,000/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table A-5

## Rate of Return on Assets (ROA) and Large Business Lending in 1997: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| | Assets in Millions | | | | |
|---|---|---|---|---|---|
| **Independent Variables[b]** | **<$100 (n=5,508)** | **$100-$300 (n=2,346)** | **$300-$500 (n=391)** | **$500-$3,000 (n=525)** | **>$3,000 (n=181)** |
| INTERCEPT | 0.008 | 0.003 | 0.006 | 0.001 | 0.013 |
| | (4.57***) | (3.55***) | (3.84***) | (0.68) | (3.55***) |
| LOSS | -0.575 | -0.068 | -0.098 | -0.050 | -0.063 |
| | (-7.12***) | (-2.31**) | (-1.38) | (-0.89) | (-0.88) |
| EQUITY | -0.001 | 0.021 | 0.030 | 0.053 | -0.002 |
| | (-0.28) | (10.49***) | (6.55***) | (9.11***) | (-0.22) |
| OFFBAL | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 |
| | (23.91***) | (4.28***) | (12.04***) | (4.71***) | (1.99**) |
| SECURITIES | -0.002 | 0.001 | -0.003 | 0.001 | -0.003 |
| | (-1.55) | (1.25) | (-1.88*) | (0.59) | (-1.15) |
| PURCHASED | -0.004 | -0.000 | -0.003 | 0.001 | -0.008 |
| | (-1.77) | (-0.29) | (-2.14**) | (0.46) | (-1.92*) |
| LARGEBUS | -0.005 | -0.000 | -0.005 | -0.003 | -0.004 |
| | (-1.55) | (-0.15) | (-1.74*) | (-1.17) | (-1.42) |
| HHI | 0.001 | 0.000 | 0.001 | 0.001 | 0.002 |
| | (1.63) | (1.29) | (0.98) | (0.76) | (1.24) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (4.24***) | (1.88*) | (0.76) | (-0.10) | (1.11) |
| DIVERS | -0.003 | 0.004 | -0.001 | -0.003 | 0.000 |
| | (-1.26) | (4.85***) | (-0.39) | (-1.74*) | (-0.04) |
| Overall F | 70.14*** | 20.63*** | 53.34*** | 27.20*** | 1.82* |
| Adjusted $R^2$ | 0.1015 | 0.0700 | 0.5464 | 0.3100 | 0.0394 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
LARGEBUS = commercial and industrial loans and commercial real estate loans greater than $250,000/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table A-6

## Rate of Return on Assets (ROA) and Large Business Lending in 1998: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| | Assets in Millions | | | | |
|---|---|---|---|---|---|
| **Independent Variables[b]** | **<$100 (n=5,104)** | **$100-$300 (n=2,378)** | **$300-$500 (n=439)** | **$500-$3,000 (n=549)** | **>$3,000 (n=171)** |
| INTERCEPT | 0.001 | 0.005 | -0.002 | -0.002 | 0.011 |
| | (0.59) | (6.72***) | (-0.64) | (-0.29) | (2.44**) |
| LOSS | 0.445 | -0.169 | -0.541 | 0.876 | 0.108 |
| | (8.24***) | (-7.12***) | (-8.62***) | (6.14***) | (1.36) |
| EQUITY | 0.012 | 0.036 | 0.091 | 0.055 | -0.019 |
| | (3.79***) | (15.77***) | (17.93***) | (3.20***) | (-2.06**) |
| OFFBAL | 0.000 | 0.001 | 0.000 | -0.001 | 0.001 |
| | (18.02***) | (25.53***) | (5.12***) | (-1.90*) | (3.36***) |
| SECURITIES | -0.000 | 0.001 | -0.008 | -0.013 | -0.008 |
| | (-0.23) | (0.77) | (-3.45***) | (-2.30**) | (-2.08**) |
| PURCHASED | 0.002 | -0.007 | 0.007 | 0.014 | -0.001 |
| | (0.78) | (-7.37***) | (2.74***) | (1.94*) | (-0.19) |
| LARGEBUS | -0.004 | 0.001 | -0.009 | -0.009 | -0.003 |
| | (-0.95) | (0.55) | (-2.12**) | (-1.14) | (-0.69) |
| HHI | 0.002 | 0.000 | -0.000 | -0.002 | 0.002 |
| | (2.38**) | (0.58) | (-0.38) | (-0.65) | (1.11) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (4.29***) | (4.23***) | (-0.67) | (1.11) | (-0.69) |
| DIVERS | -0.008 | 0.004 | -0.006 | -0.019 | 0.005 |
| | (-2.72***) | (4.22***) | (-2.17**) | (-3.43***) | (-1.77*) |
| Overall F | 52.76*** | 131.08*** | 58.92*** | 7.29*** | 3.73*** |
| Adjusted $R^2$ | 0.0836 | 0.3299 | 0.5429 | 0.0935 | 0.1258 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
LARGEBUS = commercial and industrial loans and commercial real estate loans greater than $250,000/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table A-7

## Rate of Return on Assets (ROA) and Large Business Lending in 1999: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| | Assets in Millions | | | | |
|---|---|---|---|---|---|
| **Independent Variables[b]** | **<$100 (n=4,714)** | **$100-$300 (n=2,422)** | **$300-$500 (n=500)** | **$500-$3,000 (n=564)** | **>$3,000 (n=177)** |
| INTERCEPT | 0.003 | 0.004 | -0.007 | 0.012 | 0.014 |
| | (1.12) | (4.48***) | (-2.22**) | (1.84*) | (2.54**) |
| LOSS | -0.187 | 0.566 | -0.487 | 0.699 | 0.026 |
| | (-1.45) | (13.87***) | (-9.35***) | (4.79***) | (0.24) |
| EQUITY | -0.003 | 0.017 | 0.103 | 0.027 | -0.020 |
| | (-0.84) | (6.36***) | (16.41***) | (1.47) | (-1.83) |
| OFFBAL | 0.000 | 0.000 | 0.000 | -0.000 | 0.001 |
| | (36.85***) | (6.45***) | (5.95***) | (-1.35) | (5.29***) |
| SECURITIES | 0.004 | 0.005 | -0.005 | -0.021 | 0.006 |
| | (1.61) | (4.92***) | (-1.81*) | (-3.60***) | (1.64) |
| PURCHASED | -0.004 | -0.006 | 0.006 | 0.006 | -0.012 |
| | (-1.11) | (-5.11***) | (2.04**) | (0.79) | (-1.85*) |
| LARGEBUS | -0.006 | -0.002 | -0.008 | -0.020 | -0.003 |
| | (-1.09) | (-0.97) | (-1.92*) | (-2.28**) | (-0.86) |
| HHI | 0.001 | 0.001 | 0.001 | -0.003 | 0.000 |
| | (1.10) | (2.32**) | (1.27) | (-1.26) | (0.27) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (4.95***) | (1.33) | (0.252) | (-0.72) | (0.49) |
| DIVERS | -0.001 | 0.008 | 0.004 | -0.019 | 0.013 |
| | (-0.29) | (6.69***) | (1.41) | (-3.29***) | (4.38***) |
| Overall F | 159.06*** | 49.77*** | 54.86*** | 5.08*** | 11.86*** |
| Adjusted $R^2$ | 0.2318 | 0.1534 | 0.4922 | 0.0611 | 0.3558 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
LARGEBUS = commercial and industrial loans and commercial real estate loans greater than $250,000/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table A-8

## Rate of Return on Assets (ROA) and Large Business Lending in 2000: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| | Assets in Millions | | | | |
|---|---|---|---|---|---|
| **Independent Variables[b]** | **<$100 (n=4,378)** | **$100-$300 (n=2,518)** | **$300-$500 (n=538)** | **$500-$3,000 (n=581)** | **>$3,000 (n=187)** |
| INTERCEPT | 0.029 | 0.004 | 0.001 | 0.005 | 0.012 |
| | (1.31) | (4.69***) | (0.36) | (1.64) | (1.68*) |
| LOSS | 0.937 | -0.189 | 0.334 | 0.277 | 0.377 |
| | (1.76*) | (-24.99***) | (6.02***) | (4.62***) | (3.13***) |
| EQUITY | 0.116 | 0.034 | 0.021 | 0.045 | 0.001 |
| | (3.82***) | (15.81***) | (4.85***) | (6.75***) | (0.09) |
| OFFBAL | 0.000 | 0.000 | 0.001 | 0.000 | -0.000 |
| | (5.49***) | (7.92***) | (9.02***) | (5.08***) | (-1.40) |
| SECURITIES | -0.011 | 0.001 | -0.002 | -0.004 | -0.003 |
| | (-0.55) | (1.78*) | (-0.99) | (-1.29) | (-0.97) |
| PURCHASED | -0.049 | -0.004 | 0.004 | 0.001 | -0.008 |
| | (-1.89*) | (-4.01***) | (1.97**) | (0.23) | (-0.99) |
| LARGEBUS | -0.033 | 0.001 | -0.009 | -0.005 | -0.003 |
| | (-0.79) | (0.59) | (-2.61***) | (-1.35) | (-0.92) |
| HHI | -0.007 | 0.001 | -0.000 | 0.000 | 0.001 |
| | (-0.72) | (2.34**) | (-0.18) | (0.01) | (0.49) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (0.79) | (0.09) | (1.84*) | (-1.40) | (0.09) |
| DIVERS | -0.014 | 0.005 | -0.005 | -0.008 | 0.005 |
| | (-0.47) | (4.99***) | (-2.28**) | (-3.03***) | (1.66*) |
| Overall F | 11.47*** | 119.70*** | 28.03*** | 16.87*** | 4.80*** |
| Adjusted $R^2$ | 0.0211 | 0.2979 | 0.3114 | 0.1973 | 0.1547 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
LARGEBUS = commercial and industrial loans and commercial real estate loans greater than $250,000/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table A-9

## Rate of Return on Assets (ROA) and Large Business Lending in 2001: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| | Assets in Millions | | | | |
|---|---|---|---|---|---|
| **Independent Variables[b]** | **<$100 (n=3,970)** | **$100-$300 (n=2,526)** | **$300-$500 (n=587)** | **$500-$3,000 (n=658)** | **>$3,000 (n=188)** |
| INTERCEPT | 0.004 | 0.005 | -0.007 | 0.006 | 0.019 |
| | (1.52) | (5.67***) | (-2.31**) | (2.95***) | (2.67***) |
| LOSS | 0.583 | 0.019 | 0.235 | -0.004 | 0.278 |
| | (5.68***) | (0.76) | (3.81***) | (-0.11) | (3.02***) |
| EQUITY | -0.008 | 0.024 | 0.089 | 0.018 | 0.001 |
| | (-1.97**) | (11.01***) | (18.45***) | (4.02***) | (0.08) |
| OFFBAL | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 |
| | (34.32***) | (8.04***) | (0.88) | (9.55***) | (0.93) |
| SECURITIES | 0.009 | 0.002 | 0.002 | 0.003 | -0.004 |
| | (3.73***) | (2.32**) | (0.67) | (1.69*) | (-1.32) |
| PURCHASED | -0.005 | -0.006 | 0.001 | -0.005 | -0.013 |
| | (-1.62) | (-5.71***) | (0.29) | (-2.14**) | (-1.53) |
| LARGEBUS | -0.010 | -0.002 | -0.008 | -0.002 | -0.013 |
| | (-2.07**) | (-1.55) | (-2.07**) | (-0.81) | (-3.33***) |
| HHI | 0.000 | 0.000 | 0.001 | 0.001 | -0.002 |
| | (0.11) | (1.36) | (0.72) | (1.19) | (-1.17) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (3.71***) | (3.04***) | (0.72) | (0.03) | (0.46) |
| DIVERS | 0.001 | 0.004 | 0.007 | 0.005 | -0.002 |
| | (0.18) | (3.69***) | (2.79***) | (2.78***) | (-0.56) |
| Overall F | 152.39*** | 36.02*** | 56.24*** | 19.06*** | 4.99*** |
| Adjusted $R^2$ | 0.2555 | 0.1109 | 0.4586 | 0.1981 | 0.1605 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
LARGEBUS = commercial and industrial loans and commercial real estate loans greater than $250,000/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table A-10

## Mean Rate of Return on Assets and Residual Large Business Lending: 1994-2001 Two-Stage Regression Analyses for U. S. Commercial Banks by Asset Size Group Using Quarterly Data (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| | **All sizes (n=31)** | **<$100 (n=31)** | **$100-$300 (n=31)** | **$300-$500 (n=31)** | **$500-$3,000 (n=31)** | **>$3,000 (n=31)** |
| INTERCEPT | 0.024 | 0.028 | 0.011 | 0.009 | 0.018 | 0.022 |
| | (2.36**) | (3.03***) | (1.37) | (1.15) | (1.91*) | (3.26***) |
| SIGMA(ROA) | 0.066 | 0.054 | 0.748 | 0.546 | 0.485 | 1.129 |
| | (3.37***) | (4.10***) | (5.42***) | (7.15***) | (4.61***) | (9.82***) |
| RESIDUAL(LBL) | -0.295 | -0.368 | -0.128 | -0.079 | -0.229 | -0.319 |
| | (-1.78*) | (-2.43**) | (-1.02) | (-0.65) | (-1.46) | (-2.93***) |
| Overall F | 5.69*** | 8.50*** | 14.75*** | 25.56*** | 10.67*** | 48.40*** |
| Adjusted $R^2$ | 0.2322 | 0.3261 | 0.4701 | 0.6131 | 0.3841 | 0.7536 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

SIGMA(ROA) = standard deviation of ROAs for banks in each group and quarter

RESIDUAL(LBL) = first-stage regression model residual for large business loans greater than $250,000 in each group and year.

## Table A-11

## Mean Rate of Return on Assets and Residual Large Business Lending: 1994-2001 Two-Stage Regression Analyses for U. S. Commercial Banks by Asset Size Group Using Quarterly Data (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| | **All sizes (n=31)** | **<$100 (n=31)** | **$100-$300 (n=31)** | **$300-$500 (n=31)** | **$500-$3,000 (n=31)** | **>$3,000 (n=31)** |
| INTERCEPT | 0.024 | 0.028 | 0.011 | 0.010 | 0.019 | 0.022 |
| | (2.33**) | (2.99***) | (1.43) | (1.37) | (2.01*) | (3.32***) |
| SIGMA(ROA) | 0.066 | 0.054 | 0.756 | 0.575 | 0.500 | 1.141 |
| | (3.29***) | (4.01***) | (5.43***) | (7.54***) | (4.65***) | (9.78***) |
| TBILL | 0.013 | 0.020 | 0.059 | 0.123 | 0.075 | 0.050 |
| | (0.15) | (0.25) | (0.76) | (1.65) | (0.82) | (0.79) |
| RESIDUAL(LBL) | -0.299 | -0.375 | -0.153 | -0.133 | -0.268 | -0.344 |
| | (-1.75*) | (-2.39**) | (-1.17) | (-1.09) | (-1.63) | (-3.01***) |
| Overall F | 3.67** | 5.50*** | 9.89*** | 18.95*** | 7.26*** | 32.06*** |
| Adjusted $R^2$ | 0.2054 | 0.3036 | 0.4624 | 0.6347 | 0.3771 | 0.7503 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

SIGMA(ROA) = standard deviation of ROAs for banks in each group and quarter

TBILL = one-year T-bill rate in each quarter

RESIDUAL(LBL) = first-stage regression model residual for large business loans greater than $250,000 in each group and year.

# APPENDIX B
# Real Estate Lending and Bank Profitability

## Table B-1

### Average Rates of Return on Assets (ROA) for U.S. Commercial Banks in the Period June 1994-June 2001: Means and t-Tests for Decile Rankings by Real Estate Lending Activity and Bank Asset Size Groups (in percent)

| | Assets in Millions | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <$100 | | $100-$300 | | $300-$500 | | $500-$3000 | | >$3000 | | All Banks | |
| Decile | Mean | n | Mean | n | Mean | n | Mean | n | Mean | n | Mean | n |
| 1 | 1.04 | 6180 | 1.05 | 559 | 1.76 | 151 | 1.13 | 297 | 1.03 | 218 | 1.06 | 7405 |
| 2-3 | 0.54 | 11764 | 0.61 | 2243 | 0.62 | 270 | 0.70 | 320 | 0.68 | 213 | 0.56 | 14810 |
| 4-7 | 0.50 | 17922 | 0.60 | 7884 | 0.61 | 1329 | 0.64 | 1747 | 0.64 | 735 | 0.54 | 29620 |
| 8-9 | 0.46 | 6669 | 0.59 | 5495 | 0.61 | 1201 | 0.60 | 1216 | 0.62 | 229 | 0.53 | 14810 |
| 10 | 0.46 | 2975 | 0.59 | 2929 | 0.62 | 691 | 0.64 | 720 | 0.69 | 91 | 0.55 | 7406 |
| All | 0.58 | 45510 | 0.61 | 19113 | 0.66 | 3642 | 0.66 | 4300 | 0.70 | 1486 | 0.60 | 74051 |

**t-Tests for Mean Differences**[ab]

| | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| Decile Comparisons | <$100 | $100-$300 | $300-$500 | $500-$3000 | >$3000 | All Banks |
| 1 vs. 10 | 3.26*** | 5.25*** | 5.64*** | 5.37*** | 3.03*** | 3.46*** |
| 2 and 3 vs. 8 and 9 | 8.34*** | 1.97** | 0.55 | 0.94 | 2.14** | 3.41*** |
| 1, 2, 3 vs. 8, 9, 10 | 4.11*** | 5.51*** | 5.31*** | 4.03*** | 4.62*** | 3.77*** |

[a]Not available (na) due to small sample sizes.

[b]Asterisks indicate the level of significance: *--.10, **--.05, and ***--.01.

## Table B-2

## Rate of Return on Assets (ROA) and Real Estate Lending in 1994: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| | Assets in Millions | | | | |
|---|---|---|---|---|---|
| **Independent Variables[b]** | **<$100 (n=7,556)** | **$100-$300 (n=2,133)** | **$300-$500 (n=376)** | **$500-$3,000 (n=451)** | **>$3,000 (n=181)** |
| INTERCEPT | 0.003 | 0.005 | -0.003 | 0.006 | -0.004 |
| | (3.47***) | (3.57***) | (-1.12) | (3.39***) | (-0.99) |
| LOSS | -0.707 | -1.036 | -0.656 | -0.328 | -0.030 |
| | (-15.21*** | (-17.14***) | (-5.69***) | (-4.52***) | (-0.21) |
| EQUITY | 0.027 | 0.038 | 0.048 | 0.010 | 0.105 |
| | (14.19*** | (9.24***) | (4.74***) | (1.52) | (5.59***) |
| OFFBAL | 0.000 | -0.001 | 0.002 | 0.001 | 0.001 |
| | (19.60***) | (-3.62***) | (4.24***) | (4.56***) | (4.54***) |
| SECURITIES | -0.004 | 0.005 | 0.001 | -0.002 | 0.000 |
| | (-4.33*** | (3.51***) | (0.59) | (-1.16) | (-0.03) |
| PURCHASED | 0.001 | -0.006 | 0.008 | -0.000 | 0.005 |
| | (0.96) | (-3.49***) | (2.66***) | (-0.23) | (1.20) |
| REALESTATE | -0.009 | -0.022 | -0.007 | -0.004 | -0.011 |
| | (-8.15***) | (-13.56***) | (-3.34***) | (-2.57***) | (-3.98***) |
| HHI | 0.001 | 0.002 | 0.001 | 0.002 | 0.002 |
| | (1.67*) | (2.92***) | (0.85) | (1.80*) | (0.99) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (7.69***) | (0.87) | (-0.03) | (-0.58) | (0.51) |
| DIVERS | 0.008 | 0.042 | 0.010 | 0.007379 | 0.002 |
| | (4.32***) | (16.27***) | (3.35***) | (3.383) | (0.76) |
| Overall F | 126.36*** | 79.26*** | 17.45*** | 13.47*** | 19.19*** |
| Adjusted $R^2$ | 0.1299 | 0.2482 | 0.2825 | 0.1992 | 0.4750 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
REALESTATE = real estate loans/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table B-3

## Rate of Return on Assets (ROA) and Real Estate Lending in 1995: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| | Assets in Millions | | | | |
|---|---|---|---|---|---|
| **Independent Variables[b]** | **<$100 (n=6,889)** | **$100-$300 (n=2,192)** | **$300-$500 (n=399)** | **$500-$3,000 (n=467)** | **>$3,000 (n=195)** |
| INTERCEPT | 0.006 | 0.007 | 0.006 | 0.003 | 0.007 |
| | (7.30***) | (8.90***) | (3.05***) | (1.88*) | (2.49**) |
| LOSS | -0.744 | -0.518 | -0.011 | -0.041 | -0.674 |
| | (-15.22***) | (-13.57***) | (-0.11) | (-0.56) | (-9.32***) |
| EQUITY | 0.015 | 0.010 | 0.041 | 0.016 | 0.051 |
| | (9.54***) | (5.07***) | (6.57***) | (2.21**) | (3.57***) |
| OFFBAL | 0.000 | 0.002 | 0.001 | 0.001 | 0.001 |
| | (34.42***) | (23.31***) | (16.23***) | (12.33***) | (5.77***) |
| SECURITIES | 0.000 | -0.000 | -0.002 | -0.001 | 0.003 |
| | (0.55) | (-0.29) | (-1.26) | (-0.44) | (1.13) |
| PURCHASED | -0.006 | -0.005 | -0.007 | 0.001 | -0.008 |
| | (-5.62***) | (-4.64***) | (-3.14***) | (0.32) | (-2.48**) |
| REALESTATE | -0.006 | -0.001 | 0.002 | 0.002 | -0.009 |
| | (-6.18***) | (-1.72*) | (1.45) | (1.19) | (-4.38***) |
| HHI | 0.001 | 0.001 | 0.000 | 0.001 | 0.002 |
| | (1.46) | (3.77***) | (0.13) | (1.41) | (1.19) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (6.09***) | (0.77) | (0.74) | (0.03) | (1.86*) |
| DIVERS | 0.015 | 0.002 | -0.003 | -0.002 | 0.009 |
| | (8.66***) | (1.69*) | (-1.38) | (-1.09) | (5.04***) |
| Overall F | 215.44*** | 100.87*** | 56.71*** | 27.72*** | 21.37*** |
| Adjusted $R^2$ | 0.2188 | 0.2908 | 0.5569 | 0.3399 | 0.4846 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
REALESTATE = real estate loans/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table B-4

## Rate of Return on Assets (ROA) and Real Estate Lending in 1996: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions <$100 (n=6,263) | $100-$300 (n=2,329) | $300-$500 (n=387) | $500-$3,000 (n=492) | >$3,000 (n=193) |
|---|---|---|---|---|---|
| INTERCEPT | 0.005 | 0.004 | 0.004 | 0.004 | 0.009 |
| | (4.46***) | (3.87***) | (2.16**) | (2.18**) | (3.19***) |
| LOSS | 0.080 | -0.266 | -0.060 | -0.043 | 0.029 |
| | (1.58) | (-7.69***) | (-0.82) | (-0.68) | (0.32) |
| EQUITY | 0.021 | 0.027 | 0.049 | 0.011 | -0.012 |
| | (11.03***) | (12.37***) | (9.29***) | (1.31) | (-1.40) |
| OFFBAL | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 |
| | (25.99***) | (16.76***) | (3.06***) | (8.27***) | (0.86) |
| SECURITIES | 0.003 | -0.001 | -0.003 | -0.000 | 0.004 |
| | (2.92***) | (-1.29) | (-2.17**) | (-0.24) | (1.24) |
| PURCHASED | -0.006 | -0.001 | -0.004 | -0.000 | -0.004 |
| | (-4.44***) | (-1.04) | (-2.12**) | (-0.22) | (-1.28) |
| REALESTATE | -0.004 | 0.001 | 0.002 | 0.005 | -0.001 |
| | (-3.60***) | (1.36) | (1.19) | (3.10***) | (-0.49) |
| HHI | 0.000 | 0.002 | 0.001 | 0.001 | 0.000 |
| | (0.75) | (4.26***) | (2.03**) | (0.94) | (0.33) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (6.37***) | (1.34) | (1.06) | (-0.49) | (0.85) |
| DIVERS | 0.008 | -0.002 | -0.005 | -0.002 | 0.004 |
| | (3.69***) | (-1.50) | (-1.79*) | (-1.51) | (1.62) |
| Overall F | 123.17*** | 61.71*** | 14.32*** | 10.64*** | 1.65 |
| Adjusted $R^2$ | 0.1493 | 0.1900 | 0.2366 | 0.1499 | 0.0292 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
REALESTATE = real estate loans/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table B-5

## Rate of Return on Assets (ROA) and Real Estate Lending in 1997: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| | Assets in Millions | | | | |
|---|---|---|---|---|---|
| **Independent Variables[b]** | **<$100 (n=5,784)** | **$100-$300 (n=2,400)** | **$300-$500 (n=394)** | **$500-$3,000 (n=526)** | **>$3,000 (n=182)** |
| INTERCEPT | 0.009 | 0.004 | 0.004 | -0.001 | 0.010 |
| | (5.71***) | (5.60***) | (2.75***) | (-0.47) | (3.03***) |
| LOSS | -0.659 | -0.127 | 0.023 | 0.087 | 0.031 |
| | (-8.27***) | (-3.94***) | (0.25) | (1.35) | (0.43) |
| EQUITY | -0.004 | 0.019 | 0.033 | 0.055 | -0.003 |
| | (-1.49) | (9.13***) | (7.05***) | (9.55***) | (-0.35) |
| OFFBAL | 0.000 | 0.000 | 0.001 | 0.000 | 0.001 |
| | (24.80***) | (3.41***) | (12.39***) | (4.48***) | (3.11***) |
| SECURITIES | -0.002 | 0.000 | -0.001 | 0.002 | -0.001 |
| | (-1.76*) | (0.61) | (-0.89) | (1.39) | (-0.43) |
| PURCHASED | -0.004 | -0.001 | -0.004 | 0.000 | -0.008 |
| | (-2.26**) | (-0.86) | (-2.46**) | (0.26) | (-1.90*) |
| REALESTATE | -0.009 | -0.005 | 0.003 | 0.006 | 0.008 |
| | (-5.27***) | (-5.40***) | (2.21**) | (4.02***) | (3.39***) |
| HHI | 0.001 | 0.000 | 0.001 | 0.000 | 0.000 |
| | (1.11) | (1.28) | (1.41) | (0.62) | (0.27) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (5.51***) | (1.82*) | (0.70) | (0.09) | (1.48) |
| DIVERS | 0.008 | 0.009 | -0.003 | -0.006 | -0.000 |
| | (2.58***) | (7.19***) | (-1.36) | (-3.34***) | (-0.24) |
| Overall F | 76.02*** | 23.62*** | 54.12*** | 29.63*** | 2.86*** |
| Adjusted $R^2$ | 0.1045 | 0.0782 | 0.5482 | 0.3288 | 0.0841 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
REALESTATE = real estate loans/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table B-6

## Rate of Return on Assets (ROA) and Real Estate Lending in 1998: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions <$100 (n=5,356) | $100-$300 (n=2,441) | $300-$500 (n=442) | $500-$3,000 (n=551) | >$3,000 (n=172) |
|---|---|---|---|---|---|
| INTERCEPT | 0.003 | 0.005 | -0.001 | -0.007 | 0.009 |
| | (1.32) | (6.90***) | (-0.59) | (-1.14) | (2.17**) |
| LOSS | 0.419 | -0.156 | -0.617 | 1.103 | 0.139 |
| | (7.87*** | (-6.31***) | (-7.11***) | (6.55***) | (1.56) |
| EQUITY | 0.009 | 0.035 | 0.089 | 0.061 | -0.019 |
| | (3.08***) | (15.33***) | (16.49***) | (3.56***) | (-2.00**) |
| OFFBAL | 0.000 | 0.000 | 0.000 | -0.000 | 0.001 |
| | (18.51***) | (25.49***) | (5.06***) | (-1.76*) | (3.35***) |
| SECURITIES | -0.001 | 0.000 | -0.006 | -0.010 | -0.006 |
| | (-0.48) | (0.61) | (-2.81***) | (-1.88*) | (-1.56) |
| PURCHASED | 0.001 | -0.007 | 0.006 | 0.014 | -0.000 |
| | (0.49) | (-7.30***) | (2.35**) | (1.93*) | (-0.10) |
| REALESTATE | -0.008 | -0.001 | -0.004 | 0.012 | 0.002 |
| | (-3.69***) | (-0.81) | (-1.32) | (2.39**) | (0.63) |
| HHI | 0.002 | 0.000 | 0.000 | -0.002 | 0.003 |
| | (2.13**) | (0.71) | (-0.05) | (-0.72) | (1.47) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (5.19***) | (4.27***) | (-0.69) | (1.11) | (-0.66) |
| DIVERS | -0.000 | 0.005 | 0.001 | -0.028 | -0.004 |
| | (-0.07) | (3.70***) | (0.33) | (-4.06***) | (-1.48) |
| Overall F | 56.31*** | 130.95*** | 58.34*** | 7.87*** | 3.90*** |
| Adjusted $R^2$ | 0.0850 | 0.3239 | 0.5395 | 0.1009 | 0.1320 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
REALESTATE = real estate loans/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table B-7

## Rate of Return on Assets (ROA) and Real Estate Lending in 1999: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions <$100 (n=4,933) | $100-$300 (n=2,476) | $300-$500 (n=501) | $500-$3,000 (n=566) | >$3,000 (n=178) |
|---|---|---|---|---|---|
| INTERCEPT | 0.005 | 0.006 | 0.003 | 0.009 | 0.011 |
| | (1.93*) | (5.70***) | (0.87) | (1.39) | (2.23**) |
| LOSS | -0.339 | 0.477 | -0.759 | 0.743 | -0.063 |
| | (-2.68***) | (10.57***) | (-15.54***) | (4.34***) | (-0.51) |
| EQUITY | -0.008 | 0.014 | 0.083 | 0.025 | -0.016 |
| | (-1.98**) | (5.44***) | (13.63***) | (1.37) | (-1.46) |
| OFFBAL | 0.000 | 0.000 | 0.000 | -0.000 | 0.001 |
| | (37.84***) | (6.33***) | (6.62***) | (-1.14) | (4.72***) |
| SECURITIES | 0.004 | 0.005 | -0.002 | -0.016 | 0.006 |
| | (1.80*) | (5.54***) | (-1.06) | (-2.91***) | (1.76*) |
| PURCHASED | -0.005 | -0.006 | 0.001 | 0.004 | -0.009 |
| | (-1.54) | (-5.64***) | (0.49) | (0.51) | (-1.41) |
| REALESTATE | -0.014 | -0.005 | -0.026 | 0.002 | -0.004 |
| | (-4.92***) | (-4.18***) | (-9.50***) | (0.37) | (-1.35) |
| HHI | 0.001 | 0.001 | 0.002 | -0.002 | 0.002 |
| | (0.96) | (2.35**) | (1.53) | (-0.95) | (0.91) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (5.99***) | (1.41) | (-0.21) | (-0.86) | (0.29) |
| DIVERS | 0.017 | 0.014 | 0.032 | -0.017 | 0.016 |
| | (3.25***) | (8.02***) | (8.42***) | (-2.40**) | (4.93***) |
| Overall F | 169.22*** | 53.02*** | 74.12*** | 4.47*** | 12.69*** |
| Adjusted $R^2$ | 0.2348 | 0.1590 | 0.5678 | 0.0523 | 0.3714 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus ot her borrowed money/total assets
REALESTATE = real estate loans/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table B-8

## Rate of Return on Assets (ROA) and Real Estate Lending in 2000: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| | Assets in Millions | | | | |
|---|---|---|---|---|---|
| **Independent Variables[b]** | **<$100 (n=4,578)** | **$100-$300 (n=2,564)** | **$300-$500 (n=542)** | **$500-$3,000 (n=581)** | **>$3,000 (n=188)** |
| INTERCEPT | 0.028 | 0.007 | -0.000 | 0.005 | 0.010 |
| | (1.31) | (7.84***) | (-0.08) | (1.48) | (1.47) |
| LOSS | 0.802 | -0.206 | 0.264 | 0.274 | 0.332 |
| | (1.56) | (-26.74***) | (3.35***) | (4.17***) | (2.49**) |
| EQUITY | 0.113 | 0.028 | 0.022 | 0.044 | 0.002 |
| | (3.85***) | (12.99***) | (4.98***) | (6.42***) | (0.17) |
| OFFBAL | 0.000 | 0.000 | 0.000 | 0.000 | -0.000 |
| | (5.66***) | (7.46***) | (7.38***) | (4.86***) | (-1.64) |
| SECURITIES | -0.007 | 0.001 | 0.000 | -0.002 | -0.003 |
| | (-0.38) | (1.55) | (0.17) | (-0.89) | (-0.93) |
| PURCHASED | -0.049 | -0.005 | 0.004 | 0.000 | -0.006 |
| | (-1.97**) | (-5.11***) | (1.85*) | (0.00) | (-0.69) |
| REALESTATE | -0.021 | -0.008 | -0.004 | -0.000 | -0.003 |
| | (-0.89) | (-8.13***) | (-1.21) | (-0.05) | (-1.08) |
| HHI | -0.008 | 0.001 | 0.000 | 0.000 | 0.001 |
| | (-0.81) | (2.15**) | (0.22) | (0.23) | (0.83) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (0.96) | (0.23) | (1.84*) | (-1.46) | (-0.02) |
| DIVERS | 0.016 | 0.013 | 0.001 | -0.007 | 0.006 |
| | (0.39) | (9.52***) | (0.35) | (-2.37**) | (2.16**) |
| Overall F | 11.79*** | 131.79*** | 27.38*** | 16.61*** | 5.43*** |
| Adjusted $R^2$ | 0.0208 | 0.3146 | 0.3046 | 0.1947 | 0.1749 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
REALESTATE = real estate loans/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table B-9

## Rate of Return on Assets (ROA) and Real Estate Lending in 2001: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions <$100 (n=4,141) | $100-$300 (n=2,570) | $300-$500 (n=593) | $500-$3,000 (n=658) | >$3,000 (n=189) |
|---|---|---|---|---|---|
| INTERCEPT | 0.006 | 0.007 | -0.004 | 0.009 | 0.015 |
| | (2.25**) | (7.68***) | (-1.21) | (3.82***) | (2.01**) |
| LOSS | 0.386 | -0.047 | 0.140 | -0.070 | 0.241 |
| | (3.94***) | (-1.76*) | (1.81*) | (-1.62) | (2.27**) |
| EQUITY | -0.011 | 0.021 | 0.084 | 0.013 | 0.001 |
| | (-2.84***) | (9.72***) | (17.02***) | (2.96***) | (0.08) |
| OFFBAL | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (34.99***) | (7.79***) | (0.29) | (8.93***) | (1.14) |
| SECURITIES | 0.010 | 0.002 | 0.000 | 0.003 | -0.002 |
| | (4.52***) | (3.05***) | (0.15) | (1.91*) | (-0.73) |
| PURCHASED | -0.007 | -0.006 | -0.000 | -0.007 | -0.010 |
| | (-2.37**) | (-6.65***) | (-0.01) | (-2.72***) | (-1.16) |
| REALESTATE | -0.012 | -0.008 | -0.007 | -0.006 | -0.002 |
| | (-4.09***) | (-6.59***) | (-2.06**) | (-2.93***) | (-0.76) |
| HHI | -0.000 | 0.000 | 0.000 | 0.001 | -0.001 |
| | (-0.16) | (1.03) | (0.54) | (1.45) | (-0.55) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (4.39***) | (3.29***) | (0.85) | (0.06) | (0.22) |
| DIVERS | 0.017 | 0.012 | 0.013 | 0.010 | 0.001 |
| | (3.44***) | (7.89***) | (3.08***) | (4.27***) | (0.25) |
| Overall F | 157.59*** | 41.52*** | 56.79*** | 20.17*** | 4.04*** |
| Adjusted $R^2$ | 0.2539 | 0.1243 | 0.4585 | 0.2078 | 0.1266 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
REALESTATE = real estate loans/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table B-10

## Mean Rate of Return on Assets and Residual Real Estate Lending: 1994-2001 Two-Stage Regression Analyses for U. S. Commercial Banks by Asset Size Group Using Quarterly Data (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| | **All sizes (n=31)** | **<$100 (n=31)** | **$100-$300 (n=31)** | **$300-$500 (n=31)** | **$500-$3,000 (n=31)** | **>$3,000 (n=31)** |
| INTERCEPT | 0.013 | 0.020 | -0.004 | 0.005 | 0.009 | 0.016 |
| | (1.62) | (1.72*) | (-0.67) | (0.87) | (1.58) | (3.02***) |
| SIGMA(ROA) | 0.059 | 0.048 | 0.736 | 0.543 | 0.465 | 1.136 |
| | (2.82***) | (3.28***) | (5.19***) | (7.04***) | (4.23***) | (9.45***) |
| RESIDUAL(RE) | -0.022 | -0.049 | -0.005 | -0.002 | -0.014 | -0.054 |
| | (-0.89) | (-1.24) | (-0.26) | (-0.16) | (-0.84) | (-2.61**) |
| Overall F | 4.19** | 5.63*** | 13.80*** | 25.02*** | 9.51*** | 45.48*** |
| Adjusted $R^2$ | 0.1708 | 0.2300 | 0.4523 | 0.6078 | 0.3543 | 0.7416 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

SIGMA(ROA) = standard deviation of ROAs for banks in each group and quarter

RESIDUAL(RE) = first-stage regression model residual for mean real estate loans in each group and year.

## Table B-11

## Mean Rate of Return on Assets and Residual Real Estate Lending: 1994-2001 Two-Stage Regression Analyses for U. S. Commercial Banks by Asset Size Group Using Quarterly Data (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| | **All sizes (n=31)** | **<$100 (n=31)** | **$100-$300 (n=31)** | **$300-$500 (n=31)** | **$500-$3,000 (n=31)** | **>$3,000 (n=31)** |
| INTERCEPT | 0.013 | 0.021 | 0.005 | 0.006 | 0.009 | 0.018 |
| | (1.59) | (1.70*) | (0.79) | (1.20) | (1.63) | (3.26***) |
| SIGMA(ROA) | 0.059 | 0.048 | 0.747 | 0.577 | 0.481 | 1.168 |
| | (2.77***) | (3.24***) | (5.18***) | (7.39***) | (4.24***) | (9.56***) |
| TBILL | 0.010 | 0.027 | 0.052 | 0.128 | 0.065 | 0.083 |
| | (0.11) | (0.29) | (0.62) | (1.61) | (0.68) | (1.22) |
| RESIDUAL(RE) | -0.023 | -0.055 | -0.009 | -0.012 | -0.018 | -0.066 |
| | (-0.86) | (-1.24) | (-0.48) | (-0.82) | (-1.01) | (-2.90***) |
| Overall F | 2.70** | 3.66** | 9.14*** | 18.45*** | 6.38*** | 31.32*** |
| Adjusted $R^2$ | 0.1415 | 0.2049 | 0.4406 | 0.6281 | 0.3423 | 0.7458 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

SIGMA(ROA) = standard deviation of ROAs for banks in each group and quarter

TBILL = one-year T-bill rate in each quarter

RESIDUAL(RE) = first-stage regression model residual for mean real estate loans in each group and year.

# APPENDIX C
# Consumer Lending and Bank Profitability

## Table C-1

### Average Rates of Return on Assets (ROA) for U.S. Commercial Banks in the Period June 1994-June 2001: Means and t-Tests for Decile Rankings by Consumer Lending Activity and Bank Asset Size Groups (in percent)

| | Assets in Millions | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <$100 | | $100-$300 | | $300-$500 | | $500-$3000 | | >$3000 | | All Banks | |
| Decile | Mean | N | Mean | n | Mean | n | Mean | n | Mean | n | Mean | n |
| 1 | 1.03 | 3515 | 0.58 | 2229 | 0.70 | 638 | 0.67 | 849 | 0.59 | 174 | 0.81 | 7405 |
| 2-3 | 0.48 | 9336 | 0.59 | 3914 | 0.60 | 692 | 0.59 | 690 | 0.62 | 178 | 0.52 | 14810 |
| 4-7 | 0.55 | 19353 | 0.61 | 7536 | 0.62 | 1185 | 0.62 | 1117 | 0.59 | 429 | 0.57 | 29620 |
| 8-9 | 0.55 | 9242 | 0.61 | 3656 | 0.65 | 667 | 0.68 | 879 | 0.70 | 366 | 0.58 | 14810 |
| 10 | 0.60 | 4064 | 0.65 | 1778 | 0.79 | 460 | 0.77 | 765 | 0.94 | 339 | 0.66 | 7406 |
| All | 0.58 | 45510 | 0.61 | 19113 | 0.66 | 3642 | 0.66 | 4300 | 0.70 | 1486 | 0.60 | 74051 |

**t-Tests for Mean Differences**[ab]

| | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| Decile Comparisons | <$100 | $100-$300 | $300-$500 | $500-$3000 | >$3000 | All Banks |
| 1 vs. 10 | 1.38 | -2.54** | -1.37 | -1.73* | -5.71*** | 1.06 |
| 2 and 3 vs. 8 and 9 | -6.87*** | -2.26** | -2.90*** | -1.95* | -2.50** | -8.05 |
| 1, 2, 3 vs. 8, 9, 10 | 0.76 | -3.33*** | -2.01** | -2.23** | -6.13*** | 0.26 |

[a]Not available (na) due to small sample sizes.

[b]Asterisks indicate the level of significance: *--.10, **--.05, and ***--.01.

## Table C-2

## Rate of Return on Assets (ROA) and Consumer Lending in 1994: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| | Assets in Millions | | | | |
|---|---|---|---|---|---|
| **Independent Variables[b]** | **<$100 (n=7,556)** | **$100-$300 (n=2,133)** | **$300-$500 (n=376)** | **$500-$3,000 (n=451)** | **>$3,000 (n=181)** |
| INTERCEPT | 0.000 | -0.002 | -0.007 | 0.003 | -0.007 |
| | (0.55) | (-1.46) | (-2.68***) | (2.28**) | (-2.19**) |
| LOSS | -0.709 | -0.951 | -0.660 | -0.343 | -0.092 |
| | (-15.19***) | (-15.71***) | (-5.86***) | (-4.87***) | (-0.71) |
| EQUITY | 0.029 | 0.047 | 0.053 | 0.012 | 0.101 |
| | (15.93***) | (11.34***) | (5.58***) | (1.94*) | (6.01***) |
| OFFBAL | 0.000 | -0.000 | 0.001 | 0.001 | 0.001 |
| | (19.63***) | (-1.13) | (3.93***) | (4.31***) | (3.01***) |
| SECURITIES | -0.002 | 0.008 | 0.004 | -0.000 | 0.000 |
| | (-2.48**) | (5.90***) | (1.82*) | (-0.19) | (0.03) |
| PURCHASED | 0.002 | -0.005 | 0.007 | 0.000 | 0.006 |
| | (1.47) | (-2.93***) | (2.56**) | (0.04) | (1.62) |
| CONSUMER | 0.010 | 0.019 | 0.010 | 0.006 | 0.023 |
| | (7.15***) | (11.57***) | (4.99***) | (4.08***) | (7.75***) |
| HHI | 0.001 | 0.001 | 0.000 | 0.001 | -0.002 |
| | (2.01**) | (1.94*) | (0.22) | (1.18) | (-1.17) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (5.74***) | (0.58) | (0.09) | (-0.32) | (1.90*) |
| DIVERS | -0.002 | 0.017 | 0.004 | 0.003 | -0.009 |
| | (-1.35) | (8.36***) | (1.54) | (1.88*) | (-3.97***) |
| Overall F | 124.43*** | 72.44*** | 19.56*** | 14.87*** | 28.19*** |
| Adjusted $R^2$ | 0.1282 | 0.2316 | 0.3076 | 0.2168 | 0.5748 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
CONSUMER = consumer loans/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets.
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table C-3

## Rate of Return on Assets (ROA) and Consumer Lending in 1995: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| | Assets in Millions | | | | |
|---|---|---|---|---|---|
| **Independent Variables[b]** | **<$100 (n=6,889)** | **$100-$300 (n=2,192)** | **$300-$500 (n=399)** | **$500-$3,000 (n=467)** | **>$3,000 (n=195)** |
| INTERCEPT | 0.004 | 0.007 | 0.007 | 0.004 | 0.004 |
| | (5.04***) | (8.88***) | (3.76***) | (2.40**) | (1.32) |
| LOSS | -0.759 | -0.524 | -0.113 | -0.088 | -0.691 |
| | (-15.36***) | (-14.07***) | (-1.15) | (-1.21) | (-9.71***) |
| EQUITY | 0.017 | 0.011 | 0.037 | 0.013 | 0.058 |
| | (11.02***) | (5.45***) | (6.23***) | (1.93*) | (4.11***) |
| OFFBAL | 0.000 | 0.002 | 0.001 | 0.001 | 0.001 |
| | (34.43***) | (23.64***) | (15.95***) | (11.73***) | (4.54***) |
| SECURITIES | 0.001 | 0.000 | -0.002 | -0.001 | 0.004 |
| | (1.84*) | (0.11) | (-1.29) | (-0.49) | (1.55) |
| PURCHASED | -0.005 | -0.005 | -0.007 | 0.000 | -0.008 |
| | (-5.11***) | (-4.66***) | (-3.19***) | (0.27) | (-2.46**) |
| CONSUMER | 0.008 | 0.003 | 0.002 | 0.001 | 0.012 |
| | (5.84***) | (3.34***) | (1.00) | (0.47) | (5.15***) |
| HHI | 0.001 | 0.001 | 0.000 | 0.001 | -0.000 |
| | (1.74*) | (3.39***) | (0.07) | (1.48) | (-0.36) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (4.71***) | (0.65) | (0.79) | (-0.08) | (3.29***) |
| DIVERS | 0.008 | 0.000 | -0.002 | -0.001 | 0.002 |
| | (5.73***) | (0.30) | (-0.87) | (-0.67) | (1.05) |
| Overall F | 214.85*** | 102.17*** | 56.43*** | 27.51*** | 22.88*** |
| Adjusted $R^2$ | 0.2184 | 0.2935 | 0.5556 | 0.3381 | 0.5025 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
CONSUMER = consumer loans/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table C-4

## Rate of Return on Assets (ROA) and Consumer Lending in 1996: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| | Assets in Millions | | | | |
|---|---|---|---|---|---|
| **Independent Variables[b]** | **<$100 (n=6,263)** | **$100-$300 (n=2,329)** | **$300-$500 (n=387)** | **$500-$3,000 (n=492)** | **>$3,000 (n=193)** |
| INTERCEPT | 0.003 | 0.004 | 0.004 | 0.007 | 0.009 |
| | (3.26***) | (4.67***) | (2.54**) | (3.56***) | (3.12***) |
| LOSS | 0.081 | -0.279 | -0.153 | -0.048 | 0.053 |
| | (1.59) | (-8.16***) | (-2.09**) | (-0.74) | (0.59) |
| EQUITY | 0.022 | 0.027 | 0.049 | 0.007 | -0.012 |
| | (11.75***) | (12.32***) | (9.21***) | (0.89) | (-1.39) |
| OFFBAL | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 |
| | (26.04***) | (16.65***) | (2.36**) | (8.25***) | (1.14) |
| SECURITIES | 0.003 | -0.001 | -0.003 | -0.002 | 0.004 |
| | (3.53***) | (-1.46) | (-1.77*) | (-1.35) | (1.25) |
| PURCHASED | -0.005 | -0.001 | -0.004 | -0.000 | -0.004 |
| | (-4.15***) | (-1.18) | (-2.40**) | (-0.17) | (-1.25) |
| CONSUMER | 0.005 | -0.000 | 0.002 | -0.004 | -0.000 |
| | (2.96***) | (-0.27) | (0.98) | (-2.62***) | (-0.18) |
| HHI | 0.000 | 0.002 | 0.001 | 0.001 | 0.000 |
| | (0.95) | (4.22***) | (1.87*) | (1.48) | (0.24) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (5.72***) | (1.34) | (1.13) | (-0.89) | (0.82) |
| DIVERS | 0.002 | -0.001 | -0.002 | 0.000 | 0.003 |
| | (1.54) | (-0.78) | (-1.18) | (0.06) | (1.51) |
| Overall F | 122.62*** | 61.46*** | 14.26*** | 10.27*** | 1.62 |
| Adjusted $R^2$ | 0.1488 | 0.1894 | 0.2356 | 0.1451 | 0.0281 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
CONSUMER = consumer loans/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets.
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table C-5

## Rate of Return on Assets (ROA) and Consumer Lending in 1997: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions <$100 (n=5,784) | $100-$300 (n=2,400) | $300-$500 (n=394) | $500-$3,000 (n=526) | >$3,000 (n=182) |
|---|---|---|---|---|---|
| INTERCEPT | 0.007 | 0.003 | 0.006 | 0.002 | 0.009 |
| | (4.16***) | (3.78***) | (3.64***) | (1.03) | (2.64***) |
| LOSS | -0.658 | -0.087 | -0.039 | 0.114 | 0.068 |
| | (-8.06***) | (-2.76***) | (-0.45) | (1.66*) | (0.92) |
| EQUITY | -0.001 | 0.021 | 0.030 | 0.052 | 0.000 |
| | (-0.44) | (10.45***) | (6.68***) | (8.97***) | (0.01) |
| OFFBAL | 0.000 | 0.000 | 0.001 | 0.000 | 0.001 |
| | (24.72***) | (3.79***) | (12.22***) | (4.46***) | (3.29***) |
| SECURITIES | -0.001 | 0.001 | -0.002 | 0.000 | -0.002 |
| | (-1.01) | (1.37) | (-1.58) | (0.28) | (-0.77) |
| PURCHASED | -0.004 | -0.000 | -0.004 | 0.001 | -0.003 |
| | (-1.85*) | (-0.44) | (-2.25**) | (0.36) | (-0.81) |
| CONSUMER | 0.008 | 0.003 | -0.002 | -0.007 | -0.010 |
| | (3.31***) | (2.99***) | (-1.35) | (-3.84***) | (-3.97***) |
| HHI | 0.001 | 0.000 | 0.001 | 0.001 | 0.002 |
| | (1.46) | (0.97) | (1.55) | (1.42) | (1.75*) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (4.43***) | (1.66*) | (0.76) | (-0.30) | (0.71) |
| DIVERS | -0.003 | 0.004 | 0.000 | -0.002 | 0.004 |
| | (-1.40) | (4.51***) | (0.04) | (-1.36) | (1.92*) |
| Overall F | 73.95*** | 21.21*** | 53.36*** | 29.40*** | 3.36*** |
| Adjusted $R^2$ | 0.1019 | 0.0704 | 0.5446 | 0.3270 | 0.1045 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
CONSUMER = consumer loans/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table C-6

## Rate of Return on Assets (ROA) and Consumer Lending in 1998: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions <$100 (n=5,356) | $100-$300 (n=2,441) | $300-$500 (n=442) | $500-$3,000 (n=551) | >$3,000 (n=172) |
|---|---|---|---|---|---|
| INTERCEPT | 0.001 | 0.005 | -0.003 | -0.001 | 0.009 |
| | (0.68) | (7.06***) | (-1.32) | (-0.26) | (2.16**) |
| LOSS | 0.447 | -0.157 | -0.630 | 1.399 | 0.108 |
| | (8.28***) | (-6.38***) | (-7.65***) | (7.83***) | (1.07) |
| EQUITY | 0.011 | 0.035 | 0.091 | 0.053 | -0.019 |
| | (3.61***) | (15.69***) | (17.86***) | (3.14***) | (-1.93*) |
| OFFBAL | 0.000 | 0.000 | 0.000 | -0.000 | 0.001 |
| | (18.47***) | (25.47***) | (4.78***) | (-1.72*) | (3.21***) |
| SECURITIES | -0.000 | 0.000 | -0.005 | -0.015 | -0.006 |
| | (-0.11) | (0.68) | (-2.56**) | (-2.76***) | (-1.61) |
| PURCHASED | 0.002 | -0.007 | 0.006 | 0.016 | 0.000 |
| | (0.67) | (-7.31***) | (2.50**) | (2.24**) | (0.00) |
| CONSUMER | -0.000 | 0.001 | 0.005 | -0.029 | 0.000 |
| | (-0.15) | (0.99) | (1.74*) | (-4.62***) | (0.13) |
| HHI | 0.002 | 0.000 | -0.000 | 0.000 | 0.003 |
| | (2.44**) | (0.60) | (-0.28) | (0.06) | (1.66*) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (4.36***) | (4.26***) | (-0.66) | (0.79) | (-0.70) |
| DIVERS | -0.008 | 0.004 | -0.003 | -0.017 | -0.004 |
| | (-2.71***) | (4.17***) | (-1.34) | (-3.18***) | (-1.30) |
| Overall F | 54.66*** | 131.00*** | 58.85*** | 9.81*** | 3.85*** |
| Adjusted $R^2$ | 0.0827 | 0.3240 | 0.5409 | 0.1258 | 0.1299 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
CONSUMER = consumer loans/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table C-7

## Rate of Return on Assets (ROA) and Consumer Lending in 1999: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions <$100 (n=4,933) | $100-$300 (n=2,476) | $300-$500 (n=501) | $500-$3,000 (n=566) | >$3,000 (n=178) |
|---|---|---|---|---|---|
| INTERCEPT | 0.001 | 0.004 | -0.008 | 0.011 | 0.013 |
| | (0.54) | (4.24***) | (-2.57***) | (1.61) | (2.48**) |
| LOSS | -0.29 | 0.486 | -0.573 | 0.729 | -0.136 |
| | (-2.29**) | (10.97***) | (-12.55***) | (4.34***) | (-1.08) |
| EQUITY | -0.004 | 0.016 | 0.101 | 0.024 | -0.017 |
| | (-1.05) | (6.33***) | (16.57***) | (1.32) | (-1.57) |
| OFFBAL | 0.000 | 0.000 | 0.000 | -0.000 | 0.001 |
| | (37.87***) | (6.44***) | (6.09***) | (-1.16) | (4.45***) |
| SECURITIES | 0.005 | 0.005 | -0.001 | -0.016 | 0.007 |
| | (2.29**) | (6.00***) | (-0.59) | (-2.94***) | (2.17**) |
| PURCHASED | -0.003 | -0.006 | 0.005 | 0.004 | -0.012 |
| | (-1.07) | (-5.38***) | (1.51) | (0.48) | (-1.91*) |
| CONSUMER | 0.011 | 0.006 | 0.015 | -0.001 | 0.009 |
| | (2.59***) | (4.20***) | (5.39***) | (-0.24) | (2.30**) |
| HHI | 0.001 | 0.001 | 0.001 | -0.002 | 0.001 |
| | (1.19) | (1.96**) | (0.89) | (-0.91) | (0.41) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (5.08***) | (1.34) | (-0.02) | (-0.87) | (0.68) |
| DIVERS | -0.001 | 0.008 | 0.005 | -0.015 | 0.012 |
| | (-0.27) | (7.27***) | (1.97**) | (-2.74***) | (3.55***) |
| Overall F | 166.69*** | 53.04*** | 60.59*** | 4.46*** | 13.33*** |
| Adjusted $R^2$ | 0.2321 | 0.1591 | 0.5170 | 0.0522 | 0.3840 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
CONSUMER = consumer loans/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table C-8

## Rate of Return on Assets (ROA) and Consumer Lending in 2000: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions <$100 (n=4,578) | $100-$300 (n=2,564) | $300-$500 (n=542) | $500-$3,000 (n=581) | >$3,000 (n=188) |
|---|---|---|---|---|---|
| INTERCEPT | 0.025 | 0.004 | -0.001 | 0.005 | 0.011 |
| | (1.15) | (4.88***) | (-0.57) | (1.55) | (1.58) |
| LOSS | 0.879 | -0.194 | 0.327 | 0.310 | 0.288 |
| | (1.69*) | (-24.89***) | (4.59***) | (4.78***) | (2.16**) |
| EQUITY | 0.115 | 0.033 | 0.023 | 0.044 | 0.002 |
| | (3.91***) | (15.48***) | (5.44***) | (6.70***) | (0.13) |
| OFFBAL | 0.000 | 0.000 | 0.000 | 0.000 | -0.000 |
| | (5.67***) | (7.94***) | (8.07***) | (5.31***) | (-1.82*) |
| SECURITIES | -0.006 | 0.001 | 0.000 | -0.003 | -0.002 |
| | (-0.33) | (1.94*) | (0.14) | (-1.01) | (-0.73) |
| PURCHASED | -0.048 | -0.004 | 0.005 | 0.000 | -0.007 |
| | (-1.91*) | (-4.07***) | (2.09**) | (0.09) | (-0.93) |
| CONSUMER | -0.002 | 0.003 | 0.000 | -0.004 | 0.006 |
| | (-0.07) | (2.49**) | (0.10) | (-1.41) | (1.78*) |
| HHI | -0.007 | 0.001 | 0.000 | 0.000 | 0.001 |
| | (-0.72) | (2.19**) | (0.16) | (0.31) | (0.53) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (0.77) | (0.14) | (1.86*) | (-1.48) | (0.18) |
| DIVERS | -0.009 | 0.004 | -0.003 | -0.007 | 0.003 |
| | (-0.31) | (5.07***) | (-1.38) | (-2.57***) | (1.02) |
| Overall F | 11.70*** | 122.29*** | 27.15*** | 16.89*** | 5.71*** |
| Adjusted $R^2$ | 0.0206 | 0.2986 | 0.3027 | 0.1975 | 0.1840 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
CONSUMER = consumer loans/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table C-9

## Rate of Return on Assets (ROA) and Consumer Lending in 2001: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions <$100 (n=4,141) | $100-$300 (n=2,570) | $300-$500 (n=593) | $500-$3,000 (n=658) | >$3,000 (n=189) |
|---|---|---|---|---|---|
| INTERCEPT | 0.003 | 0.004 | -0.005 | 0.006 | 0.015 |
| | (1.20) | (5.00***) | (-1.73*) | (2.97***) | (2.01**) |
| LOSS | 0.402 | -0.037 | 0.306 | -0.061 | 0.142 |
| | (4.03***) | (-1.38) | (3.98***) | (-1.44) | (1.29) |
| EQUITY | -0.008 | 0.024 | 0.087 | 0.018 | 0.006 |
| | (-2.12**) | (11.16***) | (18.41***) | (4.01***) | (0.41) |
| OFFBAL | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (34.91***) | (8.26***) | (1.24) | (8.97***) | (0.75) |
| SECURITIES | 0.011 | 0.003 | -0.000 | 0.004 | -0.002 |
| | (4.81***) | (3.69***) | (-0.14) | (2.18**) | (-0.68) |
| PURCHASED | -0.006 | -0.006 | 0.001 | -0.006 | -0.010 |
| | (-2.01**) | (-6.04***) | (0.21) | (-2.46**) | (-1.22) |
| CONSUMER | 0.006 | 0.007 | -0.005 | 0.005 | 0.008 |
| | (1.39) | (5.87***) | (-1.46) | (2.75***) | (2.38**) |
| HHI | 0.000 | 0.000 | 0.001 | 0.001 | -0.001 |
| | (0.24) | (0.87) | (0.69) | (1.05) | (-0.92) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (3.63***) | (3.17***) | (0.76) | (0.01) | (0.36) |
| DIVERS | 0.003 | 0.004 | 0.006 | 0.005 | -0.003 |
| | (0.79) | (4.61***) | (2.23**) | (2.84***) | (-0.95) |
| Overall F | 155.38*** | 40.38*** | 56.36*** | 20.03*** | 4.72*** |
| Adjusted $R^2$ | 0.2512 | 0.1212 | 0.4566 | 0.2065 | 0.1505 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
CONSUMER = consumer loans/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table C-10

## Mean Rate of Return on Assets and Residual Consumer Lending: 1994-2001 Two-Stage Regression Analyses for U. S. Commercial Banks by Asset Size Group Using Quarterly Data (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| | **All sizes (n=31)** | **<$100 (n=31)** | **$100-$300 (n=31)** | **$300-$500 (n=31)** | **$500-$3,000 (n=31)** | **>$3,000 (n=31)** |
| INTERCEPT | -0.003 | -0.013 | -0.001 | 0.004 | 0.000 | -0.011 |
| | (-0.46) | (-1.13) | (-0.22) | (1.76*) | (0.16) | (-3.97***) |
| SIGMA(ROA) | 0.058 | 0.043 | 0.752 | 0.541 | 0.495 | 1.221 |
| | (3.06***) | (3.48***) | (5.37***) | (7.05***) | (4.52***) | (12.25***) |
| RESIDUAL(CONS) | 0.103 | 0.211 | 0.042 | 0.000 | 0.029 | 0.073 |
| | (1.26) | (1.64) | (0.85) | (-0.01) | (1.39) | (4.95***) |
| Overall F | 4.69** | 6.38*** | 14.43*** | 24.98*** | 10.51*** | 75.09*** |
| Adjusted $R^2$ | 0.1924 | 0.2577 | 0.4643 | 0.6074 | 0.3802 | 0.8270 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

SIGMA(ROA) = standard deviation of ROAs for banks in each group and quarter

RESIDUAL(CONS) = first-stage regression model residual for consumer loans in each group and year.

## Table C-11

## Mean Rate of Return on Assets and Residual Consumer Lending: 1994-2001 Two-Stage Regression Analyses for U. S. Commercial Banks by Asset Size Group Using Quarterly Data (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions: All sizes (n=31) | <$100 (n=31) | $100-$300 (n=31) | $300-$500 (n=31) | $500-$3,000 (n=31) | >$3,000 (n=31) |
|---|---|---|---|---|---|---|
| INTERCEPT | -0.003 | -0.012 | -0.002 | 0.001 | -0.001 | -0.011 |
| | (-0.41) | (-1.09) | (-0.48) | (0.32) | (-0.28) | (-3.75***) |
| SIGMA(ROA) | 0.058 | 0.044 | 0.759 | 0.569 | 0.508 | 1.220 |
| | (2.99***) | (3.42***) | (5.36***) | (7.33***) | (4.55***) | (12.04***) |
| TBILL | -0.008 | -0.023 | 0.052 | 0.114 | 0.066 | -0.006 |
| | (-0.09) | (-0.27) | (0.68) | (1.46) | (0.73) | (-0.12) |
| RESIDUAL(CONS) | 0.102 | 0.212 | 0.049 | 0.010 | 0.032 | 0.073 |
| | (1.23) | (1.62) | (0.96) | (0.49) | (1.52) | (4.87***) |
| Overall F | 3.02** | 4.14** | 9.59*** | 18.03*** | 7.07*** | 48.37*** |
| Adjusted $R^2$ | 0.1638 | 0.2331 | 0.4541 | 0.6223 | 0.3700 | 0.8209 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

SIGMA(ROA) = standard deviation of ROAs for banks in each group and quarter
TBILL = one-year T-bill rate in each quarter
RESIDUAL(CONS) = first-stage regression model residual for consumer loans in each group and year.

# APPENDIX D
# Agricultural Lending and Bank Profitability

## Table D-1

### Average Rates of Return on Assets (ROA) for U.S. Commercial Banks in the Period June 1994-June 2001: Means and t-Tests for Decile Rankings by Agricultural Lending Activity and Bank Asset Size Groups (in percent)

| | Assets in Millions | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <$100 | | $100-$300 | | $300-$500 | | $500-$3000 | | >$3000 | | All Banks | |
| Decile | Mean | n | Mean | n | Mean | n | Mean | n | Mean | n | Mean | n |
| 1 | 0.53 | 4113 | 0.57 | 2262 | 0.73 | 423 | 0.70 | 510 | 0.87 | 97 | 0.57 | 7405 |
| 2-3 | 0.66 | 5390 | 0.58 | 5085 | 0.68 | 1443 | 0.66 | 2026 | 0.72 | 866 | 0.64 | 14810 |
| 4-7 | 0.54 | 17128 | 0.62 | 8790 | 0.63 | 1546 | 0.66 | 1633 | 0.64 | 523 | 0.58 | 29620 |
| 8-9 | 0.59 | 12084 | 0.63 | 2398 | 0.61 | 208 | 0.63 | 120 | Na | Na | 0.59 | 14810 |
| 10 | 0.62 | 6795 | 0.66 | 578 | 0.60 | 22 | 0.74 | 11 | Na | Na | 0.62 | 7406 |
| All | 0.58 | 45510 | 0.61 | 19113 | 0.66 | 3642 | 0.66 | 4300 | 0.70 | 1486 | 0.60 | 74051 |

**t-Tests for Mean Differences**[ab]

| | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| **Decile Comparisons** | **<$100** | **$100-$300** | **$300-$500** | **$500-$3000** | **>$3000** | **All Banks** |
| 1 vs. 10 | -1.89* | -3.57*** | 2.05** | -0.49 | N/a | -1.89* |
| 2 and 3 vs. 8 and 9 | 0.38 | -4.31*** | 2.73*** | 1.31 | N/a | 0.66 |
| 1, 2, 3 vs. 8, 9, 10 | 0.05 | -5.29*** | 3.44*** | 1.34 | N/a | 0.29 |

[a]Not available (na) due to small sample sizes.

[b]Asterisks indicate the level of significance: *--.10, **--.05, and ***--.01.

## Table D-2

## Rate of Return on Assets (ROA) and Agricultural Lending in 1994: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| | Assets in Millions | | | | |
|---|---|---|---|---|---|
| **Independent Variables[b]** | **<$100 (n=7,556)** | **$100-$300 (n=2,133)** | **$300-$500 (n=376)** | **$500-$3,000 (n=451)** | **>$3,000 (n=181)** |
| INTERCEPT | 0.001 | -0.002 | -0.007 | 0.004 | -0.007 |
| | (1.32) | (-1.57) | (-2.69***) | (2.33**) | (-1.78*) |
| LOSS | -0.649 | -0.909 | -0.599 | -0.267 | 0.072 |
| | (-14.04***) | (-14.64***) | (-5.20***) | (-3.86***) | (0.48) |
| EQUITY | 0.029 | 0.048 | 0.056 | 0.016 | 0.101 |
| | (15.57***) | (11.23***) | (5.72***) | (2.41**) | (5.15***) |
| OFFBAL | 0.000 | 0.000 | 0.002 | 0.001 | 0.002 |
| | (19.56***) | (1.84*) | (6.19***) | (6.38***) | (5.49***) |
| SECURITIES | -0.002 | 0.008 | 0.003 | -0.001 | 0.001 |
| | (-2.49**) | (5.63***) | (1.17) | (-0.69) | (0.40) |
| PURCHASED | 0.001 | -0.005 | 0.008 | 0.000 | 0.006 |
| | (0.76) | (-2.73***) | (2.84***) | (0.08) | (1.35) |
| AGLOAN | 0.003 | 0.009 | 0.011 | 0.009 | 0.011 |
| | (3.31***) | (3.73***) | (1.50) | (1.19) | (0.42) |
| HHI | 0.001 | 0.001 | 0.000 | 0.001 | -0.001 |
| | (2.09**) | (2.22**) | (0.39) | (1.37) | (-0.34) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (6.24***) | (1.64) | (0.17) | (-0.26) | (0.65) |
| DIVERS | 0.000 | 0.022 | 0.006 | 0.005 | 0.001 |
| | (0.17) | (10.13***) | (2.23**) | (2.51**) | (0.42) |
| Overall F | 119.33*** | 56.04*** | 16.08*** | 12.74*** | 15.99*** |
| Adjusted $R^2$ | 0.1235 | 0.1885 | 0.2652 | 0.1898 | 0.4270 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
AGLOAN = agricultural production and agricultural real estate loans/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table D-3

## Rate of Return on Assets (ROA) and Agricultural Lending in 1995: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| | Assets in Millions | | | | |
|---|---|---|---|---|---|
| **Independent Variables[b]** | **<$100 (n=6,889)** | **$100-$300 (n=2,192)** | **$300-$500 (n=399)** | **$500-$3,000 (n=467)** | **>$3,000 (n=195)** |
| INTERCEPT | 0.005 | 0.007 | 0.007 | 0.004 | 0.004 |
| | (5.58***) | (8.84***) | (3.74***) | (2.20**) | (1.35) |
| LOSS | -0.686 | -0.498 | -0.077 | -0.079 | -0.668 |
| | (-14.16***) | (-13.62***) | (-0.83) | (-1.17) | (-8.81***) |
| EQUITY | 0.017 | 0.011 | 0.038 | 0.014 | 0.046 |
| | (10.57***) | (5.37***) | (6.54***) | (2.04**) | (3.08***) |
| OFFBAL | 0.000 | 0.003 | 0.001 | 0.001 | 0.002 |
| | (34.67***) | (24.23***) | (16.19***) | (12.56***) | (7.61***) |
| SECURITIES | 0.002 | 0.000 | -0.003 | -0.000 | 0.004 |
| | (2.63***) | (0.44) | (-1.58) | (-0.33) | (1.40) |
| PURCHASED | -0.007 | -0.005 | -0.006 | 0.001 | -0.007 |
| | (-6.69***) | (-4.87***) | (-2.97***) | (0.28) | (-1.95*) |
| AGLOAN | 0.005 | 0.003 | -0.004 | 0.013 | 0.016 |
| | (7.08***) | (2.13**) | (-0.92) | (1.59) | (0.70) |
| HHI | 0.000 | 0.001 | 0.000 | 0.001 | -0.000 |
| | (1.28) | (3.32***) | (0.37) | (1.25) | (-0.11) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (6.28***) | (1.12) | (0.78) | (0.04) | (2.08**) |
| DIVERS | 0.011 | 0.001 | -0.002 | -0.000 | 0.009 |
| | (7.86***) | (1.49) | (-0.95) | (-0.32) | (4.89***) |
| Overall F | 217.14*** | 101.12*** | 56.38*** | 27.91*** | 17.54*** |
| Adjusted $R^2$ | 0.2202 | 0.2913 | 0.5554 | 0.3415 | 0.4330 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
AGLOAN = agricultural production and agricultural real estate loans/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table D-4

## Rate of Return on Assets (ROA) and Agricultural Lending in 1996: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions <$100 (n=6,263) | $100-$300 (n=2,329) | $300-$500 (n=387) | $500-$3,000 (n=492) | >$3,000 (n=193) |
|---|---|---|---|---|---|
| INTERCEPT | 0.003 | 0.004 | 0.004 | 0.006 | 0.009 |
| | (3.33***) | (4.63***) | (2.63***) | (3.39***) | (3.11) |
| LOSS | 0.106 | -0.283 | -0.111 | -0.136 | 0.046 |
| | (2.12**) | (-8.68***) | (-1.85*) | (-2.38**) | (0.57) |
| EQUITY | 0.022 | 0.027 | 0.049 | 0.006 | -0.012 |
| | (11.71***) | (12.31***) | (9.19***) | (0.81) | (-1.39) |
| OFFBAL | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 |
| | (26.24***) | (16.71***) | (2.84***) | (7.89***) | (1.18) |
| SECURITIES | 0.004 | -0.001 | -0.003 | -0.001 | 0.004 |
| | (4.36***) | (-1.24) | (-2.10**) | (-0.95) | (1.26) |
| PURCHASED | -0.007 | -0.001 | -0.004 | -0.000 | -0.005 |
| | (-5.48***) | (-1.33) | (-2.23**) | (-0.23) | (-1.29) |
| AGLOAN | 0.006 | 0.001 | -0.001 | 0.002 | 0.001 |
| | (6.06***) | (0.67) | (-0.19) | (0.23) | (0.04) |
| HHI | 0.000 | 0.002 | 0.001 | 0.001 | 0.000 |
| | (0.46) | (3.98***) | (2.09**) | (1.07) | (0.21) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (6.95***) | (1.42) | (1.08) | (-0.91) | (0.87) |
| DIVERS | 0.006 | -0.001 | -0.003 | -0.001 | 0.003 |
| | (3.53***) | (-0.51) | (-1.37) | (-0.43) | (1.53) |
| Overall F | 126.28*** | 61.51*** | 14.12*** | 9.39*** | 1.62 |
| Adjusted $R^2$ | 0.1526 | 0.1895 | 0.2338 | 0.1330 | 0.0280 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
AGLOAN = agricultural production and agricultural real estate loans/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table D-5

## Rate of Return on Assets (ROA) and Agricultural Lending in 1997: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| | Assets in Millions | | | | |
|---|---|---|---|---|---|
| **Independent Variables[b]** | **<$100 (n=5,784)** | **$100-$300 (n=2,400)** | **$300-$500 (n=394)** | **$500-$3,000 (n=526)** | **>$3,000 (n=182)** |
| INTERCEPT | 0.007 | 0.003 | 0.005 | 0.001 | 0.010 |
| | (4.44***) | (3.75***) | (3.51***) | (0.53) | (3.02***) |
| LOSS | -0.570 | -0.052 | -0.115 | -0.042 | -0.040 |
| | (-7.28***) | (-1.79*) | (-1.58) | (-0.75) | (-0.56) |
| EQUITY | -0.001 | 0.021 | 0.030 | 0.053 | 0.000 |
| | (-0.49) | (10.39***) | (6.68***) | (9.08***) | (0.04) |
| OFFBAL | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 |
| | (24.55***) | (4.14***) | (12.14***) | (4.64***) | (2.02**) |
| SECURITIES | -0.000 | 0.001 | -0.002 | 0.002 | -0.001 |
| | (-0.40) | (1.69*) | (-1.32) | (1.01) | (-0.50) |
| PURCHASED | -0.006 | -0.001 | -0.004 | 0.001 | -0.006 |
| | (-2.90***) | (-0.76) | (-2.36**) | (0.31) | (-1.46) |
| AGLOAN | 0.006 | 0.002 | 0.001 | 0.002 | -0.014 |
| | (4.17***) | (2.32**) | (0.36) | (0.30) | (-0.61) |
| HHI | 0.001 | 0.000 | 0.001 | 0.001 | 0.002 |
| | (1.25) | (0.94) | (1.10) | (0.89) | (1.60) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (5.15***) | (1.96**) | (0.86) | (-0.18) | (1.12) |
| DIVERS | 0.001 | 0.005 | 0.000 | -0.003 | 0.000 |
| | (0.29) | (5.28***) | (0.20) | (-1.43) | (0.02) |
| Overall F | 74.74*** | 20.78*** | 52.94*** | 27.00*** | 1.52 |
| Adjusted $R^2$ | 0.1029 | 0.0690 | 0.5426 | 0.3079 | 0.0251 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
AGLOAN = agricultural production and agricultural real estate loans/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table D-6

## Rate of Return on Assets (ROA) and Agricultural Lending in 1998: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions <$100 (n=5,356) | $100-$300 (n=2,441) | $300-$500 (n=442) | $500-$3,000 (n=551) | >$3,000 (n=172) |
|---|---|---|---|---|---|
| INTERCEPT | 0.001 | 0.005 | -0.003 | -0.002 | 0.009 |
| | (0.46) | (6.98***) | (-1.13) | (-0.41) | (2.17**) |
| LOSS | 0.453 | -0.149 | -0.537 | 0.887 | 0.117 |
| | (8.58***) | (-6.45***) | (-8.50***) | (6.23***) | (1.43) |
| EQUITY | 0.011 | 0.035 | 0.091 | 0.054 | -0.019 |
| | (3.75***) | (15.44***) | (17.82***) | (3.13***) | (-1.93*) |
| OFFBAL | 0.000 | 0.000 | 0.000 | -0.000 | 0.001 |
| | (18.57***) | (25.68***) | (5.35***) | (-1.88*) | (3.33***) |
| SECURITIES | 0.001 | 0.001 | -0.006 | -0.012 | -0.006 |
| | (0.42) | (1.73*) | (-2.82***) | (-2.17**) | (-1.65*) |
| PURCHASED | -0.000 | -0.008 | 0.007 | 0.014 | 0.000 |
| | (-0.06) | (-8.10***) | (2.66***) | (1.94*) | (0.05) |
| AGLOAN | 0.005 | 0.004 | -0.001 | -0.014 | -0.010 |
| | (3.11***) | (4.10***) | (-0.16) | (-0.81) | (-0.37) |
| HHI | 0.002 | 0.000 | -0.000 | -0.001 | 0.003 |
| | (2.21**) | (0.15) | (-0.05) | (-0.37) | (1.68*) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (5.01***) | (4.77***) | (-0.79) | (0.83) | (-0.76) |
| DIVERS | -0.006 | 0.006 | -0.004 | -0.019 | -0.004 |
| | (-1.92*) | (5.64***) | (-1.49) | (-3.36***) | (-1.42) |
| Overall F | 55.83*** | 133.61*** | 58.12*** | 7.24*** | 3.87*** |
| Adjusted $R^2$ | 0.0844 | 0.3284 | 0.5377 | 0.0925 | 0.1306 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
AGLOAN = agricultural production and agricultural real estate loans/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table D-7

## Rate of Return on Assets (ROA) and Agricultural Lending in 1999: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions <$100 (n=4,933) | $100-$300 (n=2,476) | $300-$500 (n=501) | $500-$3,000 (n=566) | >$3,000 (n=178) |
|---|---|---|---|---|---|
| INTERCEPT | 0.001 | 0.004 | -0.008 | 0.011 | 0.011 |
| | (0.54) | (4.23***) | (-2.53**) | (1.60) | (2.18**) |
| LOSS | -0.198 | 0.558 | -0.529 | 0.714 | 0.020 |
| | (-1.60) | (13.93***) | (-11.32***) | (4.88***) | (0.19) |
| EQUITY | -0.004 | 0.016 | 0.102 | 0.024 | -0.018 |
| | (-1.03) | (6.16***) | (16.14***) | (1.31) | (-1.59) |
| OFFBAL | 0.000 | 0.000 | 0.000 | -0.000 | 0.001 |
| | (38.07***) | (6.73***) | (6.44***) | (-1.22) | (5.27***) |
| SECURITIES | 0.008 | 0.007 | -0.003 | -0.017 | 0.007 |
| | (3.31***) | (7.24***) | (-1.34) | (-2.97***) | (2.02**) |
| PURCHASED | -0.008 | -0.008 | 0.007 | 0.004 | -0.010 |
| | (-2.46**) | (-6.63***) | (2.06**) | (0.52) | (-1.59) |
| AGLOAN | 0.012 | 0.007 | -0.004 | -0.007 | 0.013 |
| | (5.63***) | (5.96***) | (-0.69) | (-0.43) | (0.44) |
| HHI | 0.001 | 0.001 | 0.002 | -0.002 | 0.001 |
| | (1.03) | (1.69*) | (1.68*) | (-0.83) | (0.61) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (5.97***) | (1.95*) | (0.12) | (-0.92) | (0.49) |
| DIVERS | 0.007 | 0.011 | 0.005 | -0.016 | 0.015 |
| | (1.72*) | (9.34***) | (1.66*) | (-2.75***) | (4.73***) |
| Overall F | 170.30*** | 55.40*** | 54.25*** | 4.48*** | 12.39*** |
| Adjusted $R^2$ | 0.2360 | 0.1651 | 0.4889 | 0.0524 | 0.3654 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
AGLOAN = agricultural production and agricultural real estate loans/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table D-8

## Rate of Return on Assets (ROA) and Agricultural Lending in 2000: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions <$100 (n=4,578) | $100-$300 (n=2,564) | $300-$500 (n=542) | $500-$3,000 (n=581) | >$3,000 (n=188) |
|---|---|---|---|---|---|
| INTERCEPT | 0.022 | 0.004 | -0.001 | 0.005 | 0.011 |
| | (1.06) | (4.95***) | (-0.39) | (1.64) | (1.54) |
| LOSS | 0.884 | -0.190 | 0.338 | 0.277 | 0.397 |
| | (1.74*) | (-25.49***) | (6.06***) | (4.62***) | (3.31***) |
| EQUITY | 0.118 | 0.032 | 0.023 | 0.044 | 0.000 |
| | (4.05***) | (15.15***) | (5.29***) | (6.61***) | (0.03) |
| OFFBAL | 0.000 | 0.000 | 0.001 | 0.000 | -0.000 |
| | (5.68***) | (8.24***) | (9.02***) | (5.19***) | (-1.37) |
| SECURITIES | -0.002 | 0.003 | -0.000 | -0.003 | -0.003 |
| | (-0.12) | (3.21***) | (-0.27) | (-1.07) | (-0.79) |
| PURCHASED | -0.054 | -0.005 | 0.005 | 0.000 | -0.007 |
| | (-2.09**) | (-5.40***) | (2.25**) | (0.08) | (-0.86) |
| AGLOAN | 0.018 | 0.006 | -0.005 | -0.008 | -0.024 |
| | (1.04) | (5.47***) | (-1.29) | (-1.11) | (-0.70) |
| HHI | -0.007 | 0.000 | 0.000 | 0.000 | 0.001 |
| | (-0.78) | (1.76*) | (0.53) | (0.43) | (0.68) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (0.97) | (0.74) | (1.75*) | (-1.59) | (-0.01) |
| DIVERS | 0.001 | 0.007 | -0.004 | -0.008 | 0.005 |
| | (0.03) | (7.09***) | (-1.83*) | (-2.98***) | (1.82*) |
| Overall F | 11.82*** | 126.06*** | 27.42*** | 16.79*** | 5.33*** |
| Adjusted $R^2$ | 0.0208 | 0.3051 | 0.3049 | 0.1965 | 0.1719 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
AGLOAN = agricultural production and agricultural real estate loans/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table D-9

## Rate of Return on Assets (ROA) and Agricultural Lending in 2001: Regression Analyses for U. S. Commercial Banks by Asset Size Group (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions <$100 (n=4,141) | $100-$300 (n=2,570) | $300-$500 (n=593) | $500-$3,000 (n=658) | >$3,000 (n=189) |
|---|---|---|---|---|---|
| INTERCEPT | 0.002 | 0.004 | -0.006 | 0.006 | 0.015 |
| | (0.95) | (5.26***) | (-1.92*) | (2.85***) | (1.93*) |
| LOSS | 0.463 | 0.015 | 0.237 | -0.003 | 0.277 |
| | (4.78***) | (0.60) | (3.85***) | (-0.07) | (2.92***) |
| EQUITY | -0.008 | 0.023 | 0.087 | 0.017 | 0.002 |
| | (-2.02**) | (10.88***) | (18.34***) | (3.97***) | (0.14) |
| OFFBAL | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 |
| | (35.12***) | (8.42***) | (0.91) | (9.63***) | (1.40) |
| SECURITIES | 0.013 | 0.004 | 0.000 | 0.004 | -0.002 |
| | (5.83***) | (4.84***) | (0.12) | (2.12**) | (-0.60) |
| PURCHASED | -0.011 | -0.007 | 0.001 | -0.006 | -0.010 |
| | (-3.46***) | (-7.34***) | (0.21) | (-2.28**) | (-1.16) |
| AGLOAN | 0.014 | 0.007 | 0.001 | 0.001 | -0.008 |
| | (6.73***) | (6.84***) | (0.31) | (0.19) | (-0.27) |
| HHI | -0.000 | 0.000 | 0.000 | 0.001 | -0.001 |
| | (-0.19) | (0.54) | (0.41) | (1.23) | (-0.65) |
| ASSETS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (4.86***) | (3.69***) | (0.77) | (-0.01) | (0.25) |
| DIVERS | 0.010 | 0.007 | 0.006 | 0.005 | -0.000 |
| | (2.80***) | (7.02***) | (2.34**) | (3.00***) | (-0.05) |
| Overall F | 161.82*** | 41.92*** | 55.94*** | 18.97*** | 3.98*** |
| Adjusted $R^2$ | 0.2590 | 0.1254 | 0.4547 | 0.1973 | 0.1242 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

LOSS = loan and lease losses, net recoveries/total assets
EQUITY = total equity/total assets
OFFBAL = total off-balance sheet activities/total assets
SECURITIES = total securities/total assets
PURCHASED = large time deposits plus other borrowed money/total assets
AGLOAN = agricultural production and agricultural real estate loans/total assets
HHI = Herfindahl index for county or SMSA in which bank is located
ASSETS = total assets
DIVERS = diversification of assets into commercial, agricultural, real estate, and consumer loans.

## Table D-10

## Mean Rate of Return on Assets and Residual Agricultural Lending: 1994-2001 Two-Stage Regression Analyses for U. S. Commercial Banks by Asset Size Group Using Quarterly Data (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| | **All sizes (n=31)** | **<$100 (n=31)** | **$100-$300 (n=31)** | **$300-$500 (n=31)** | **$500-$3,000 (n=31)** | **>$3,000 (n=31)** |
| INTERCEPT | -0.008 | 0.006 | 0.003 | 0.004 | 0.006 | 0.005 |
| | (-0.59*) | (0.75) | (1.08) | (2.14**) | (2.56**) | (1.09) |
| SIGMA(ROA) | 0.049 | 0.038 | 0.731 | 0.543 | 0.462 | 1.044 |
| | (2.77***) | (2.93***) | (5.17***) | (7.07***) | (4.17***) | (7.81***) |
| RESIDUAL(AG) | 0.149 | -0.007 | -0.004 | -0.019 | -0.120 | -0.462 |
| | (1.06) | (-0.10) | (-0.07) | (-0.25) | (-0.75) | (-0.62) |
| Overall F | 4.39** | 4.62** | 13.74*** | 25.07*** | 9.40*** | 34.69*** |
| Adjusted $R^2$ | 0.1797 | 0.1892 | 0.4511 | 0.6083 | 0.3514 | 0.6849 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

SIGMA(ROA) = standard deviation of ROAs for banks in each group and quarter

RESIDUAL(AG) = = first-stage regression model residual for agricultural loans in each group and year.

## Table D-11

## Mean Rate of Return on Assets and Residual Agricultural Lending: 1994-2001 Two-Stage Regression Analyses for U. S. Commercial Banks by Asset Size Group Using Quarterly Data (t statistics in parentheses[a])

| Independent Variables[b] | Assets in Millions | | | | | |
|---|---|---|---|---|---|---|
| | **All sizes (n=31)** | **<$100 (n=31)** | **$100-$300 (n=31)** | **$300-$500 (n=31)** | **$500-$3,000 (n=31)** | **>$3,000 (n=31)** |
| INTERCEPT | -0.008 | 0.006 | 0.003 | 0.003 | 0.005 | 0.005 |
| | (-0.63) | (0.69) | (0.99) | (1.69) | (2.29**) | (1.07) |
| SIGMA(ROA) | 0.051 | 0.038 | 0.738 | 0.575 | 0.480 | 1.045 |
| | (2.77***) | (2.89***) | (5.13***) | (7.43***) | (4.18***) | (7.64***) |
| TBILL | -0.039 | -0.016 | 0.042 | 0.125 | 0.066 | 0.006 |
| | (-0.41) | (-0.17) | (0.52) | (1.60) | (0.68) | (0.09) |
| RESIDUAL(AG) | 0.162 | -0.003 | -0.013 | -0.067 | -0.164 | -0.476 |
| | (1.11) | (-0.04) | (-0.22) | (-0.84) | (-0.94) | (-0.62) |
| Overall F | 2.90* | 2.98** | 9.02*** | 18.48*** | 6.30*** | 22.34*** |
| Adjusted $R^2$ | 0.1556 | 0.1610 | 0.4370 | 0.6285 | 0.3392 | 0.6738 |

[a] Asterisks indicate significance at the following levels: *--.10, **--.05, and ***--.01.

[b] Independent variables are defined as follows:

SIGMA(ROA) = standard deviation of ROAs for banks in each group and quarter

TBILL = one-year T-bill rate in each quarter

RESIDUAL(AG) = = first-stage regression model residual for agricultural loans in each group and year.