

Bank Real Estate Lending and the
New England Capital Crunch

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Abstract

The stock of real estate loans held by New England banks has declined dramatically. Given the limited potential for real estate investments, weak demand for real estate loans is to be expected. However, supply as well as demand factors may account for some of the decline in bank real estate loans. This paper documents that bank lending for real estate may have been constrained by a capital crunch, whereby poorly capitalized banks shrank their assets, including real estate loans, to satisfy capital requirements. Because the loss of bank capital is so widespread in New England, bank dependent borrowers may have difficulty obtaining real estate financing.

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Bank Real Estate Lending and the New England Capital Crunch

Because of its dependence on bank financing, real estate has always borne the brunt of reductions in credit availability. During previous recessions, high interest rates caused disintermediation, which reduced bank credit, especially to the real estate sector (Gibson 1973; Jaffee and Rosen 1979; Dokko, Edelstein and Urdang 1990). However, with the elimination of deposit rate ceilings and with interest rates falling rather than rising, the recent period of tight bank credit bears little resemblance to previous periods of disintermediation. Instead, it has been hypothesized that bank financing has been curtailed because of the large losses of capital in the banking sector, primarily from losses on real estate loan portfolios (Syron 1991; Peek and Rosengren 1991). Consequently, banks have had to shrink in order to satisfy capital requirements. Thus, a more apt description of current credit availability problems is that we are experiencing a capital crunch. The focus of this paper is to establish the importance of this reduction in bank capital for bank real estate lending behavior.¹

Banks acquired sizable portfolios of real estate loans during the 1980s, the collateral for which has recently dropped substantially in value. This eroded bank capital at a time when capital/asset ratios were being strictly enforced. Troubled banks have had little success in raising new capital, and earnings are not likely to quickly reverse the deteriorating capital position of most banks. Thus, banks have been forced to meet the new capital standards by shrinking their balance sheets.

Banks' shrinkage does not necessarily imply a credit crunch, even with binding capital requirements. One option for a bank is to sell securities,

which does not restrict credit availability to borrowers by that bank. However, since many New England banks were also concerned with liquidity, they generally increased their securities holdings. Thus, many institutions satisfied their capital requirements by reducing outstanding loans. They have achieved this by tightening credit conditions, removing some loans from the books, and taking few, if any, new customers.

Decreases in outstanding bank loans will reduce credit availability to those borrowers dependent on local bank borrowing. Borrowers with access to national credit markets, banks outside the region, or other financial intermediaries will be much less affected by problems in the local banking sector. Decreases in bank lending will have differential effects across categories of loans as well as categories of borrowers. For example, because of the access to national credit markets through the secondary mortgage market, single-family home financing is unlikely to be disrupted by local banking problems. On the other hand, many construction and commercial real estate borrowers, particularly smaller businesses, may have few alternatives to local lenders.

Some retrenchment from the rapid expansion in the 1980s was likely as the unduly optimistic projections for real estate were not realized. Even so, it is possible that banks now may be overly cautious in extending credit to real estate projects. If banks were only reacting to low expected returns in real estate lending, the retrenchment should be independent of the financial condition of the banks. However, this study finds that the reductions in real estate lending have been greatest at poorly capitalized institutions, which are shrinking to satisfy newly mandated capital regulations. Because the loss of bank capital has been so widespread in New England, borrowers dependent on

local lenders may find few credit alternatives if their current lender is unable or unwilling to continue the lending relationship.

Because New England provides an extreme case of a situation that has occurred to a lesser degree in much of the rest of the country, this paper focuses on the relation between bank capital and real estate loans in New England. The first section of the paper documents the rapid expansion in real estate loans by banks in New England during the 1980s. The second section examines the consequences of the downturn in real estate prices. Bank capital/asset ratios deteriorated and banks sought to satisfy binding capital requirements by reducing their lending. The third section considers whether the real estate lending behavior of poorly capitalized institutions has differed from that of well capitalized institutions and provides some possible explanations for these differences. We also make adjustments for loan charge-offs and consider the possibility that banks may have substituted mortgage securities for mortgage loans in their asset portfolios. The final section provides conclusions.

I. Real Estate Lending in the 1980s

A number of factors likely contributed to the upsurge in real estate lending in the 1980s. The large losses on Third World loans caused banks to reemphasize domestic lending. The particularly favorable treatment of real estate in the Economic Recovery Tax Act of 1981 as well as problems with farm loans and oil industry loans made real estate lending particularly attractive.² The increased interest in real estate lending coincided with a buoyant real estate market in many parts of the country, with the explosion in real estate prices in New England being among the more conspicuous. Table 1

shows the growth rates of real estate loans in bank portfolios in the United States and New England between 1984, when real estate lending began to increase rapidly, and 1989, when real estate lending in New England peaked, as well as the portfolio shares in 1989. The data include all commercial banks and savings banks with FDIC insurance.³ Savings banks are presented separately in the table because their portfolios are more heavily weighted towards real estate lending compared to commercial banks and because they are much more important in New England, where they account for 36 percent of bank assets. Because savings banks are principally located in New England and the mid-Atlantic states, both regions that have experienced large drops in real estate prices, and because total assets of savings banks nationwide are small relative to those of commercial banks, we do not focus on savings banks nationwide in our comparisons below.

Real estate lending by commercial banks in New England grew even more rapidly than for commercial banks in the nation as a whole between 1984 and 1989. While commercial bank assets in New England grew by 97 percent over this period, each category of real estate loans grew by more than 250 percent. Particularly explosive was the 332 percent growth in the construction loan category, followed by the increase of almost 270 percent in multifamily residential loans and in commercial real estate loans. By 1989, New England commercial banks had 15.6 percent of their assets in the relatively risky categories of construction and commercial real estate loans, more than two and one-half times their equity capital base. At the same time, even though their capital/asset ratio rose more than that for banks across the nation during this period, their 114 percent growth in equity capital was eclipsed by a 226 percent increase in nonperforming loans (defined here as loans 90 days past

due plus nonaccruing loans), with nonperforming real estate loans accounting for much of the increase.

New England savings banks were even more aggressive lenders than commercial banks in the riskiest categories of real estate, with growth in construction and commercial real estate loans of 921.5 percent and 277.5 percent, respectively. This expansion was in part due to a relaxation of portfolio restrictions for savings banks and in part due to the conversion of mutual savings banks to stock savings banks, which provided a large influx of capital. The rebalancing of their portfolios could only occur with a rapid expansion of lending, which in retrospect, may have been faster than could prudently be done (Simons 1992). The much larger increase in nonperforming loans for New England savings banks than for New England commercial banks suggests that, in fact, lending standards may have been relaxed. As with commercial banks, the increase in problem loans at savings banks far exceeded their increase in capital over this period.

II. The Decline of Real Estate Lending in the 1990s

Real estate loans extended by New England banks changed dramatically in 1990. Table 2 provides the growth rates from the first quarter of 1990 to the first quarter of 1991 for FDIC-insured commercial and savings banks in New England and in the United States. In New England, real estate loans at commercial banks declined by 9.6 percent and at savings banks by 7.6 percent, compared to an increase of 7.5 percent for commercial banks nationwide. Each category of real estate loans declined at both commercial and savings banks in New England, while only construction loans declined at commercial banks nationally, and that decline was only about one-quarter of the decline in New

England. The decline in New England real estate lending coincided with the deterioration in the quality of the loan portfolio, with a ratio of nonperforming loans to total assets at commercial banks more than double that for commercial banks nationwide. Because real estate loans accounted for a larger share of nonperforming loans in New England than in the nation, the ratio of nonperforming real estate loans to total assets in New England commercial banks was three times that for commercial banks nationwide. This deterioration in the New England loan portfolio contributed to the 7.2 percent decline in capital for commercial banks and 18.1 percent for savings banks, while bank capital in commercial banks nationwide increased by 5.7 percent.⁴

Figure 1 shows the relationship between real estate prices, real estate loans, and total nonperforming loans for New England and the United States. The boom in real estate lending occurred during a period of rapidly rising real estate prices. (For details, see Case 1986.) From 1984 to 1989, while house prices increased by 70 percent in New England, real estate loans held by FDIC-insured banks there more than tripled. The rapid rise in real estate prices, combined with the widely held perception that nominal real estate prices might flatten but were unlikely to fall, contributed to the more rapid expansion of real estate lending in New England compared to the nation as a whole. As prices began to flatten in New England, so did real estate lending, and by 1989 both house prices and real estate loans were decreasing.

The decline in real estate prices did more than just diminish the ardor for additional real estate lending; nonperforming real estate loans began to increase rapidly. As the volume of nonperforming loans rose, banks made additional provisions for loan loss reserves, resulting in losses sufficient to seriously diminish the capital of many New England banks.

This loss of capital occurred at the same time that regulators began to rigorously enforce minimum capital requirements. (For a discussion of optimal bank capital regulation, see Pringle 1974; Santomero and Watson 1977.) The Basle Accord, an international agreement that required banks to maintain a minimum ratio of capital to risk-adjusted assets, forced regulators to focus on capital regulation. In addition, bank regulators in the United States adopted a minimum ratio of capital to unadjusted assets (the leverage ratio). Given the huge costs associated with the earlier lax regulation of the savings and loan industry, and given the adoption of new minimum capital standards both nationally and internationally, forbearance for poorly capitalized institutions did not occur to the same extent as it had during the savings and loan crisis or for commercial banks affected by losses on Third World loans.

Banks below minimum capital standards had only two options: increase equity with retained earnings or new capital, or shrink their assets.⁵ New England banks with large loan losses had little possibility of quickly restoring capital with retained earnings and did not raise additional equity, possibly because of the difficulty of issuing new shares at what they considered to be a "fair" price.⁶ As a result, most institutions with binding capital requirements in New England were forced to shrink.

Table 3 shows that the shrinkage of institutions in New England has been widespread. Our sample of New England banks (described in detail in Section III) indicates that weak capital and asset shrinkage have been particularly apparent at the larger institutions. Because many cease and desist orders recently written for New England institutions have required leverage ratios to exceed 6 percent, we have used a 6 percent capital/asset ratio cutoff. Among large commercial banks (banks with over \$300 million in assets), 42 percent

had capital below 6 percent and 72 percent had lower assets in 1991 than they did in 1990. Because large commercial banks account for more than 50 percent of total banking assets in our sample, shrinkage among these institutions can have a serious impact on credit availability. While only 18 percent of the large savings banks had capital below 6 percent, 62 percent shrank their assets. Among the small commercial and savings banks, the capital position was better. Still, 37 percent of the small commercial banks and 26 percent of the small savings banks shrank their assets. Thus, the loss in capital has been both large and widespread. Unlike the situation in previous periods, however, capital ratios are being enforced.⁷

Banks can shrink by selling securities. Alternatively, they can shrink their loan portfolios by tightening credit standards and, in some cases, calling or refusing to roll over loans. Because poorly capitalized banks feel more pressure to shrink their asset portfolios, their customers may find their loan conditions or loan availability altered, primarily because of the financial condition of their banks. Given the prominent role that real estate loans played in causing the problems for banks, such loans may have been a particular target as banks reduced their loan portfolios to satisfy capital requirements. The next section of this paper documents that poorly capitalized institutions decreased their real estate loan portfolios more than well capitalized institutions in the same market. Thus, unlike periods of disintermediation that should affect all banks similarly, this shock may be unevenly distributed, with customers of poorly capitalized banks suffering a disproportionate burden. Moreover, in an atmosphere of widespread bank portfolio shrinkage, customers denied access to credit by their customary lender may find few alternative sources of funds from other banks in the

region. Thus, borrowers dependent on local or regional banks may find credit unavailable, while borrowers with access to national credit markets, banks outside the region, or non-bank lenders would be little affected.

III. The Capital Crunch and Real Estate Loans

A major difficulty in most empirical studies of credit crunches is disentangling supply from demand. Most studies have examined loans over time to determine if problems in the banking sector have an important independent role beyond the normal decline in demand that occurs during economic downturns. However, these studies are seriously flawed by their inability to completely control for loan demand.

We control for demand in two ways: (1) by examining a cross section of banks in New England that experienced the same downturn in real estate prices and (2) by including additional explanatory variables intended to capture differences in lending opportunities across banks.⁸ If diminished real estate lending reflected decreased lending opportunities to the real estate sector, the degree of a bank's shrinkage would be unrelated to its capital/asset ratio. If, however, low capital/asset ratios have caused banks to shrink their real estate portfolios, we should find much larger reductions in poorly capitalized institutions than in well capitalized institutions. And if so, problems in the banking sector may account for some of the substantial drop in lending to the real estate sector in New England.⁹

The Data

Our sample is based on data from the quarterly Consolidated Report of Condition for Insured Commercial and Savings Banks (call reports) for all FDIC-insured commercial and savings banks in the First Federal Reserve

District (New England) that operated continuously between December 31, 1988, and March 31, 1991. For the regression analysis, we use data from the first quarter of 1990 to the first quarter of 1991. This period was chosen for a number of reasons: it coincides with the large drop in real estate lending; a relatively short window limits the distortions that occur with bank mergers and failures; and four quarters of data (or a multiple thereof) are needed to calculate the changes in the variables in order to avoid problems with seasonal factors. Furthermore, in the first quarter of 1990, bank examiners found substantial problems in the Bank of New England's real estate portfolio, causing other banks (and examiners) to examine their own institutions.

We excluded institutions that were not "mature" banks, defined as banks that opened after January 1, 1989, or that had any of the following characteristics: no loan losses, no nonperforming loans, no demand deposits, no commercial and industrial loans, real estate loans accounting for less than 3 percent of assets, or a capital/asset ratio above 20 percent. These were generally institutions not actively involved in loan origination, or new institutions. In the latter instance, their inclusion in the sample would have resulted in a relationship between the change in loans and capital/asset ratios that reflected expansion due to new formations rather than contraction due to binding capital requirements, thus biasing the results in favor of the capital crunch hypothesis.

We retroactively consolidated the assets and liabilities of FDIC-insured banks that merged during our sample period. We eliminated those banks that acquired a failed institution, however, because they acquired only a portion of the failed institution's assets. Institutions that merged with FSLIC-insured institutions were dropped because FSLIC data were not comparable with

FDIC data. Failed institutions that were liquidated were dropped because their shrinkage would represent insolvency rather than changes in bank behavior.¹⁰

When we calculated the percentage change in real estate loans for the banks remaining in our sample, we found a few institutions with real estate loan growth substantially exceeding 100 percent in a single year. Such institutions were contacted; they indicated that the sharp jump was due to a reclassification of certain loans (usually commercial and industrial loans) into the real estate loan category as a result of a systematic change in their accounting and/or monitoring systems. Consequently, we contacted all those institutions with percentage changes in real estate loans that appeared to be unusually large for that type of institution (exceeding 10 percent for large commercial and savings banks; exceeding 30 percent for small commercial banks; exceeding 15 percent for small savings banks).¹¹ We then eliminated those institutions (14) where loan reclassifications accounted for the large increase, since the change was not a reflection of that bank's lending behavior.

The remaining sample of lending institutions consisted of 389 commercial and savings banks, of which 36 were large commercial banks, 140 were small commercial banks, 73 were large savings banks, and 140 were small savings banks.¹² We differentiate large from small according to the criterion used in the call reports, \$300 million in assets. We also separate savings and commercial banks, because savings banks have traditionally had a much larger portfolio concentration in one- to four-family mortgages.

Bank Capital

Numerous capital ratios are used by regulators, based on risk-adjusted

and unadjusted assets, capital including and excluding subordinated debt, and capital including and excluding intangible assets. Our measure of the capital ratio is total equity capital divided by total assets. This measure is quite similar to the leverage ratio, which is the most binding capital ratio for many New England banks.¹³

Banks have some latitude in timing their reserving for loan losses (Walter 1991). Consequently, we also make adjustments to capital to control for banks' willingness to reserve for nonperforming loans. Banks with large loan loss reserves relative to their nonperforming loans will have lower capital than peers that have reserved less. This adjustment is intended to put all banks on an equal footing, regardless of the exact timing of their loan loss provisions. Peers are defined as all other banks in the same category from among large commercial banks, large savings banks, small commercial banks, and small savings banks. Equation 1 provides an adjustment that controls for bank discretion in the timing of reserving against future loan losses.

$$(1) \quad adjK_i = K_i + \left(1 - \frac{\beta_i}{\bar{\beta}}\right) LLR_i$$

where

$$\beta_i = \frac{NP_i}{LLR_i}$$

$$\bar{\beta} = \frac{\sum NP_i}{\sum LLR_i}$$

K_i = equity capital for bank i

NP_i = nonperforming loans for bank i

LLR_i = loan loss reserves for bank i

If a bank has not reserved as much relative to nonperforming loans as similar banks, the capital is decreased.¹⁴ If a bank has large reserves relative to nonperforming loans compared to similar banks, the capital is increased.

Total assets are similarly adjusted to maintain a consistent balance sheet.

Because our results were not sensitive to whether adjusted or unadjusted capital was used, we report only those empirical results based on the adjusted capital measure.

Adjusted Real Estate Loans

The percentage change in a bank's real estate loans is a flawed measure of the change in credit made available to the real estate sector since it is not adjusted for the reduction in loans resulting from charge-offs. An institution that extended no new loans but charged off real estate loans would appear to be contracting its lending. The change in the stock of loans, therefore, would reflect past loans gone bad rather than a lack of willingness to extend credit to the real estate sector. Since we are primarily concerned with bank credit availability to real estate, we want to correct the stock of loans for loans gone bad.

When a real estate loan is charged off, the charge-off equals the difference between the current market value of the loan and the face value of the loan. If the loan is foreclosed, the collateral is transferred to the other real estate owned category (OREO) at its current market value.

Properties in OREO are held by the bank until the property can be sold. Thus, the full face value of the loan is subtracted from the stock of loans when a

loan is foreclosed. To incorporate this correction, the dependent variable is calculated as:

$$\frac{(LNRE911 - LNRE901) + (RECO - RERECOV) + (OREO911 - OREO901)}{(LNRE901 + OREO901)}$$

where:

LNRE911 = stock of real estate loans in 1991:1

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RECO = real estate charge-offs over the period

RECOV = real estate recoveries over the period

OREO911 = the stock of other real estate owned in 1991:1

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The first expression in the numerator is the change in the stock of loans.

The second expression in the numerator is charge-offs net of recoveries and is added, since an increase in charge-offs lowers the stock of loans but does not reduce the amount of funds made available to real estate by the bank. The third expression in the numerator reflects loans transferred to OREO rather than a reduction in lending, so it, too, is added back. The denominator reflects the total funds available to real estate, real estate loans outstanding plus the stock of foreclosed properties currently held.

Correcting the stock of loans for loans gone bad is important for the capital crunch hypothesis because a failure to make this correction could result in a conclusion that credit was less available when, in reality, the drop in the stock of loans reflected only losses on loans made in the past. During periods of large losses, such as that experienced in New England during

our sample period, this will be particularly important because the decrease in the stock of loans overstates the decrease in credit availability.

Empirical Test

If the drastic drop in real estate lending was a shock affecting only the demand for loans, all banks should reduce their real estate loan originations by a similar proportion. If, on the other hand, reductions in lending occurred disproportionately at poorly capitalized institutions, then capital constraints may be forcing banks to shrink, with at least some of that adjustment occurring in their real estate loan portfolios. By looking at a cross section of institutions in the same geographic region, we avoid many of the problems in controlling for demand experienced in time series analyses of credit crunches. All institutions face approximately the same lending opportunities, since they are in the same market and face the same market conditions.

The loan data are available from the call reports filed by all FDIC-insured institutions. Unfortunately, the balance sheet information provides the stock of loans rather than loan originations. Several studies (King 1986; Bernanke and Lown 1991) have examined credit crunch issues by treating the first difference of the stock of loans as new funds available to lend. However, the stock of loans can change for reasons other than new originations. Both loan sales and the writing down of bad loans can cause the stock of loans to change even if the quantity of loans being originated is unaltered. Unfortunately, loan sale information on real estate loans is not available.

We estimate the following equation:

$$(2) \quad RE_i = \alpha_0 + \alpha_1 (K/A)_i + \alpha_2 ASSETS_i + \alpha_3 FEE_i + \alpha_4 C\&I_i + \alpha_5 CONSTR_i + \alpha_6 SINGLE_i \\ + \alpha_7 MULTI_i + \alpha_8 COMMERCIAL_i + \mu_i$$

The dependent variable RE is the percentage change in total real estate loans corrected for loan loss experiences (as described above) from the first quarter of 1990 to the first quarter of 1991. K/A is the beginning-of-period (first quarter of 1990) capital to asset ratio, corrected for differences in the timing of reserving against nonperforming loans (as described above).

While many demand factors will be controlled for by examining institutions in the same geographic region at a particular time, we further control for possible demand factors by controlling for bank characteristics. Banks specialize in different segments of the market, and it is possible that these market niches did not experience demand shocks of the same magnitude.

The first control variable is the logarithm of bank assets (ASSETS) at the beginning of the period, first quarter 1990. Banks are limited in the percentage of their capital they can lend to any one borrower. Thus, small banks will be limited in their lending to borrowers that require large loans. If large borrowers experienced larger shocks than small borrowers, larger banks may experience larger loan demand shocks.

The second control variable is FEE, the ratio of fee income to the sum of total interest income and fee income, calculated for calendar year 1989. This controls for differences in demand for different types of bank activities. In particular, banks with large off-balance-sheet activities may be better insulated from demand shocks than banks that focus on lending.

We also include several variables that control for market exposure to different types of lending. C&I, the ratio of commercial and industrial loans to total assets for calendar year 1989, captures large exposures to business

lending. CONSTR, SINGLE, MULTI, and COMMERCIAL are construction loans, one- to four-family mortgages, multifamily mortgages, and commercial real estate loans, respectively, each divided by total assets and calculated for calendar year 1989. These variables capture the exposure the institution had to the various real estate sectors immediately prior to the estimation period. In addition to controlling for demand shocks, these variables also can control for supply factors other than those associated with capital ratios. For example, the estimated coefficients on loan categories would reflect portfolio shifts by banks generally that were associated with a change in the relative expected risk-adjusted returns on alternative loan categories. Furthermore, if banks want to shrink their portfolios quickly, the relative magnitudes of the estimated coefficients on loan categories would reflect the speed at which a bank could terminate loans. Other things equal, real estate loan categories that have shorter maturities (for example, construction loans) should have larger negative effects on real estate loan growth rates.

To further control for differences by institution, we segment our sample into large and small savings bank and commercial bank categories. While savings banks no longer have statutory limitations on their lending activity, traditionally they have had a larger exposure to one- to four-family mortgages and a smaller exposure to commercial and industrial loans than commercial banks.

The purpose of the empirical test is to verify that a portion of the decrease in real estate lending results from the impaired capital condition of banks rather than exclusively from decreases in demand or a general portfolio composition shift associated with lower expected returns on real estate loans. If the cause was a general decrease in loan demand or a reduction in the

expected returns to real estate loans, the decreases in lending would occur at all institutions and not be systematically related to their capital/asset ratios. If after picking institutions in one region and after controlling for specialization in market sectors, we still find a significant role for the capital/asset ratio, then the evidence would support the hypothesis that the widespread impairment of bank capital reduced credit to bank dependent borrowers in the real estate sector.

Results for Adjusted Real Estate Loans

Table 4 presents the regression results for equation 2. We allow for the possibility of heteroskedasticity in the error term using a White (1980) correction. The adjusted capital/asset ratio effect is always positive and is significant at the 1 percent confidence level for the all banks sample, for the small commercial bank sample, and for the large savings bank sample. The effect for the large commercial bank sample is significant at the 10 percent confidence level. The positive coefficient indicates that poorly capitalized institutions contracted their real estate loan portfolios more than did well capitalized institutions. For commercial banks, a 1 percent drop in the capital/asset ratio resulted in a more than 1 percent decline in real estate loans. For the all banks sample, the response was approximately 1 percent. This evidence supports the hypothesis that poorly capitalized institutions were shrinking their real estate portfolios to satisfy capital requirements. Furthermore, larger institutions have larger positive coefficients than smaller institutions, which are generally better capitalized. And commercial banks have larger coefficients than the generally better capitalized savings banks.

The logarithm of assets has a negative coefficient in each of the

subsamples and is significant for the large savings bank category. FEE has a negative effect in all but the small savings bank category and is statistically significant in the small commercial bank and large savings bank categories. Exposure to commercial and industrial loans has a positive effect in three of the four subsamples, but is not significant. All of the real estate variables except for three in the large commercial bank category enter with negative coefficients, indicating that a larger real estate exposure results in a larger percentage decrease in total (adjusted) real estate loans over this period. Although the evidence from the four subcategory regressions is mixed, for the all banks sample the relative magnitudes of the coefficients on the real estate control variables are generally consistent with the speed of adjustment hypothesis, with construction loans having the largest effect and the longer maturity one- to four-family mortgage loans having the smallest impact (in absolute value).

F-tests cannot reject combining large with small commercial banks, large commercial banks with large savings banks, small commercial banks with small savings banks, or the combination of all four subcategories into the all banks aggregate. However, the data do reject at the 5 percent confidence level the combination of large savings banks with small savings banks. Thus, it is reasonable to focus on the all banks sample. In that case, each of the control variables with the exception of MULTI is significantly different from zero at the 1 percent confidence level, although none are consistently so in the subsamples.¹⁵

While real estate loans have been reduced, at least in part because of the capital constraints on banks, some of this decline in bank loan portfolios may reflect the securitization of real estate loans, so that the net decline

in real estate credit made available by banks may still be overstated. Unfortunately, no good data exist on sales of real estate loans. While this is unlikely to be a major factor for construction and commercial real estate loans, it may be important for the one- to four-family mortgage category.

Results Including Real Estate Securities

While poorly capitalized banks have reduced their real estate loans by more than their better capitalized peers, this may represent, in part, a decision to become more liquid. If so, the drop in real estate loans could be partially offset by an increase in the holdings of real estate securities. The correlations between the change in loans corrected for loan losses and the change in mortgage securities holdings, each divided by total assets, are as follows: -0.27 for large commercial banks, -0.10 for large savings banks, -0.06 for small commercial banks, -0.07 for small savings banks, and -0.10 for the all banks sample. Thus, it appears that banks may have partially offset their reductions in real estate loans, although the correlations are not high.

While the substitution of mortgage securities for mortgage loans by banks in a region may not change the amount of total funds supplied by those banks to the real estate sector, the total amount supplied to that region may change, as well as the composition among real estate lending categories. First, the mortgage securities market is national in scope and local banks likely would prefer mortgage securities collateralized by loans from other geographical regions to better diversify their real estate portfolios. (At the same time, mortgage funds available to the region would be increased if a local bank originated a mortgage and sold it to a lender in another geographical region.) Second, the majority of mortgage securities are collateralized by single-family homes. A substitution of mortgage securities

collateralized by single-family homes for construction loans in a lender's portfolio would reduce the funds available from that bank to the construction sector.

When we sum across the banks in our sample, total real estate securities held are approximately the same magnitude as total real estate loans held. To test whether capital constraints restrict extensions of credit in the form of mortgage securities plus real estate loans, we reestimated equation 2 with a new dependent variable, the percentage change in the stock of real estate securities plus loans corrected for loan losses. The results are reported in Table 5.

As was the case with the data in Table 4, F-tests can reject only the combination of large savings banks with small savings banks. In particular, the data cannot reject combining all four subcategories of banks into the all banks aggregate. In that regression, the coefficient on the adjusted capital/asset ratio is now smaller, but still significant at the 1 percent confidence level. This is consistent with the capital crunch hypothesis whereby the lower a bank's capital/asset ratio, the more it reduces its overall exposure to real estate assets. Thus, increases in real estate securities holdings have not fully offset the reductions in the real estate loan portfolios of poorly capitalized banks. ASSETS as well as three of the four real estate control variables are also significant, while FEE and C&I are no longer significant. In the four subcategory regressions, the adjusted capital/asset ratio is significant only for the small commercial bank category, and in each case the point estimate is smaller than in the corresponding Table 4 regression. Similarly, the coefficients on the control variables tend to be less significant and often of a smaller magnitude.

IV. Conclusion

Banks in New England have experienced major losses of capital as a result of their exposure to risky real estate loans, with 52 percent of total charge-offs coming from real estate loans. While banks' large exposure to real estate was profitable during the real estate boom, it made large real estate lenders particularly vulnerable to a real estate bust. This loss of capital at a time of increased importance of capital requirements has caused banks to attempt to improve their capital/asset ratio by shrinking their assets and liabilities.

This shrinkage is particularly apparent in New England, where poorly capitalized banks have been contracting their real estate loans more than their better capitalized peers. Large commercial and savings banks, which hold the bulk of loans, experienced the largest drop in capital. These institutions have been particularly aggressive in reducing their real estate loan portfolios. After controlling for exposure by loan categories, size, and fee income, and after adjusting the change in real estate loans for the reduction attributable to charge-offs and foreclosures, we still find that poorly capitalized banks have made less new funds available (contracted funds more) for real estate loans, compared to better capitalized banks. And this reduction has not been offset by an increase in holdings of mortgage securities. For the all banks sample, the adjusted capital/asset ratio has a significant positive effect on the growth rate of total funds (loans plus mortgage securities) made available to the real estate sector.

Extending our analysis from aggregate real estate lending to consider individual types of real estate loans might provide further insights into the real estate lending market in New England during this difficult period.

However, loan charge-offs and recovery data by categories of real estate loans are not available prior to the first quarter of 1991, the end of our sample period. Available evidence indicates that charge-offs are concentrated in the construction and commercial real estate categories and thus the omission of the charge-offs correction could have important consequences for results related to the relative performance of the different real estate loan categories. Construction and commercial real estate borrowers, unlike home mortgage borrowers, are likely to be dependent on local banks for financing, particularly if they are small businesses. Thus, examining the components of real estate lending should clarify whether the capital crunch may be reducing credit availability to bank dependent borrowers. As the data become available, we plan to explore such questions in future research.

While the limited potential for real estate investments in the current market would naturally discourage lending, real estate lending is suffering not only from reduced demand by borrowers but also from a drop in credit availability from capital-constrained bank lenders. While this is not a problem for borrowers with access to national credit markets, other financial intermediaries, or banks outside the region, it is a problem for borrowers dependent on local bank lenders. Given the widespread financial problems in the New England banking industry, borrowers who have their loans called or not renewed as a result of financial problems of the lender, rather than the borrower, may find few alternative sources of credit.

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Footnotes

1. The consequences of the capital crunch for bank lending are not unique to real estate loans. Bernanke and Lown (1991), Peek and Rosengren (1991), and Hancock and Wilcox (1992) provide evidence of the shrinkage of other loan and bank liability categories related to the capital position of banks.
2. While the 1981 Tax Act greatly increased incentives to real estate investment in the United States, the boom was not uniform across regions of the country, and many other countries also experienced a real estate boom during the same period. Furthermore, the increased funds flowing into U.S. real estate included a substantial portion from pension funds and foreign investors not directly affected by the tax changes. The Deficit Reduction Act of 1984 and especially the Tax Reform Act of 1986 contained provisions that more than reversed the incentives of the 1981 Act. (See, for example, Follain, Hendershott, and Ling 1987; Poterba 1990.) These changes likely contributed to the reversal of the boom.
3. Some of the increase between 1984 and 1989 reflects the transfer of savings banks into the FDIC insurance fund. In addition, many savings banks converted from mutual to stock ownership, with the resulting capital infusion encouraging an aggressive expansion of lending.
4. The decline in bank capital in New England was actually more severe than is indicated by the table. Bank capital in the first quarter of 1991 includes the \$500 million equity infusion into the Bank of New England and the \$250 million infusion into Connecticut Bank and Trust by the Federal Deposit Insurance Corporation (FDIC). Omitting these capital infusions, the decline in equity capital for New England commercial banks would have been 15 percent.

5. To the extent that risk-based rather than leverage capital ratios were the binding constraint, a bank could stretch its capital by shifting some of its portfolio into lower risk-weighted assets. However, in New England during our sample period, leverage ratios rather than risk-based capital ratios appear to have been the binding constraint in most cases (see footnote 13).

6. The reason investors may require a large risk premium is explored in Myers and Majluf (1984). As applied to banking, outside investors have difficulty ascertaining the value of a firm because management does not have an incentive to disclose unfavorable information. When collateral values are rising, few defaults occur and the likelihood of a serious erosion of bank capital is low. Thus, investors need only to monitor the health of the economy. However, when loans are defaulting and collateral is impaired, the importance of monitoring increases. Since data on the individual loans in a bank's portfolio are not publicly available, outside investors raise their required risk premium because of the increased difficulty in ascertaining the quality of the bank portfolio.

7. Hancock and Wilcox (1992) find that poorly capitalized banks have shrunk assets much more in this recession than in the 1982 recession. Kane (1985) shows that poorly capitalized savings and loans expanded rapidly, rather than shrank, as a result of their loss of capital in the early 1980s.

8. While cross-section data do not enable us to quantify the demand effects, such data do enable us to test whether an independent role for supply factors is present by allowing us to control for demand factors.

9. Our test focuses on differences in lending behavior between poorly capitalized and well capitalized banks. Consequently, it cannot identify an across the board reduction in real estate lending associated with an increase

in the risk aversion of lenders to real estate sector loans, or even to lending generally. Many investigators might define a credit crunch more broadly to include such situations.

10. Given that we omit failed institutions, the aggregate pool of funds available likely contracted by more than indicated by our sample of banks. However, our focus is on distinguishing between poorly capitalized and well capitalized institutions to test the capital crunch hypothesis, rather than on determining the extent to which aggregate lending declined.

11. Aggregate data overstate real estate lending by the volume of non-real-estate loans reclassified as real estate loans. Thus, real estate lending may have been substantially weaker than had appeared.

12. Despite the deletions of institutions described above, the remaining sample still represents 76 percent of all real estate loans held by New England banks during this period.

13. As of June 30, 1991, of the 20 largest First District commercial and savings banks, none violated tier 1 risk-based capital guidelines, seven violated total risk-based guidelines, and nine violated a 5 percent leverage ratio.

14. For the purpose of calculating adjusted capital, we divided the sample of all New England banks (before omitting from our sample those that reclassified loans or had little exposure to real estate loans) into four categories: large commercial, small commercial, large savings, and small savings. An average loan loss provision was then calculated for each set of comparable institutions and used to adjust the capital of each bank in that category. For the first quarter of 1990, the average ratios of nonperforming loans to loan loss reserves were: large commercial banks, 1.53; small commercial

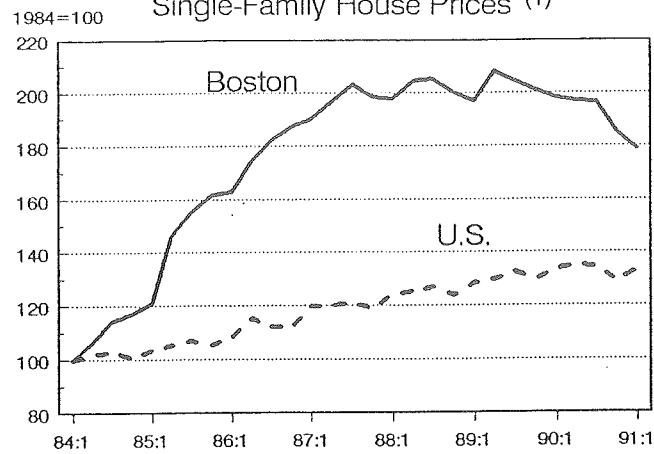
banks, 2.28; large savings banks, 2.71; small savings banks, 3.94.

15. When corresponding equations were estimated with the percentage change in real estate loans unadjusted for charge-offs as the dependent variable, the coefficients on the adjusted capital/asset ratio had larger values, as would be expected, with all but the coefficient for the small savings bank category significant at the 1 percent confidence level. Among the control variables, the magnitudes of the coefficients were little changed from those in Table 4 with the exception of that on CONSTR, which was twice as large (in absolute value). This difference in estimated coefficients likely reflects the large proportion of real estate loan charge-offs accounted for by construction loans.

Figure 1

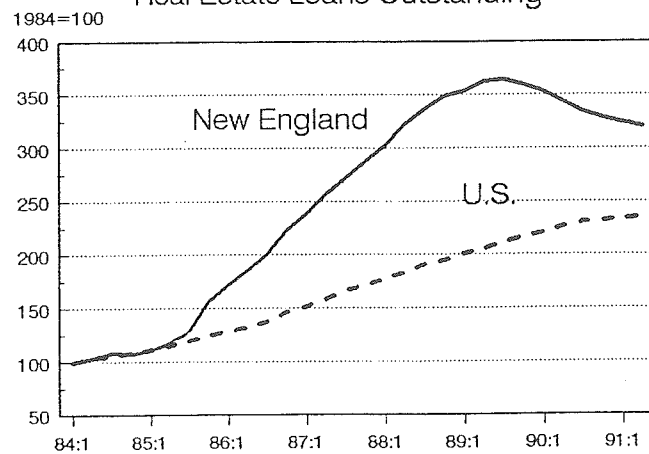
Panel A

Single-Family House Prices (1)



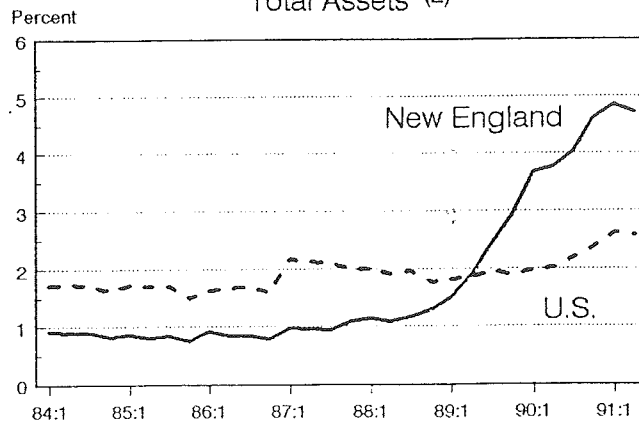
Panel B

Real Estate Loans Outstanding (2)



Panel C

Nonperforming Loans as a Percentage of Total Assets (2)



(1) Source: National Association of Realtors.

(2) Source: Call Reports for FDIC-insured institutions. Changes in a data series will reflect changes in the number of FDIC-insured institutions.

Table 1

Commercial and Savings Bank Holdings of Real Estate, New England and the United States, 1984 to 1989

	New England				United States			
	Commercial		Savings		Commercial		Savings	
	Growth Rate (%) 84-89	% of Total Assets 89	Growth Rate (%) 84-89	% of Total Assets 89	Growth Rate (%) 84-89	% of Total Assets 89	Growth Rate (%) 84-89	% of Total Assets 89
RE Loans	269.9	31.4	223.2	65.8	97.8	22.0	107.6	59.9
Construction	332.1	6.2	921.5	6.3	89.3	4.2	550.4	4.4
1-4 family	257.4	15.0	181.3	44.0	87.9	10.3	98.8	39.6
Multifamily	269.3	.8	278.8	4.0	88.0	.6	72.1	5.8
Commercial	257.4	9.4	277.5	11.5	128.8	6.4	115.2	10.1
Capital	114.4	6.0	218.0	8.8	37.2	6.3	158.5	7.7
Nonperforming Loans ¹	225.8	2.1	792.5	2.5	39.5	1.9	1421.1	1.8
Total Assets ²	97.0	100.0	165.2	100.0	32.7	100.0	76.0	100.0

¹Nonperforming loans have been defined as the sum of loans that are nonaccruing and those 90 days past due.²The levels of total assets for 1989 are (\$ billions): New England commercial banks, 181.0; New England savings banks, 100.0; U.S. commercial banks, 3217.8; U.S. savings banks, 239.2.

Table 2

Commercial and Savings Bank Holdings of Real Estate, New England and the United States, 1990:1 to 1991:1

	New England				United States			
	Commercial		Savings		Commercial		Savings	
	Growth Rate (%)	% of Total Assets	Growth Rate (%)	% of Total Assets	Growth Rate (%)	% of Total Assets	Growth Rate (%)	% of Total Assets
	90:1-91:1	91:1	90:1-91:1	91:1	90:1-91:1	91:1	90:1-91:1	91:1
RE Loans	-9.6	31.3	-7.6	62.8	7.5	24.2	-3.7	60.4
Construction	-35.2	3.9	-46.7	3.1	-10.4	3.6	-32.5	2.8
1-4 family	-6.5	16.0	-3.0	44.4	13.4	12.1	-1.5	40.6
Multifamily	-6	.9	-17.1	3.5	4.9	.7	-6.0	6.2
Commercial	-1.0	10.4	-2.9	11.7	9.5	7.2	.4	10.8
Capital	-7.2	5.6	-18.1	6.9	5.7	6.7	-9.3	7.2
Nonperforming Loans ¹	-28.7	5.3	10.7	4.2	32.5	2.5	36.1	3.8
Nonperforming RE Loans	21.6	3.0	15.7	2.8	71.1	1.0	36.4	2.9
Total Assets ²	-8.3	100.0	-5.7	100.0	1.2	100.0	-5.0	100.0

¹Nonperforming loans have been defined as the sum of loans that are nonaccruing and those 90 days past due.²The levels of total assets for 1991:1 are (\$ billions): New England commercial banks, 161.1; New England savings banks, 95.3; U.S. commercial banks, 3354.9; U.S. savings banks, 229.9.

Table 3

Balance Sheet Statistics for New England Banks¹

		<u>All Banks</u>	<u>Large Commercial Banks</u>	<u>Large Savings Banks</u>	<u>Small Commercial Banks</u>	<u>Small Savings Banks</u>
K/A < 6%	Number	59	15	13	21	10
	Percent	15	42	18	15	7
Assets ₉₁ < Assets ₉₀	Number	160	26	45	52	37
	Percent	41	72	62	37	26
Banks in Sample		389	36	73	140	140
K/A < 6%	Assets ²	80,216	61,345	15,745	2,770	855
	Percent	42	61	28	16	4
Assets ₉₁ < Assets ₉₀	Assets ²	131,877	81,275	39,717	5,660	5,222
	Percent	69	81	71	39	27
Total Assets of Banks ¹		190,678	100,635	56,195	14,513	19,333

¹Based on our sample of First District banks, as described in text.²Assets in thousands of dollars.

Table 4
Determinants of the Percentage Change in Total Real Estate Loans Adjusted for Net Charge-Offs and OREO¹
1990:1 - 1991:1

	Constant	Adj. K/A	ASSETS	FEE	C&I	CONSTR	SINGLE	MULTI	COMMERCIAL	n	R ²	SEE
Large Commercial Banks	.14 (.50)	1.79 (0.93)	-.021 (.027)	-.09 (.22)	.30 (.36)	.10 (.52)	.00 (.27)	.30 (.63)	-.21 (.35)	36	.173	.113
Small Commercial Banks	.30 (.20)	1.35** (.50)	-.012 (.017)	-.74* (.30)	.18 (.14)	-.22 (.27)	-.43** (.13)	-.24 (.29)	-.33* (.15)	140	.278	.132
Large Savings Banks	.52** (.18)	.67** (.24)	-.033* (.012)	-.59* (.26)	-.13 (.12)	-.28 (.17)	-.12 (.09)	-.44 (.24)	-.23 (.12)	73	.485	.057
Small Savings Banks	-.25 (.14)	.17 (.25)	-.013 (.010)	.16 (.31)	.28 (.21)	-.51** (.10)	-.14 (.09)	-.29 (.18)	-.16 (.13)	140	.244	.065
All Banks	.32** (.07)	.98** (.22)	-.020** (.005)	-.47** (.14)	.26** (.09)	-.34** (.10)	-.20** (.06)	-.21 (.12)	-.25** (.09)	389	.305	.098

¹ Estimated with a White correction for heteroskedasticity; standard errors in parentheses.

*Significant at 5% confidence level

**Significant at 1% confidence level

Table 5
Determinants of the Percentage Change in Total Mortgage Securities plus Total Real Estate Loans Adjusted for Net Charge-Offs and OREO¹
1990:1 - 1991:1

	Constant	Adj. K/A	ASSETS	FEE	C&I	CONSTR	SINGLE	MULTI	COMMERCIAL	n	R ²	SEE
Large Commercial Banks	.17 (.48)	1.24 (1.00)	.011 (.027)	.32 (.25)	.11 (.41)	.05 (.61)	-.18 (.31)	-.81 (.63)	-.47 (.38)	36	.192	.129
Small Commercial Banks	.27 (.21)	1.27* (0.53)	-.008 (.018)	-.70* (.31)	.12 (.15)	-.10 (.29)	-.41* (.15)	-.41 (.31)	-.39* (.17)	140	.224	.140
Large Savings Banks	.64** (.20)	.47 (.30)	-.038* (.015)	-.60* (.27)	-.23* (.15)	-.43** (.19)	-.16 (.09)	-.10 (.28)	-.27 (.10)	73	.375	.070
Small Savings Banks	.36* (.14)	.11 (.25)	-.016 (.011)	.62 (.73)	.24 (.21)	-.56** (.12)	-.23 (.09)	-.27 (.21)	-.26 (.13)	140	.266	.068
All Banks	.33** (.08)	.82** (.23)	-.015** (.006)	-.30 (.19)	.17* (.10)	-.34** (.10)	-.27** (.07)	-.25 (.14)	-.36** (.10)	389	.245	.106

¹Estimated with a White correction for heteroskedasticity; standard errors in parentheses.

*Significant at 5% confidence level

**Significant at 1% confidence level