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Abstract

Investigators examining problems with credit availability during the most recent recession have been unable to provide definitive evidence that the decline in bank loans was, at least in part, a supply phenomenon. Furthermore, they have not focused on the subset of loans made to borrowers most likely to be dependent on bank financing. This study overcomes these flaws.

By examining formal regulatory actions, we clearly identify a supply shock that caused an abrupt decline in bank lending that cannot be attributed to demand. Furthermore, we find that this decreased lending occurred at institutions and in lending categories serving those firms most likely to be dependent on bank financing. This decline in lending to small businesses was likely a contributing factor to the unprecedented increase in business failures in New England.

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Recently, much attention has been focused on the "lending" (or "credit") view of the transmission of monetary policy as a supplement to the traditional "money" view. This literature emphasizes the imperfect substitutability of bank loans and open market financial instruments as sources of financing for firms (for example, Bernanke and Blinder 1988; Kashyap and Stein 1993). The bank lending channel becomes more important the smaller the degree of substitutability available to firms, making small firms a key element in the transmission mechanism. Such firms tend to be "bank-dependent," having no direct access to national credit markets and limited, if any, access to large banks outside the local area or to large nonbank lenders such as life insurance companies or pension funds. Thus, when local banks reduce credit availability, the lack of alternative sources of credit can result in a sharp deterioration in the economic viability of these small firms.

While a number of recent studies have found evidence supporting the lending view, most have relied on aggregate credit data (Kashyap, Stein and Wilcox 1993; Morgan 1993) or interest rate spreads on open market credit instruments (Bernanke and Blinder 1992), although a few studies have separated the data into large and small firm aggregates (Gertler and Gilchrist 1994).[1] The absence of studies focusing on those firms with the smallest degree of substitutability between bank loans and open market instruments as sources of credit, "bank-dependent" small firms, is due to the dearth of good micro data on such firms. In this study, we use an approach that does not rely on small-firm

data. Instead, we utilize lender data, extending earlier work investigating the effect of bank capital and bank regulation on credit availability.

That literature found that undercapitalized (or less well capitalized) banks reduced lending more than their better capitalized peers during the most recent downturn (Baer and McElravey 1994; Bernanke and Lown 1991; Hancock and Wilcox 1992; Peek and Rosengren 1994b, 1995). However, those studies suffer from two major flaws. First, they have not convincingly shown that a significant portion of this shrinkage reflects a reduction in loan supply. If the decrease in lending reflects solely a decline in loan demand, reduced credit availability is not a problem. Second, by focusing on large banks and total assets or total loans, previous studies may have overlooked the sector most critical to understanding the extent and severity of credit availability problems, small firms dependent on bank financing.

This study shows that bank regulators have induced an abrupt reduction in bank lending in response to the imposition of formal regulatory actions. This reduction in loan supply occurs discretely in the quarter when a formal regulatory agreement is imposed on a bank and the effect is highly significant. Because these regulatory actions are bank-specific and occur throughout our entire sample period, and because we control extensively for loan demand shocks with variables reflecting a bank's size, portfolio composition and financial position, as well as a set of time and geographic region dummies, it is highly unlikely that

the formal actions variable could be serving as a proxy for loan demand shocks.

However, documenting that bank loan supply was a factor in the decline in bank loans is not enough. We must still ask whether the affected loans were those to bank-dependent businesses. We find that small banks, which lend primarily to smaller firms, have reacted to losses of bank capital and to the imposition of formal regulatory actions restricting their activities by reducing loans, including those types of loans most likely to be extended to bank-dependent borrowers. We buttress our initial findings with data first included in bank call reports in 1993:II designed to obtain information on the importance of bank lending to small businesses. We find that the proportion of small loans in a bank's portfolio does affect the growth in loans, providing further support for the argument that bank-dependent borrowers were disproportionately affected by the shrinkage of bank portfolios during the 1989-93 period. Thus, our evidence significantly extends the credit crunch literature by documenting a regulatory-induced reduction in loan supply. And, those loans were of the type most likely to have been made to bank-dependent borrowers.

I. Background

Lending Relationships

Imperfect information gives rise to the special role for bank loans. Information asymmetries make open market credit

instruments imperfect substitutes for bank loans as a source of credit for many firms, especially smaller firms, and make long-term bank lending relationships valuable. Large, well-established firms that have access to national credit markets are required by the Securities and Exchange Commission to provide much publicly available information about their status and activities, and they are often followed by market analysts. On the other hand, much of the information about smaller firms is private.

Banks acquire much of this private information about small firms through financial relationships and, in particular, through repeated banking and lending transactions. In fact, most small and medium-sized firms establish financial services relationships with local commercial banks, and these banks often serve as their primary sources of credit (Elliehausen and Wolken 1990). For small firms, establishing lending relationships increases the availability of credit (Petersen and Rajan 1994) and may make the lender less likely to require collateral (Berger and Udell 1993). And, small firms typically concentrate their borrowing among a few banks (Petersen and Rajan 1994). While banking relationships have been shown to be valuable for larger firms that do have access to national credit markets (see, for example, Slovin, Sushka and Polonchek 1993), the considerations described above ensure that lending relationships will be particularly valuable to smaller firms.

If a small firm's primary source of credit either fails or

chooses (or is forced by regulators) to reduce lending, the firm may have difficulty replacing that source of credit. It takes time for a small firm to establish a major new lending relationship, with the new lender slowly acquiring the stock of private information about the firm that serves as the foundation of the relationship. Furthermore, banks may be especially reluctant to take on new borrowers that they know little about at a time when they observe widespread business failures and the impairment of collateral as asset values decline. And, as occurred during the last recession, this problem can be compounded by widespread regulatory pressure on banks to shrink lending.

Small Loans and Lending by Small Banks

Because relatively few banks account for a disproportionate share of bank assets, banking studies frequently focus on large banks. When studying credit availability issues, however, small banks play an important role that may be obscured by aggregate statistics. Large banks tend to provide services to large and mid-sized companies whose access to credit is likely to extend beyond local banking markets and may well include direct access to national credit markets. Small businesses with little or no access to credit other than the small banks in their local community are the borrowers most likely to be bank dependent. For example, in Vermont in 1989, no banking organization had deposits in excess of $1 billion, and approximately one-half of

total deposits were in institutions with less than $300 million in deposits.[2] Thus, studies that focus only on large institutions will ignore regions of the country not dominated by large banks, where credit problems may be most acute if banks in the region become troubled.

Starting with the second-quarter 1993 bank call reports, banks have been required to disclose the amount of outstanding small business loans they held in the second quarter of each year. These additional data were required by Congress in an attempt to obtain a better understanding of how credit contractions affected small businesses. For the purposes of this survey, small businesses were defined by the size of their loan rather than the size of the business.[3] Data are reported for both commercial and industrial loans (C&I) and nonfarm, nonresidential loans that use real estate as collateral (NFNR). Three different thresholds of "small" are used: loans in amounts less than $100,000, less than $250,000, and less than $1 million.

Table 1 describes bank holdings of small business loans in New England in 1993:II. The top panel shows the percentage of bank loans in the three size groups of small business loans, disaggregated by bank size. For banks with under $100 million in assets, 96 percent of their NFNR loans were for amounts less than $1 million, as were 94 percent of their C&I loans. For these smaller banks, most business loans were much smaller than $1 million, with 61 percent of NFNR loans and 80 percent of C&I loans for amounts below $250,000.

The top panel of Table 1 shows that as the size of the lending institution increased, so did the size of the loans extended. This should not be surprising. Banks are generally restricted from lending more than 10 percent of their equity to any one borrower, and many banks have internal restrictions on borrower concentration that set the threshold at 5 percent. Because banks are highly leveraged, this implies that small banks can lend only to small businesses. For example, a bank with $100 million in assets and 10 percent capital would exceed a 10 percent lending guideline with a business loan that exceeded $1 million; if the bank were less well capitalized, the limit would be even lower.

For the New England banks with assets exceeding $1 billion, 42 percent of nonfarm, nonresidential loans were for amounts less than $1 million, while only 15 percent of commercial and industrial loans were in that size category. For these largest banks, only about 5 percent of loans of each type were for amounts less than $100,000. Thus, small business loans accounted for a very large share of the business of small banks, but only a modest amount of the loans held by large banks.

The bottom panel of Table 1 provides the percentage of total small business loans made by each size category of banks. Most previous studies have ignored small banks, defined as those with less than $300 million in assets. In New England, such a cutoff would exclude 54 percent of nonfarm, nonresidential loans in amounts below $100,000, and 32 percent of those below $1 million.

While small banks hold a small percentage of total bank assets (16 percent in New England in 1993:II), they account for a much larger percentage of small business loans.[4] And these are the loans that are likely to have the largest impact on economic activity when reductions in bank lending occur.

Bank Problems and the Pressure to Shrink Lending

Bank-dependent businesses may have been severely affected in the most recent recession because falling asset values had a severe impact on banks' capital positions and thus their ability to lend, as loans defaulted and regulators required increased loan loss reserves against loans with impaired collateral. This regulatory response was likely enhanced because of the increased regulatory emphasis on bank capital that resulted from the Basle Accord and the adoption of the leverage capital requirement. Furthermore, while real estate values fell in many regions of the country, New England was more severely affected than any other region; it was also the region where credit availability concerns were expressed most vocally.

One measure of the depth of bank problems during the recent recession is the number of banks that underwent the most severe regulatory enforcement actions, cease and desist orders and written agreements. Such formal enforcement actions are imposed on financially troubled banks, and they include requirements that a bank restore its capital ratio and raise loan loss reserves to better reflect the extent of the problems in the bank's loan

portfolio. Because civil penalties on management and the board of directors can result if these enforcement actions are not implemented as agreed, they are likely to alter bank behavior. In fact, Peek and Rosengren (1995) found that significantly greater shrinkage in loan portfolios occurred at banks subject to such formal regulatory actions, other things equal.

Table 2 shows how widespread these enforcement actions were in New England. Between the first quarter of 1989 and the second quarter of 1993, 30 percent of all banks in New England entered into a formal agreement with regulators. These banks accounted for 46 percent of all bank assets in New England, measured as of the first quarter of 1989. Because banking problems were so pervasive in New England, small firms whose primary banking relationship ended as a result of their bank either failing or downsizing likely had significant difficulty in finding alternative lenders.

II. Data and Methodology

This study is based on quarterly call report data for all FDIC-insured commercial and savings banks in New England. The sample includes data for the period 1989:I through 1993:II.[5] The bank coverage is broader and less problematic than in previous studies. We include new banks, failed banks, merged banks, and small as well as large banks. Failed banks, as well as de novo banks that came into existence during the sample period under consideration, have been largely ignored in previous studies,

which have included only institutions that spanned the entire time period studied (Bernanke and Lown 1991; Baer and McElravey 1994; Hall 1993; Hancock and Wilcox 1992, 1993; Peek and Rosengren 1994a, 1994b, 1995).

Mergers and acquisitions pose problems for bank studies because they result in large jumps in the balance sheet items of the surviving bank during the period when the acquisition is consummated. Furthermore, a complete and accurate bank structure file is not available in the call report. Previous studies have addressed this problem in a variety of ways, for example, omitting banks involved in acquisitions, omitting observations exhibiting large changes, or force-merging institutions.[6]

Rather than relying on arbitrary merger adjustments, we created a complete bank structure file that included information on all mergers and acquisitions by (or of) commercial and savings banks in New England, purchases or sales of bank branches, de novo banks, and failed banks. Because an acquisition or the purchase or sale of bank branches results in a one-time jump in balance sheet data, we exclude those affected quarters, rather than deleting the entire set of observations on the institution. Because we do not force-merge banks, acquired (and failed) banks are included in the sample as long as they report separate data. Because de novo bank behavior can result in a correlation between bank growth and capital that reflects a bank's initial position as a de novo bank (all capital and cash), we do not include their first eight quarters of call report data. The resulting panel

data set includes 502 individual banks with a maximum of 17 quarterly observations, given that the 1989:I observation is lost as a result of first-differencing the loan data for the regressions. The resulting unbalanced panel has 6866 observations.

We focus on four dependent variables in our estimation, each of which is first-differenced and then scaled by beginning-of-period assets. Total bank loans is examined, since this is the variable most frequently reported in previous studies. In addition, we examine bank-dependent loans (BD), composed of commercial and industrial loans, multifamily real estate loans, construction loans, and commercial real estate loans.[7] In contrast to consumer credit and one- to four-family mortgage credit which are now widely available from nonbank sources and from banks outside the local area, bank loan customers in this bank-dependent category are likely to have few substitutes for local bank financing.

The final two variables attempt to approximate new lending, which is more relevant than the change in outstanding loans for analyzing credit availability issues. Following Peek and Rosengren (1995), we add back charge-offs and changes in other-real-estate-owned (OREO) to obtain a measure of net bank-dependent loans (BDN). To obtain the aggregate most closely approximating net new lending, we then add net loan sales to BDN, forming the variable bank-dependent loans net of loan sales (BDNS).[8]

The base regression is:

$$\frac{\Delta L_{j,i,t}}{A_{i,t-1}} = \alpha_1 + (\alpha_2 + \alpha_3 \frac{K_{i,t-1}}{A_{i,t-1}}) FA_{i,t} + \alpha_4 \frac{K_{i,t-1}}{A_{i,t-1}} (1 - FA_{i,t}) + \beta_{i,j} X_{i,j,t-1} + \epsilon_{i,t} \quad (1)$$

The dependent variable is the change in loan category j of bank i scaled by total assets of bank i at the beginning of the quarter. The equation includes a dummy variable for formal regulatory actions (FA), with a value of one for any quarter the bank is under a formal action and zero otherwise. We anticipate FA to have a negative effect on the change in loans, with the α_2 component being negative and α_3 being positive. A formal action should result in reduced lending, with the reduction being greater the lower the capital ratio (as the bank comes under more pressure to shrink). For symmetry, we also include the capital ratio for those institutions not under a formal action. We anticipate α_4 to be positive, but smaller than α_3, if banks voluntarily (perhaps to avoid a formal action) react to lowered capital ratios.

The equation also includes a vector (X) of additional explanatory variables intended to control for differences in loan demand across banks. While restricting the sample to a single Federal Reserve District greatly limits the variation in demand across banks, that variation is not entirely eliminated. To further control for demand, we include a dummy variable for each of the six states in New England interacted with a set of 17 quarterly dummy variables, one for each quarter in the sample (a

total of 101 dummy variables after eliminating one to avoid perfect collinearity with the constant term). This allows changes in demand to differ across states both in magnitude and in timing.

To further control for demand differences, the vector X also contains six variables with bank-specific values. Because banks may serve different markets depending on bank size, we include the logarithm of (beginning-of-period) bank assets. Since bank capital constrains the size of loans a bank may make to any one borrower, smaller institutions may be prevented from making large loans. If loan demand varies by size of borrower, loan growth may vary by size of institution. We also include variables that measure each bank's (beginning-of-period) portfolio concentrations in construction, commercial real estate, and commercial and industrial loans, as well as the ratio of nonperforming loans (loans past due 90 days or more plus nonaccruing loans) to total assets. For example, because real estate in New England was disproportionately affected in the downturn, banks with a large exposure to commercial real estate and construction loans may have experienced the largest declines in demand. Similarly, shocks to commercial and industrial loan demand may have differed from those to loans to individuals and to real estate loans. Finally, to further distinguish among portfolio characteristics across banks, we include a dummy variable that has a value of one if the bank has a savings bank charter and zero if it has a commercial bank charter.

The estimation technique is a variance components model which allows for bank-specific effects. This specification restricts the bank-specific constant terms to be drawn from a common distribution with a finite variance.

III. Empirical Results

Small Banks

As shown in Table 1, small banks provide a large percentage of small business loans. However, most studies of bank shrinkage and capital regulation have focused on large banks, leaving the effects on smaller business loans unknown. It is therefore important to determine whether the bank shrinkage documented for large banks in previous studies also occurred at small banks. The first set of regressions reported in Table 3 provides estimates of equation 1, highlighting the differences between large and small banks. Each explanatory variable in equation 1 (with the exception of the state*quarter dummy variables) was interacted with a dummy variable that took the value of one for large banks, defined as having assets of at least $300 million in the first quarter of 1989, and zero otherwise. Thus, the large bank (LB) estimated coefficients represent the differential effect relative to that of the small bank variables, with their absolute effect being the sum of the estimated coefficients on the corresponding pairs of small and large bank variables.

The estimated coefficients in Table 3 for small banks for the formal action and formal action*leverage ratio variables are

each statistically significant and of the predicted sign. The imposition of a formal action reduces the growth rate of loans, and that reduction is greater the lower the leverage ratio of the bank. A lower capital ratio also reduces the growth rate of loans for banks not under formal actions, but the effect is only about half that for banks with formal actions.

While the growth rate of loans declines more rapidly as banks get larger, the estimated effect is statistically significant only for changes in total lending and in bank-dependent lending (the first two columns of Table 3). The portfolio share of construction loans has a statistically significant effect only for total loans and a negative estimated coefficient only for total bank-dependent loans. The estimated effect of the portfolio share of commercial real estate loans, on the other hand, is consistently negative, with the estimated coefficients both larger (in absolute value) and statistically significant for the three categories of bank-dependent loans. Interestingly, while the estimated effect of the portfolio share of C&I loans is significant at the 1 percent confidence level in each of the four equations, it has a positive estimated coefficient for total loans and negative coefficients for the three bank-dependent loan categories. This suggests that while banks with a C&I loan concentration were shrinking their holdings of bank-dependent loans (which includes C&I loans), they were increasing their holdings of other types of loans, and at a rate that more than offset the decline in bank-dependent loans.

The nonperforming loan ratio has a negative estimated effect that is significant at the 1 percent confidence level in all four equations. Not surprisingly, banks with problem loans tended to have slower loan growth. However, a comparison of columns 2 and 3 suggests that a substantial portion of the reduction appears to be a consequence of loan foreclosures and charge-offs, with the estimated effect for net bank-dependent loans (BDN) being only 60 percent of that for total bank-dependent loans (BD). Finally, while there is no statistically significant difference between savings banks and commercial banks for total loan growth (although the estimated coefficient on the savings bank dummy is positive), each of the estimated effects for the three bank-dependent loan categories is negative and significant at the 1 percent confidence level.

For the change in total loans, being subject to a formal action causes loans to decline by 1.36 percent of total assets per quarter, other things equal. Because the change in loans has been scaled by total assets, and loans account for two-thirds of assets on average for banks in our sample, the percentage decline in loans is even more dramatic.

However, because the leverage ratio has different estimated impacts for banks with and without a formal action, the differential impact of the leverage ratio must be included in order to calculate the total effect of a formal action on loan shrinkage. The total effect is equal to the estimated effect of the formal action dummy variable plus the leverage ratio

multiplied by the difference between the two estimated leverage ratio effects. For leverage ratios of 2, 4, and 6 percent, the net effects as a percent of total assets are -1.18, -1.01, and -0.84, respectively. Recognizing that a higher leverage ratio mitigates the degree of shrinkage associated with a formal action, an alternative measure of the effect of formal actions is the value of the leverage ratio at which formal actions cease to retard loan growth. Here, this "break-even" value for the leverage ratio is 15.60 percent, well beyond the range at which capital regulations are binding.

The estimated impacts of formal actions on the change in loans as a percentage of total assets (and the "break-even" leverage ratio) diminish slightly as we move from total loans to net new lending (BDNS). For example, measured at a 4 percent leverage ratio, the quarterly rates of shrinkage as a percent of total assets for BD, BDN, and BDNS are 0.52, 0.62, and 0.33, respectively, with corresponding break-even leverage ratios of 11.85, 11.41, and 7.17 percent. However, because bank-dependent loans account for only approximately 30 percent of total assets in our sample, these shrinkage rates represent much sharper declines as a percent of bank-dependent loans.

Furthermore, given that small businesses tend to concentrate their banking relationships, that new relationships take time to develop, and that this shrinkage is occurring in the bank-dependent loan category at small banks, which tend to have small rather than large firms as customers, it is likely that the

effect of implementing formal actions on these small banks was devastating to many of their (primarily small business) loan customers. And, even for those small banks not subject to formal actions, loan growth shrinks as their capital position deteriorates.

How does the behavior of large banks differ? Even if large banks reacted in the same way and to the same degree, it would not be nearly as problematic for small firms, since the smallest firms tend to rely on small rather than large banks. In fact, the results show few significant differences, although F-tests reject the hypothesis that the set of large bank coefficients are the same as those for small banks. Of particular interest, none of the estimated coefficients on the formal action dummy variable or the formal action*leverage ratio variable indicate statistically significant differences in the effects on large banks compared to small banks.

Using the estimated coefficients to make the same calculations as above for the large bank reactions to formal actions, the total effects are smaller for large banks for total loans, BD and BDN, but larger for BDNS. Similarly, the break-even leverage ratios are slightly smaller for large banks for total loans and substantially smaller for BD and BDN, but slightly larger for BDNS.

Do Regulatory Actions Proxy for Demand Effects?

Questions have been raised as to whether the loan shrinkage

documented in this and previous articles simply reflects a decline in loan demand associated with the downturn in economic activity. While a decline in loan demand was certainly a factor, the important question is whether it was the only factor. Were that the case, the concern with reduced credit availability would be misplaced. Other studies have assumed that capital-to-asset ratios serve as a proxy for supply rather than demand effects. Here, we go a step further by using formal regulatory actions as the loan supply proxy, a variable more closely related to regulatory actions and allowing a more precise measurement of the timing of the effect.

The evidence presented in Table 3 is inconsistent with the formal regulatory actions dummy variable being a proxy for demand effects. Peek and Rosengren (1995) have shown in a simple one-period model that a decline in loan demand would result in greater loan shrinkage at unconstrained banks relative to constrained banks. In the unconstrained capital case, a decrease in loan demand causes both deposits and loans to decrease. However, in the capital-constrained case, banks already have been forced by the constraint to hold fewer deposits and loans than they would otherwise choose, so that the decrease in demand has no effect on deposits or loans. If formal actions are serving as a proxy for demand rather than supply effects, one should find positive estimated coefficients on formal actions and negative coefficients on the capital-to-asset ratios of constrained banks as well-capitalized unconstrained banks shrink more than their

poorly capitalized peers. However, the empirical evidence in Table 3 reports estimated coefficients of the opposite signs that are highly significant.

Given the comprehensive set of explanatory variables included in the equations intended to control for loan demand effects, as well as the signs and significance levels of the estimated coefficients on the formal actions variables, it is highly unlikely that the estimated impact of the formal actions variable is reflecting loan demand rather than loan supply effects. However, if one remained skeptical, to what might one attribute the necessary correlation between formal actions and declines in loan demand? A reasonable story would be that as loan customers have problems, the problems are transmitted to their lenders through problems with their loan portfolios. For example, an adverse shock to business firms would cause both a deterioration in their ability to make loan payments (as well as a possible decline in the value of collateral pledged on the loan) and a decline in their demand for new loans as they cut back investment and operations. For the lenders, this would result in a deterioration in the quality of their loan portfolios, as more loans became past due or were placed on nonaccrual status. Loan loss reserves would have to be increased, reducing income. Eventually, loans would be foreclosed and charged off. If the deterioration were severe enough, regulators would then impose a formal regulatory action on the bank.

While such a scenario would lead to a correlation between formal regulatory actions and a decline in loan demand, each associated with the deterioration in the economic viability of the bank's loan customers, it is not a foregone conclusion that the formal actions dummy variable would serve as a proxy for loan demand. First, our equations contain variables that control for loan demand shifts that can differ by state as well as over time and that reflect loan problems at individual banks directly (nonperforming loans) as well as indirectly through portfolio concentrations of loan types that were particularly troubled. Second, the nature of the effects emanating from the decline in loan demand differ from those resulting from the imposition of a formal regulatory action. If the decline in bank loans was solely a consequence of a decline in loan demand, we would expect to see the loan shrinkage occurring well before the imposition of the formal action (as well as after the imposition) as the health of both loan customers and the loan portfolio deteriorated. On the other hand, if the formal action variable is serving as a proxy for loan supply shocks, the imposition of a formal action would cause a discrete decline in the rate of loan growth at the precise time the formal action is imposed on the bank. Such evidence would be particularly strong insofar as the imposition of formal actions occurred throughout our sample period, while any sharp decline in loan demand would likely be concentrated in a very few quarters and would occur across the spectrum of banks.

This suggests a straightforward test of the hypothesis that

the formal actions dummy variable can be serving as a loan demand proxy. Rather than including the single dummy variable for all quarters with a formal action, a set of dummy variables for individual quarters both before and after the imposition of a formal action is included in the equation. Table 4 reports the results from estimating such an equation with individual quarterly dummy variables for the eight quarters prior to the formal action (FA(-8)-FA(-1)), the quarter in which the examination was concluded that resulted in the formal action (FA(0)), and the subsequent eight quarters (FA(1)-FA(8)).

Table 4 contains columns for small banks, large banks, and all banks, with the equations having the same set of explanatory variables as those in Table 3, but with the formal actions dummy variable replaced by the set of individual dummy variables shown in Table 4. Given that we now have 17 separate dummy variables associated with formal actions, the results are impressive. With the exception of FA(-8), each of the estimated coefficients for the quarters prior to the initiation of the formal action has a positive estimated coefficient, a number of which are statistically significant, indicating additional loan growth in those quarters, other things equal. At the same time, each of the estimated coefficients on the dummy variables for the quarter in which the formal action was initiated, as well as for the subsequent eight quarters, with the exception of FA(7) for large banks, has a negative sign, with at least 6 of the 9 coefficients being statistically significant in each equation. Thus, there

does appear to be an abrupt decline in loan growth at a bank at precisely the time that it is placed under a formal action.

Table 5 makes this point even more clearly. Here, the individual quarterly dummy variables have been aggregated to reduce collinearity problems and the estimated coefficients associated with the period with formal actions are measured relative to the period containing the four quarters immediately preceding the initiation of the formal action. Thus, Base is a dummy variable with a value of one during the four quarters prior to a formal action, the quarter of initiation, and the eight subsequent quarters, and zero otherwise. We still include FA(0), but have aggregated the subsequent eight quarters into two four-quarter dummy variables.

For small banks, all four estimated coefficients for the Base period are positive and three of the four are statistically significant. The differential effect (relative to the Base period) is negative in each case for the formal action quarters, with 11 of the 12 estimated coefficients significant at the 1 percent confidence level. Thus, loan growth decreases with the imposition of a formal action, the change is sharp and the timing coincides precisely with the initiation of the formal action. Panel B for large banks tells much the same story. The primary differences are that loan growth in the Base period is faster and the decline in many instances is greater for large banks. In addition, the timing of the reduction in "lending" (the change in net bank-dependent loans adjusted for net loan sales) differs,

with the initial reduction larger for small banks, but smaller in subsequent quarters.

The timing evidence in Tables 4 and 5 is inconsistent with formal actions serving as a proxy for loan demand. The decline in lending occurs discretely at the time of the examination resulting in the formal action. For this response to reflect a loan demand effect, demand would have had to decrease sharply in the quarter that coincided with the conclusion of the examination that resulted in the formal action, keeping in mind that different banks had these examinations in different quarters. Furthermore, given that examinations are normally scheduled a year in advance, it would be quite a coincidence if examiners were able to precisely anticipate the timing of a discrete decline in loan demand at individual banks. The evidence, however, is consistent with bank regulators' altering the supply of loans at banks by imposing formal actions. Thus, it seems reasonable to conclude that the formal actions variable is, in fact, serving as a proxy for shifts in loan supply and not loan demand.

Small Business Survey

The second empirical test focuses on whether the shrinkage of bank-dependent loans was associated with banks that extended significant amounts of small loans to businesses. To address this question, we examined data for all New England commercial banks that reported their small loans to businesses in

the 1993:II call report. By limiting ourselves to banks that had specifically reported small loans to businesses for 1993:II, we exclude all banks that failed or were acquired prior to 1993:II, reducing the sample size to 355 banks and 5683 observations.

We use the 1993:II small loan survey data to calculate the ratio of small loans (nonfarm, nonresidential real estate business loans plus commercial and industrial loans under $1 million) to assets for each bank. This "small loans" variable is then used to provide evidence on the extent to which focusing on small business lending alters a bank's lending behavior. We create three subgroups of banks, those reporting that small loans are equal to between 0 and 5 percent of their total assets, those reporting 5 to 15 percent and those reporting small loans representing more than 15 percent of their assets. Two dummy variables are then created. Small2 has a value of 1 if the bank is in the second group (5 to 15 percent small loans) and zero otherwise, and Small3 has a value of one if the bank is in the above 15 percent group, and zero otherwise.

Using the 0 to 5 percent small loans group as the base, we add Small2 and Small3 individually, as well as interacted with the formal actions dummy variable, the leverage ratio*formal actions variable, and the leverage ratio*no formal actions variable, to the basic specification estimated in Table 3, but with no large bank-small bank distinction. The estimated coefficients on Small2 and Small3 indicate the differential effect on loan growth (compared to the base group) of having a

higher portfolio concentration in small business loans. Similarly, the estimated coefficients on the small loan interactive terms indicate the additional loan growth (shrinkage) attributable to the imposition of a formal action and a higher leverage ratio (with or without a formal action) on banks with a higher portfolio concentration of small loans.

To conserve space, Table 6 reports only the particular coefficients of interest, those associated with the small loans effects. For total loans, having a larger portfolio concentration in small loans tends to reduce loan growth, with the effect being much larger (and statistically significant) for Small3. For the other loan categories, Small2 has an estimated coefficient that is positive, while Small3 has negative coefficients on BD and BDN, but a positive coefficient on BDNS, none being significant. Small2*FA and Small3*FA each have estimated negative coefficients in each equation, although only one of the eight is statistically significant, indicating that the imposition of a formal action has a larger restraining impact on loan growth for those banks with small loan concentrations in excess of 5 percent of assets. However, the effect does not appear to be monotonic, with the Small2*FA effect being larger (in absolute value) than that for Small3*FA in each equation.

The level of significance is much higher for the interactions with the leverage ratio. For banks under formal actions, all eight of the interactive terms have positive and statistically significant effects, with those on Small3*LR*FA

being slightly larger than those for Small2*LR*FA. Thus, having a larger portfolio concentration of small loans makes banks under formal actions more sensitive to their leverage ratios, for example, shrinking loans faster with declines in the leverage ratio. For banks without formal actions, the estimated coefficients are again positive, but only those for Small3*LR*NO FA are statistically significant. Furthermore, for banks in the two subgroups with the highest portfolio shares of small loans, the gap widens between the responses to changes in the leverage ratio for banks with and without formal actions. Thus, having formal actions would cause such banks with low leverage ratios to shrink more and those with high leverage ratios to grow faster compared to those banks without formal actions.

Table 7 provides evidence on the composition of small business loans at New England banks in the second quarter of 1993. Bank-dependent loans equaled 27 percent of total bank assets in 1993:II, 10 percent below the average for our entire sample period. Of the $59.8 billion in bank-dependent loans, 32 percent were nonfinancial, nonresidential real estate business loans of under $1 million.

Even after the significant shrinkage that occurred in the portfolios of banks under formal actions, in 1993:II these banks still held 35 percent of New England bank assets, 49 percent ($29.2 billion) of bank-dependent loans, and more than one-third of NFNR and C&I business loans below $1 million. Because so many of the loans are in categories primarily served by banks, and

because so many of the loans are below $1 million, it can be assumed that the widespread shrinkage of bank loan portfolios in the early 1990s severely affected the well-being of small firms in New England that had relied primarily on local banks for credit.

IV. The Effect on Small Businesses

In the absence of a panel data set with good firm-level data on small firms, the direct effect on small businesses of the recent reduction in credit availability cannot be measured. However, indirect evidence indicates that the reductions in lending may have seriously harmed businesses in New England. Table 8 provides the results of a survey conducted by the Federal Reserve Bank of Boston during the summer of 1992 covering 1,048 small and medium-sized firms. These firms were drawn from a list of 6,000 firms headquartered in New England with 1991 annual sales between $10 million and $250 million.

The survey shows that 74.8 percent of the smallest firms in the survey received some or all of their short-term credit from New England-based banks, and only 12.8 percent received some or all of their credit from nonbank sources. Thus, despite the inroads made by finance companies and other financial intermediaries in some areas of business financing, most small businesses continue to rely on local banks for short-term credit.

Given the timing of the survey, it includes only those firms that survived the most severe period of limited credit

availability during the recent recession. Despite this survivor bias, the survey found that 5.7 percent of the smallest firms in the sample (annual sales between $10 and $49 million) no longer had short-term credit because their credit had been terminated by their bank within the past two years. For the largest firms in the survey (annual sales between $100 and $249 million), only 1.7 percent had no short-term credit because their credit had been terminated. Given this pattern across the firm sizes included in the survey, it is likely that a much larger proportion of firms smaller than $10 million in annual sales were denied credit.

In addition to these survivors, many firms denied credit from their bank and unable to find an alternative source of credit would be forced into bankruptcy. In fact, during this tight credit period, bankruptcies of business firms in New England reached unprecedented heights for the postwar period, as shown in Figure 1.[9] While the overall recession was severe in New England, the unemployment rate peaked at only slightly above the 1982 peak and below the peak reached in 1975, yet the business failure rate in this recession was substantially higher than in either of these past recessions. This suggests that some factor in addition to the normal cyclical conditions severely affected the viability of firms in New England. The high rate of bank failures, and the substantial number of surviving banks that curtailed their lending at this time, make reduced bank lending a likely candidate for that additional factor.

V. Conclusion

This paper fills a gap in the recent credit crunch literature by documenting that reductions in bank loans are in part due to reductions in loan supply and affect loan categories most likely to be dependent on bank financing. By examining regulatory actions, we are able to identify an abrupt event that significantly reduces loans. Even after controlling for a variety of possible loan demand effects, we find that lending that was growing prior to the regulatory intervention abruptly decreases with the imposition of a formal action. Thus, unlike previous studies that have used bank capital ratios as a proxy for a supply constraint, we are able to clearly identify the source and timing of the loan supply shock.

In addition, we find that formal regulatory actions were widespread among small banks in New England and that these troubled small banks significantly shrank their loans, particularly to borrowers likely to be dependent on banks. We also find that for banks under a formal regulatory action, the higher the percentage of small loans to businesses (which are generally extended to small businesses) in the bank's portfolio, the greater the loan shrinkage and the more responsive is the bank to its leverage ratio, with loan growth declining with lower leverage ratios.

The lender data used in this study provide indirect evidence on the effect of reduced credit availability on small firms. Focusing on sectors least able to find substitutes for bank

credit, this evidence is consistent with previous work that emphasizes the importance of bank lending for the economy (for example, Kashyap, Stein, and Wilcox 1993, Bernanke and Blinder 1992). Additional evidence from the Federal Reserve Bank of Boston survey showing the substantial share of surviving small firms in New England denied credit provides supporting evidence that the bank-induced cutback in credit may have adversely affected bank-dependent businesses. Furthermore, the unprecedented business bankruptcy rate in New England during this period of reduced credit availability reinforces our conclusions regarding the importance of bank credit in the economy. Unfortunately, until good data are available on individual small firms with little or no access to national credit markets, the importance of this link in the lending channel will not be completely resolved.

References

Baer, Herbert and John McElravey. 1994. "Capital Adequacy and the Growth of U.S. Banks." In C. Stone and A. Zissu, ed., Global Risk Based Capital Regulation: Management and Funding Strategies, Vol. 2, Burr Ridge, Ill: Dow-Jones Professionals, pp. 48-73.

Berger, Alan N. and Gregory F. Udell. 1993. "Lines of Credit, Collateral, and Relationship Lending in Small Firm Finance." Board of Governors of the Federal Reserve System Finance and Economics Working Paper 93-9.

Berger, Alan N. and Gregory F. Udell. 1994. "Did Risk-Based Capital Allocate Bank Credit and Cause a Credit Crunch in the U.S.?" Journal of Money Credit and Banking, forthcoming.

Bernanke, Ben S. and Blinder, Alan S. 1988. "Credit, Money, and Aggregate Demand." American Economic Review, 78, May, pp. 435-39.

Bernanke, Ben S. and Blinder, Alan S. 1992. "The Federal Funds Rate and the Channels of Monetary Transmission." American Economic Review, 82, September, pp. 901-21.

Bernanke, Ben S. and Cara S. Lown. 1991. "The Credit Crunch." Brookings Papers on Economic Activity, No. 2, pp. 205-48.

Elliehausen, Gregory E. and John D. Wolken. 1990. "Banking Markets and the Use of Financial Services by Small and Medium-sized Businesses." Staff Studies No. 160, Board of Governors of the Federal Reserve System, September.

Fazzari, Steven M., R. Glenn Hubbard and Bruce C. Petersen. 1988. "Financing Constraints and Corporate Investment." BPEA, No. 1, pp. 141-95.

Gertler, Mark and Simon Gilchrist. 1994. "Monetary Policy, Business Cycles and the Behavior of Small Manufacturing Firms." The Quarterly Journal of Economics, 59, May, pp. 310-39.

Hall, Brian J. 1993. "How Has the Basle Accord Affected Bank Portfolios?" Journal of the Japanese and International Economies 7, pp. 408-440.

Hancock, Diana and James A Wilcox. 1992. "The Effects on Bank Assets of Business Conditions and Capital Shortfalls." In Credit Markets in Transition, Proceedings of the 28th Annual Conference on Bank Structure and Competition, Federal Reserve Bank of Chicago, May, pp. 502-20.

Hancock, Diana and James A. Wilcox. 1993. "Was There a 'Capital Crunch" in Banking? The Effects on Real Estate Lending of Business Conditions and Capital Shortfalls." Journal of Housing Economics 3, no. 1, December pp. 31-50.

Hancock, Diana and James A. Wilcox. 1995. "Bank Balance Sheet Shocks: Their Dynamic Effects on Bank Capital and Lending." Journal of Banking and Finance (forthcoming 1995).

Kashyap, Anil K., Owen Lamont and Jeremy C. Stein. 1992. "Credit Conditions and the Cyclical Behavior of Inventories," The Quarterly Journal of Economics, 59, August, pp. 565-92.

Kashyap, Anil K. and Jeremy C. Stein. 1993. "Monetary Policy and Bank Lending." in Monetary Policy, N. Gregory Mankiw, ed. Chicago: University of Chicago Press, pp. .

Kashyap, Anil K., Jeremy C. Stein and David W. Wilcox. 1993. "Monetary Policy and Credit Conditions: Evidence from the Composition of External Finance." American Economic Review. 83(1), March, pp. 78-98.

Morgan, Donald. 1993. "The Lending View of Monetary Policy and Loan Commitments," mimeo, Federal Reserve Bank of Kansas City, July.

Peek, Joe and Eric S. Rosengren. 1994a. "Bank Real Estate Lending and the New England Capital Crunch." AREUEA Journal, 22(1), pp. 33-58.

Peek, Joe and Eric S. Rosengren. 1994b. "The Capital Crunch: Neither a Borrower Nor a Lender Be." Journal of Money, Credit, and Banking, forthcoming.

Peek, Joe and Eric S. Rosengren. 1995. "Bank Regulation and the Credit Crunch." Journal of Banking and Finance, 19(1), forthcoming.

Petersen, Mitchell A. and Raghuram G. Rajan. 1994. "The Benefits of Lending Relationships: Evidence from Small Business Data." Journal of Finance, 49(1), pp. 3-38.

Scanlon, Martha. 1981. "Relationship Between Commercial Bank Size and Size of Borrower." Studies of Small Business Finance, Interagency Task Force on Small Business Finance.

Slovin, Myron B., Marie E. Sushka, and John A. Polonchek. 1993. "The Value of Bank Durability: Borrowers as Bank Stakeholders." Journal of Finance, 48(1), pp. 247-67.

Footnotes

1. As Kashyap and Stein (1993) note, studies based on individual firm data provide evidence that can be interpreted as supporting the lending view (for example, Fazzari, Hubbard and Petersen 1988; Kashyap, Lamont and Stein 1992). However, being restricted to publicly listed firms, their data do not include the very small firms most likely to be bank dependent.

2. For antitrust purposes, the Federal Reserve Bank of Boston publishes banking structure tables defining separate banking markets. The state of Vermont is split into 30 distinct banking markets, with only two of the markets having individual banks with deposits in excess of $300 million.

3. Size of business rather than size of loan is obviously a preferred measure. Presumably this question was asked in terms of size of loan for call report purposes to minimize the cost to banks of complying with the question, since loan size would be readily available, but size of business would require examining each loan file. Scanlon (1981) found that loan size did serve as a good proxy for borrower size for very large loans and for very small loans, but less so for the middle range. One problem is that when large firms make a partial takedown of a loan commitment or draw on a large credit line, it is counted as a small loan. However, by focusing on small banks, much of this problem is avoided since large banks account for most of the small loans to large firms.

4. Actually, this table overstates the importance of large banks (and understates the relative importance of small banks) for lending to small firms. Many of the small loans at large banks actually represent partial takedowns of lines of credit and large loan commitments by large firms (Scanlon 1981).

5. Unfortunately, call report data on small loans were first collected in 1993, and quarterly call report data for small banks, which account for a significant proportion of small business loans, are not available for recessions prior to that in 1990. Thus, this study focuses on loan data since 1989, a period that covers the most recent downturn and recovery.

6. Peek and Rosengren (1994a, 1994b, 1995) exclude banks involved in nonaffiliated mergers and acquisitions. However, this results in the elimination of many institutions, particularly the reasonably healthy acquiring institutions, from any panel with an extended time dimension. A more common correction has been to force-merge institutions, so that any institution acquired during the period studied is assumed to have been acquired at the beginning of the period, with the data for the acquired institution added to that of the acquirer for the period prior to the merger and attributed to the surviving institution (Bernanke and Lown 1991; Hall 1993; Hancock and Wilcox 1993, 1995). Because many of

these transactions were assisted mergers or acquisitions involving failing banks, force-merging the balance sheets of these banks is not appropriate. In most cases, only a subset of the balance sheet was transferred to the acquiring institution. Moreover, because the acquiring bank often retained the right over several years to return some of the assets to the regulator, the final amounts of assets and liabilities transferred could not be determined for some time after the acquisition. Furthermore, even if we could identify precisely the assets and liabilities transferred, the combined balance sheet would attribute any shrinkage in the target bank prior to the transaction to its healthier successor.

Finally, some studies eliminate banks with large quarterly changes (Hancock and Wilcox 1995) or eliminate quarterly observations with large changes (Berger and Udell 1994). An obvious problem with deleting observations based on a threshold is that data values for many quarters when mergers occurred may fall below that threshold and fail to be eliminated. At the same time, some behavioral changes not associated with mergers may cause values in some quarters to be above that threshold.

7. We do not estimate separate equations for these subcategories because changes in individual bank management information systems during our sample period caused substantial movements between these categories unrelated to actual lending patterns (Peek and Rosengren 1994a).

8. BDNS is a measure of the change in funds made available to (bank-dependent) loan customers. Charge-offs, transfers of real estate loans to the other-real-estate-owned category due to foreclosures and net loan sales can each reduce the quantity of loans outstanding without a corresponding reduction in new lending.

9. The best data for business failures is a series by Dun & Bradstreet. However, the post-1984 data are not directly comparable with the pre-1984 data because the coverage of the series was expanded in 1984 to include the following additional industry sectors: agriculture, forestry and fishing; finance, insurance and real estate; and the services sector. While the level of business failures will certainly show a series break, the failure ratio used in Figure 1 may be little affected because these industries are included in both the numerator and denominator. Thus, the break is only important to the extent that the failure rates in these industries differ from that of the original sample. Note that the increase in coverage occurred well before the sharp increase in the failure rate in New England.

Table 1
Small Business Lending in New England,[a] 1993:II

Bank Size	Number of Banks	Percent of Loans Classified as Small Business Loans: Nonfarm, Nonresidential, Loan Size ($) < 100,000	< 250,000	< 1 Mill	Commercial and Industrial, Loan Size ($) < 100,000	< 250,000	< 1 Mill
<$100 Mill	178	38.45	61.15	96.37	65.73	80.42	94.40
100-299	168	36.57	56.25	88.83	55.08	68.81	87.74
300-499	39	23.67	40.93	75.92	47.21	63.41	89.82
500-999	34	10.85	25.61	59.27	24.86	39.26	62.27
> 1 Bill	33	5.56	16.13	41.64	4.96	7.81	14.64
All Banks	452	13.88	27.48	56.37	9.67	13.98	22.58

Bank Size	Number of Banks	Share of Total Small Business Loans Held by Bank Size Classes (Percent): Nonfarm, Nonresidential, Loan Size ($) < 100,000	< 250,000	< 1 Mill	Commercial and Industrial, Loan Size ($) < 100,000	< 250,000	< 1 Mill
<$100 Mill	178	13.92	11.18	8.59	11.66	9.87	7.18
100-299	168	39.94	31.01	23.88	22.21	19.20	15.16
300-499	39	11.21	9.78	8.85	7.38	6.86	6.01
500-999	34	11.45	13.64	15.39	13.94	15.24	14.96
> 1 Bill	33	23.49	34.39	43.30	44.81	48.83	56.69
All Banks	452	100.00	100.00	100.00	100.00	100.00	100.00

[a]Loans are classified as small business loans based on size of loan rather than size of business.

Source: Bank call reports.

Table 2

Formal Regulatory Actions at New England Banks
1989:I to 1993:II

	All Banks		Banks under Regulatory Actions	
	Number	Total Assets[a] (000)	Number	Total Assets[a] (000)
Large	154	240,482	54	116,557
Small	364	40,982	101	10,832
All	518	281,464	155	127,389

[a]Total assets are calculated as of 1989:I for consistency in comparisons. However, for the 25 banks not in the sample as of 1989:I, we use their values as of the date they first enter the sample.

Source: Bank call reports.

Table 3
Determinants of the Change in Loans: Small and Large Banks[a]
Estimation Method: Variance Components, 1989:II to 1993:II

Independent Variable	Δ Loans / $Assets_{-1}$	ΔBD Loans / $Assets_{-1}$	ΔBDN Loans / $Assets_{-1}$	ΔBDNS Loans / $Assets_{-1}$
Constant	5.189**	3.555**	2.528*	2.498
	(4.47)	(3.41)	(2.51)	(1.54)
Formal action	-1.357**	-.782**	-.947**	-.739*
	(4.13)	(2.77)	(3.44)	(2.00)
Leverage ratio, formal action	.184**	.124**	.147**	.209**
	(4.27)	(3.35)	(4.10)	(4.37)
Leverage ratio, no formal action	.097**	.058**	.064**	.106**
	(4.13)	(2.82)	(3.19)	(3.64)
Log $Assets_{-1}$	-.456**	-.194*	-.143	-.074
	(4.76)	(2.26)	(1.72)	(0.55)
$\frac{Construction}{Assets}_{-1}$	.040**	-.008	.010	.012
	(2.58)	(0.60)	(0.78)	(0.68)
$\frac{Commercial\ RE}{Assets}_{-1}$	-.007	-.050**	-.047**	-.061**
	(0.91)	(7.54)	(7.38)	(6.47)
$\frac{C\&I}{Assets}_{-1}$	.014*	-.036**	-.034**	-.047**
	(2.00)	(5.87)	(5.74)	(5.35)
$\frac{NPL}{Assets}_{-1}$	-.387**	-.224**	-.133**	-.137**
	(15.73)	(10.63)	(6.46)	(5.01)
Savings bank	.058	-.829**	-.856**	-1.118**
	(0.33)	(5.26)	(5.63)	(4.59)
Large bank (LB)	-1.802	4.613*	4.859*	14.730**
	(0.80)	(2.29)	(2.50)	(4.85)
LB formal action	-.121	.462	.093	-.747
	(0.23)	(1.01)	(0.21)	(1.27)
LB leverage ratio, formal action	-.002	-.072	-.016	-.071
	(0.03)	(1.14)	(0.26)	(0.89)
LB leverage ratio, no formal action	-.036	-.066	-.074*	-.144**
	(0.83)	(1.76)	(2.03)	(2.84)
LB log $Assets_{-1}$	.214	-.215	-.256	-.831**
	(1.34)	(1.50)	(1.85)	(3.81)
LB $\frac{Construction}{Assets}_{-1}$	-.046	-.027	-.023	.009
	(1.85)	(1.27)	(1.09)	(0.31)
LB $\frac{Commercial\ RE}{Assets}_{-1}$	-.008	-.007	-.003	-.031
	(0.51)	(0.52)	(0.24)	(1.70)
LB $\frac{C\&I}{Assets}_{-1}$	-.009	0.18	-.014	-.055**
	(0.62)	(1.34)	(1.07)	(2.98)
LB $\frac{NPL}{Assets}_{-1}$	.060	-.059	.026	.016
	(1.50)	(1.72)	(0.79)	(0.37)
LB savings bank	-.338	-.276	-.105	-.825
	(0.97)	(0.88)	(0.35)	(1.74)
R^2	.206	.135	.093	.082
SSR	47,075	34,916	33,114	51,449
SER	2.746	2.365	2.303	2.871

[a]Large banks are defined as those with assets in excess of $300 million. Each equation also contained 101 state-quarter interactive dummy variables (6 * 17 -1) to control for demand factors.

Absolute values of t-statistics in parentheses.
* Significant at the 5 percent confidence level.
** Significant at the 1 percent confidence level.

Table 4
Timing Test for Impact of Formal Actions[a]

Independent Variable	Small Banks	Large Banks	All Banks
	$\frac{\Delta \text{ Loans}}{\text{Assets}_{-1}}$	$\frac{\Delta \text{ Loans}}{\text{Assets}_{-1}}$	$\frac{\Delta \text{ Loans}}{\text{Assets}_{-1}}$
FA(-8)	-0.133	-0.965	-0.451
	(0.12)	(0.46)	(0.44)
FA(-7)	0.995*	0.089	0.778*
	(2.37)	(0.13)	(2.15)
FA(-6)	0.268	0.335	0.292
	(0.69)	(0.53)	(0.88)
FA(-5)	0.630	1.078*	0.767**
	(1.82)	(2.00)	(2.64)
FA(-4)	1.148**	0.293	0.913**
	(3.54)	(0.58)	(3.34)
FA(-3)	0.212	0.972*	0.440
	(0.67)	(2.02)	(1.67)
FA(-2)	0.258	1.245**	0.579*
	(0.83)	(2.79)	(2.27)
FA(-1)	0.136	0.400	0.219
	(0.44)	(0.91)	(0.87)
FA(0)	-0.829*	-2.178**	-1.230**
	(1.95)	(3.50)	(3.53)
FA(1)	-0.807*	-1.310*	-0.921**
	(1.99)	(2.26)	(2.79)
FA(2)	-1.042**	-1.512**	-1.151**
	(2.59)	(2.68)	(3.55)
FA(3)	-0.956*	-1.442*	-1.063**
	(2.40)	(2.57)	(3.29)
FA(4)	-1.328**	-1.252*	-1.251**
	(3.28)	(2.20)	(3.82)
FA(5)	-0.611	-1.792**	-0.949**
	(1.47)	(3.03)	(2.80)
FA(6)	-1.252**	-0.965	-1.118**
	(2.86)	(1.54)	(3.13)
FA(7)	-0.724	0.564	-0.274
	(1.50)	(0.78)	(0.69)
FA(8)	-0.449	-0.334	-0.371
	(1.09)	(0.59)	(1.12)

[a] Each equation is specified as that in Column 1 of Table 3 with the formal action dummy variable replaced with the set of individual FA dummies shown in the table.

Absolute values of t-statistics in parentheses.

* Significant at the 5 percent confidence level.

** Significant at the 1 percent confidence level.

Table 5
Response to Formal Action Relative to Four Quarters Prior to Formal Action[a]

Independent Variable	Panel A Small Banks			
	Δ Loans / Assets$_{-1}$	ΔBD Loans / Assets$_{-1}$	ΔBDN Loans / Assets$_{-1}$	ΔBDNS Loans / Assets$_{-1}$
Base	0.258	0.383*	0.354*	0.672**
	(1.43)	(2.46)	(2.34)	(3.31)
FA(0)	-1.218**	-1.119**	-1.160**	-0.815
	(2.88)	(3.09)	(3.29)	(1.75)
FA(1)-FA(4)	-1.397**	-0.938**	-1.060**	-0.940**
	(4.36)	(3.41)	(3.96)	(2.62)
FA(5)-FA(8)	-1.092**	-0.896**	-1.107**	-1.022**
	(3.26)	(3.12)	(3.96)	(2.74)

Independent Variable	Panel B Large Banks			
	Δ Loans / Assets$_{-1}$	ΔBD Loans / Assets$_{-1}$	ΔBDN Loans / Assets$_{-1}$	ΔBDNS Loans / Assets$_{-1}$
Base	0.575*	0.768**	0.750**	1.778**
	(2.15)	(3.34)	(3.35)	(5.86)
FA(0)	-3.015**	-1.272*	-1.030*	-0.111
	(4.93)	(2.45)	(2.03)	(0.17)
FA(1)-FA(4)	-2.181**	-0.823*	-1.172**	-1.812**
	(4.82)	(2.13)	(3.12)	(3.72)
FA(5)-FA(8)	-1.530**	-0.875*	-1.348**	-2.387**
	(3.26)	(2.19)	(3.47)	(4.74)

[a] Each equation is specified as those in Table 3 with the formal action dummy variable replaced with the set of four dummy variables shown in the table. The base dummy variable takes on a value of one in the four quarters preceding the formal action as well as any quarter in which a formal action is in place. Thus, the estimated coefficients on the three FA dummies reflect the impacts relative to that during the four quarters preceding the imposition of a formal action.

Absolute values of t-statistics in parentheses.
* Significant at the 5 percent confidence level.
** Significant at the 1 percent confidence level.

Table 6
The Effect of Small Business Loan Portfolio Concentration (<$1 million)[a, b]
Estimation Method: Variance Components, 1989:II to 1993:II

Independent Variable	Δ Loans / $Assets_{-1}$	ΔBD Loans / $Assets_{-1}$	ΔBDN Loans / $Assets_{-1}$	ΔBDNS Loans / $Assets_{-1}$
Small2	-.063	.518	.319	.365
	(0.13)	(1.34)	(0.85)	(0.65)
Small3	-1.213*	-.221	-.266	.678
	(2.39)	(0.56)	(0.69)	(1.17)
Small2•FA	-3.059	-3.190	-3.081	-5.173*
	(1.39)	(1.82)	(1.80)	(2.27)
Small3•FA	-2.046	-2.166	-1.979	-4.155
	(0.94)	(1.25)	(1.17)	(1.84)
Small2•LR•FA	.713*	.537*	.527*	.762*
	(2.13)	(2.02)	(2.02)	(2.21)
Small3•LR•FA	.741*	.667*	.612*	.967**
	(2.25)	(2.55)	(2.39)	(2.84)
Small2•LR•NO FA	.079	.017	.027	.035
	(1.55)	(0.43)	(0.70)	(0.62)
Small3•LR•NO FA	.252**	.225**	.215**	.214**
	(4.92)	(5.62)	(5.52)	(3.76)

[a] In addition to those shown in the table, each equation contains the same explanatory variables as in Table 3, however, no distinction is made between large and small banks.

[b] The sample includes only those banks that filed a call report in 1993:II. The base group is the set of banks reporting small loans between 0 and 5 percent of their total assets. Small2 and Small3 represent dummy variables taking on a value of 1 for banks with small loans representing 5 to 15 percent of assets and above 15 percent of assets, respectively. The estimated coefficients reflect effects relative to those of the base group.

Absolute values of t-statistics in parentheses.
* Significant at the 5 percent confidence level.
** Significant at the 1 percent confidence level.

Table 7
Composition of Small Business Loans at New England Banks, 1993:II

	Banks	Assets	Bank-Dependent Loans	Total NFNR[a] Business < $1 million	Total C&I[a] < $1 million
Large, Formal Action (%)	5.5	31.4	45.0	25.2	26.7
Large, No Formal Action (%)	22.5	53.1	43.5	47.1	51.1
Small, Formal Action (%)	17.5	3.6	3.9	9.2	7.0
Small, No Formal Action (%)	54.5	12.0	7.6	18.5	15.2
Total (%)	100.0	100.0	100.0	100.0	100.0
Total	365[b]	222.7[c]	59.8[c]	19.3[c]	7.1[c]

[a]NFNR stands for nonfarm, nonresidential business loans; C&I stands for commercial and industrial loans
[b]Number of institutions
[c]$Billions

Table 8
Sources of Short-Term Credit for New England Businesses[a], 1992
(Percent of Respondents in Size Group)

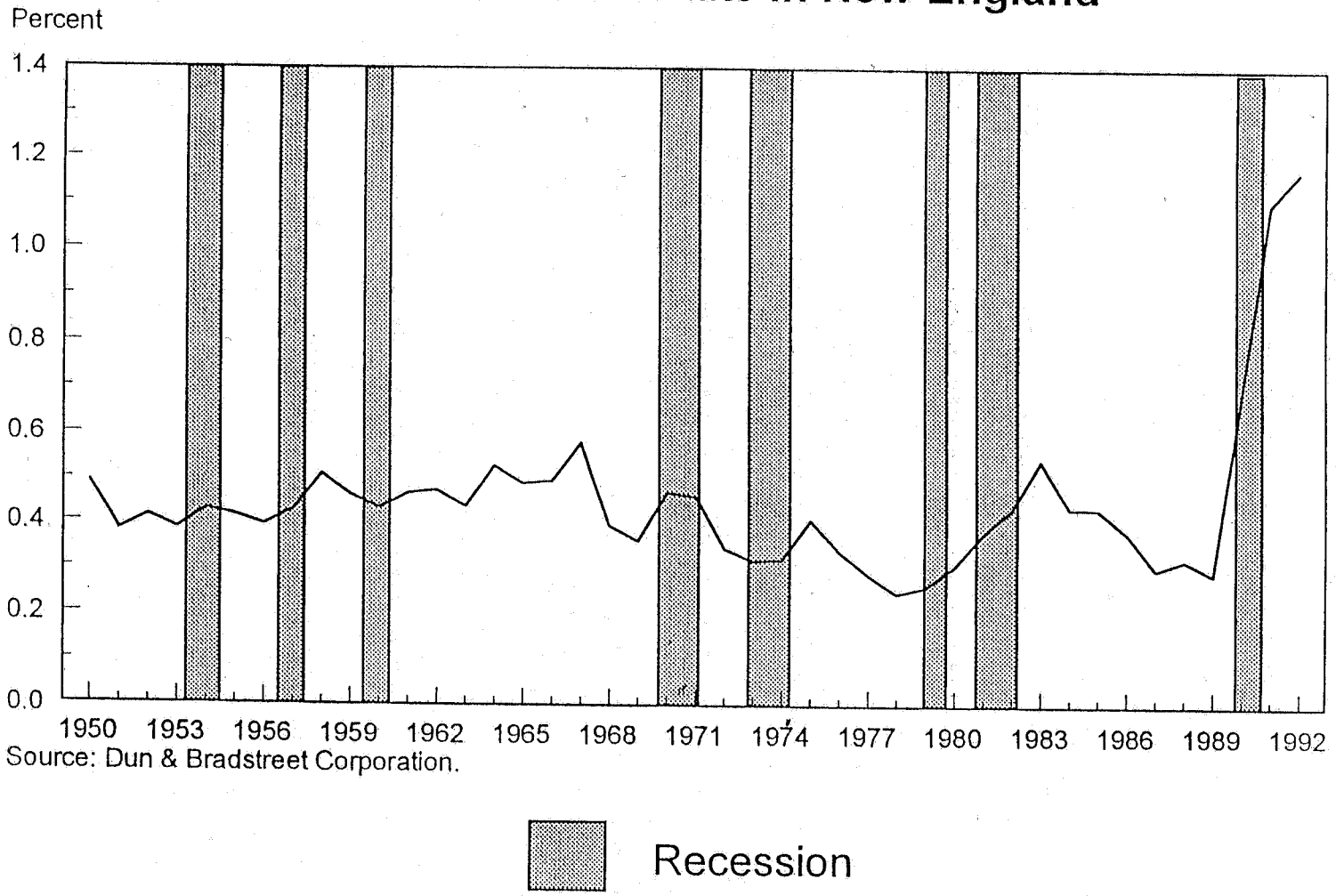
	Large Firms $100-249 million[b]	Medium Firms $50-99 million[b]	Small Firms $10-49 million[b]
1. No short-term credit because credit terminated within past two years	1.7	4.6	5.7
2. All from New England-based banks	55.0	52.8	65.6
3. Some or all from New England-based banks	70.3	70.1	74.8
4. Some or all from nonbank source other than parent	4.2	19.0	12.8
Total Respondents	153	259	636

[a]Excludes firms not needing credit or obtaining credit solely from their parent company.
[b]1991 annual sales

Source: Federal Reserve Bank of Boston

Figure 1

Business Failure Rate in New England



Source: Dun & Bradstreet Corporation.