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Lessons from the Rhode Island Banking Crisis

Thomas E. Pulkkinen and Eric S. Rosengren

The failure of the Rhode Island Share and Deposit Indemnity Corporation (RISDIC), a private insurance fund, and the closure of its 45 remaining member institutions froze the accounts of 300,000 individuals and 10 percent of all deposits in the state. While the closure of two institutions triggered RISDIC's demise, flaws in both design and management had set the stage for failure and are the focus of this article. The authors group RISDIC's problems into three categories: risk concentrations, control of the insurance fund by those it insured, and RISDIC's inadequate regulatory oversight of members.

Concentrations of risks abounded. Both the fund and the geographic area it covered were small, and member institutions lent heavily in real estate. The fund's failure to sufficiently reserve against this exposure was particularly problematic: RISDIC could not have covered major losses at any one of its 10 largest members. RISDIC also neglected standard regulatory practices in supervising member institutions. Adequate deposit insurance rests on several fundamentals, among them diversification, independent supervision, disclosure of weaknesses, and adequate reserves; RISDIC managed to delay but not avoid the consequences of neglecting these principles. 3

Lessons from New England Bank Failures

Richard E. Randall

The rapid deterioration in the condition of New England banks during the late 1980s, following a period of robust growth and prosperity in the region, provides valuable lessons relevant to efforts to protect the banking system from future shocks. This article demonstrates the timing of events leading to the failure of 87 New England banks. It

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emphasizes the development of abnormal risk concentrations, an eventual change in the economic and psychological underpinnings of these risks, and the rapid transition from apparently healthy banks to failure.

The author finds that most bankers ceased aggressive risk-taking at the first sign of emerging credit problems, and that bank supervisors generally reacted promptly as credit weaknesses emerged but did not act against the earlier risk concentrations. Furthermore, capital ratios did not deteriorate until some time after credit problems emerged. 13

Taxes, Income Distribution, and the Real Estate Cycle: Why All Houses Do Not Appreciate at the Same Rate

Christopher J. Mayer

Changes in house prices are generally reported on an aggregate basis. This article suggests that within a metropolitan area, high-value and low-value homes appreciate at different rates. Overall, the author's results indicate that appreciation rates are more volatile for high-priced homes than for less expensive homes around the real estate cycle.

The different rates of price appreciation are partly explained by changes in the user cost of owning a home. Cyclical factors also play a part. Furthermore, the author found that changes in the prices of lower-value homes have a contemporaneous effect on high-end home prices, while the opposite is not true. His results suggest that in a house-price boom, first-time homebuyers may be in a better position to buy a low-priced home than the reported, aggregate price index suggests. 39

Lessons from the Rhode Island Banking Crisis

Thomas E. Pulkkinen and Eric S. Rosengren

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On January 1, 1991, the newly inaugurated governor of Rhode Island announced the closure of 45 credit unions, banks, and loan and investment companies insured by the Rhode Island Share and Deposit Indemnity Corporation, a private insurance fund. The closing of the 45 depository institutions froze the accounts of 300,000 depositors, directly affecting roughly one in three residents of Rhode Island. Furthermore, the closure froze 10 percent of all deposits in Rhode Island depository institutions, an unusually high percentage of bank deposits in a particular region, seriously disrupting transactions of businesses and individuals alike.

The failure of the Rhode Island Share and Deposit Indemnity Corporation (RISDIC) was preceded by the highly publicized failures of private insurance funds in Ohio and Maryland during the mid 1980s. Many of the mistakes contributing to the failures of these other insurers were also made in Rhode Island. Several features of RISDIC were particularly threatening to its long-run viability, however.

First, both RISDIC and the insured depository institutions had significant concentrations of risk. The insurer covered deposits in a small geographic area, exposing the RISDIC fund to substantial risk from a regional economic downturn. A parallel structural shortcoming was the small size of the RISDIC fund, which made it unable to sustain the failure of even one of its largest insured institutions. Similarly, the insured institutions had substantial concentrations in real estate lending, making them particularly susceptible to a downturn in that sector.

Second, the insurer was run by the insured members, fostering conflicts of interest between RISDIC actions in support of the ongoing safety and soundness of the insurance fund and decisions beneficial to the profitability of the RISDIC members. Management of the insured institutions constituted a substantial majority of the RISDIC board of directors, and in fact the board could be legally constituted without any outside directors at all.

Third, the regulatory design of RISDIC was inadequate, and the private insurer disregarded many of the principles practiced by federal regulators of depository institutions. RISDIC examiners were accountable to a board composed of officials from the examined institutions. In addition, RISDIC and its insured institutions had not effectively implemented either the standard practices promulgated by the National Association of Share Insurance Corporations and adopted by RISDIC in 1985 or the operating standards required of credit unions and banks supervised by federal agencies.

The first section of this article provides a brief chronology of events. The second describes the problems that contributed to the RISDIC failure. The third section describes the effects of the Rhode Island banking crisis on other private insurance funds and on government policy. The final section summarizes lessons to be drawn for private insurance from the RISDIC crisis.

I. Chronology of Events

RISDIC was chartered by the Rhode Island General Assembly and began operation in 1971 as a private nonprofit insurance company. Its initial purpose was to provide insurance for credit unions chartered in Rhode Island. At first, the membership was limited mostly to small institutions, with total deposits in 1972 of $134 million distributed over 40 institutions. Both the number of institutions and the total deposits in these institutions gradually increased, partly as a result of legislation enacted in 1976 that allowed RISDIC to insure financial institutions other than credit unions and a 1977 law requiring insurance for all depository institutions. By 1980 RISDIC insured $761 million in deposits, slightly more than a 300 percent increase in real dollars from 1972, at 78 institutions.

RISDIC's responsibilities grew with its membership. In 1980, legislation permitted the Rhode Island Department of Business Regulation (DBR) to accept RISDIC examinations.[1] Because of limited hiring by DBR as a result of austere state budgets, by the late 1980s DBR increasingly relied on RISDIC personnel to conduct depository examinations. This decreased the objectivity and effectiveness of the supervisory process by placing the management of the examined companies in charge of what should have been an independent review function.[2] In addition, insurance coverage was increased by RISDIC over time, rising from the initial maximum coverage of $40,000 per account to $100,000, consistent with the increase in federal limits. The ceiling was raised further in 1985, when RISDIC adopted rules to provide insurance up to $500,000 and to provide unlimited coverage on specific accounts.

The desire to extend insurance coverage to larger accounts and to a more diverse group of institutions was, in part, an attempt to compensate for a shift to federal insurance coverage by the stronger RISDIC-insured institutions. The exodus to federal insurance was accelerated by the failure of private insurance funds in Ohio and Maryland in early 1985. While the Rhode Island legislature did not enact the 1986 bill filed by the governor that would have required federal insurance for all RISDIC institutions, nine of the 22 largest RISDIC-insured institutions nonetheless became federally insured, leaving behind mostly small or weak institutions. Two-thirds of the remaining large RISDIC-insured institutions ultimately were unable to obtain federal insurance.

The defections of the strongest companies to the Federal Deposit Insurance Corporation (FDIC) and the National Credit Union Association (NCUA), as well as mergers, caused the number of RISDIC-insured institutions to fall to a low of 46 institutions by 1989. Despite this decrease in the number of institutions, a rapid expansion of deposits in the large, weak institutions that remained in RISDIC

The Rhode Island Attorney General, federal banking regulators, and others privately counseled Rhode Island government officials on the perils of RISDIC as early as 1985 and 1986.

[1] This was not intended to alter the substance of exams. The standards of RISDIC and of the DBR were compatible and many of RISDIC's examiners were former DBR staff.

[2] In reality, while the RISDIC board bore responsibility for an examination function essential to the safety and soundness of the insurance fund, information on examination results remained with RISDIC staff and was not generally reviewed by the board. However, the results were sent to the DBR.

resulted in a 40 percent increase, in real dollars, from 1980 to 1989.

While the Rhode Island Attorney General, federal banking regulators, and others privately counseled Rhode Island government officials on the perils of RISDIC as early as 1985 and 1986, the inherent vulnerability of the small insurance fund came to the fore as a result of a series of events starting at the beginning of 1990. In February, the DBR ordered that remedial action be taken to correct the unsound funding of fraudulent leases at Jefferson Loan and Investment Company that RISDIC examiners had observed developing over the course of two years. Jefferson failed in July 1990 at considerable cost to RISDIC and was reconstituted as Banner Loan and Investment Company, a subsidiary of RISDIC-insured Marquette Credit Union. That same month, RISDIC began an examination of Heritage Loan and Investment Company. By October, after DBR became involved in the examination, it was apparent that as a result of widespread fraud and embezzlement, Heritage was insolvent. RISDIC took control of Heritage and injected $17.5 million of insurance fund money into the institution. As the investigation of Heritage's problems intensified, its chairman fled the state and depositors began a run that RISDIC did not have the resources to meet, resulting in Heritage's closure.

The losses from both Heritage Loan and Investment Company and Jefferson Loan and Investment Company drained liquid assets at the insurance fund, requiring RISDIC to assess members for additional premium payments to repay Heritage depositors and restore the insurance fund. Despite the additional assessment, depositors remained concerned about the viability of the insurance fund. Large depositor withdrawals occurred at several RISDIC-insured institutions. By December 31, 1990, Rhode Island Central Credit Union had exhausted its lines of credit and Rhode Island Credit Union League (RICUL),[3] a provider of liquidity for credit unions, was unwilling to provide further funds to the troubled, privately insured credit unions. Not having the resources to satisfy depositor demand for withdrawal, the RISDIC board of directors requested a state-appointed conservator for the insurance fund.

With RISDIC in receivership, the governor of Rhode Island announced that all 45 RISDIC-insured institutions would be closed on January 1, 1991. During 1991, 33 of the institutions either reopened with federal insurance, paid off their depositors, or became inactive. The remaining 12 institutions, including most of the largest, remained closed with depositor funds frozen throughout 1991. In February, legislation created the Depositors Economic Protection Corporation (DEPCO) to attend to the resolution of the closed institutions. Constitutional and legal questions concerning the creation of DEPCO delayed state action to take control of the failed institutions and provide partial restitution to depositors. Buoyed by favorable court rulings, DBR placed most of the remaining troubled depository institutions into receivership, and DEPCO issued revenue bonds to finance payouts to depositors.

Table 1
Resolution of RISDIC-Insured Institutions, March 1993

Status	Number of Institutions
Reopened in 1991 as independent companies with federal insurance	25
Nondepository institutions that became inactive	2
Repaid depositors in 1991	6
Acquired by Coventry Credit Union in 1991	1
Acquired by Northeast Savings in 1992	4
Acquired by First Bank and Trust in 1992	1
Never reopened, with partial payouts to depositors still required	6

Source: Monitoring Department, Federal Reserve Bank of Boston.

The first payments (other than emergency withdrawals) to depositors of some of the closed institutions began in June 1991, six months after the closure of the institutions. Partial payouts to depositors are still continuing, financed in part by DEPCO bonds and by the sale of assets of the closed institutions.

Table 1 describes the current status of the RISDIC-insured members as of March 1993. Twenty-five of the 45 institutions initially closed had reopened with federal insurance, six had repaid depositors and been liquidated, two were nondepository institutions that had become inactive, five had been acquired by other financial institutions with financial assistance from DEPCO and one without, and six never reopened, with further payouts required as of March 1993.

[3] RICUL is the main outside source of liquidity for federal and state-chartered credit unions in Rhode Island. RICUL extends lines of credit to member credit unions and provides other services such as check clearing. If RICUL did not have sufficient funds to honor all of its lines of credit, it had access to credit through the Central Liquidity Facility, which serves as the central bank and lender of last resort for credit unions.

II. Why Did RISDIC Fail?

From its very creation, RISDIC was susceptible to failure caused by exposure at its insured institutions. While the insurer appeared stable for almost two decades, several of its members were sufficiently large and weak to have caused its failure during that period. That RISDIC did not fail earlier was attributable to its political clout and its ability to mask severe financial difficulties within its underlying membership. While the triggering events for the RISDIC crisis were the closure of Jefferson and Heritage, the failure of the privately insured deposit system can be attributed to the design and management of the insurance and regulatory systems. This section highlights the deficiencies that made RISDIC prone to failure: the high concentration of risks for both the insurer and the insured, the insurer serving as an instrument of the insured, and inadequate regulatory and supervisory oversight.

From its very creation, RISDIC was susceptible to failure caused by exposure at its insured institutions.

Concentration of Risks

A major role of insurance is to spread the cost of a member's recovery from financial loss across a diverse membership whose losses are not all expected to occur at the same time. In this way an event that would pose a grave risk to any one member can be ameliorated with insurance, so that no single event devastates any of the insured. This basic premise of insurance was violated by RISDIC.

RISDIC was chartered to insure member financial institutions solely in the state of Rhode Island. However, the state is particularly ill-suited for this type of private insurance. It has a population of only 1 million, less than many cities in the United States, in an area of a little over 1,000 square miles. With a highly urbanized population and a concentration of manufacturing industries, few possibilities of achieving a diverse insurance pool are available.

Commercial insurers with undue exposure to a particular type of risk frequently limit exposure through reinsurance. This enables an insurer to shift risk too large for it to absorb, by reselling some of the exposure to other insurers. RISDIC had reinsurance until 1981, but it was discontinued when the policy was no longer sold by its private insurance company. It is unclear how actively RISDIC sought other reinsurance (though other private insurers did have reinsurance), but it certainly would have benefited from the reduced exposure.

Given the lack of diversification and the absence of reinsurance, it was important for RISDIC to reserve appropriately for exposure to problems at individual institutions.[4] Table 2 illustrates just how far RISDIC strayed from the principle of maintaining a large reserve relative to the potential risks from the failure of any one member. The insurance pool, which totaled $25 million in 1990, was inadequate to cover major losses at any of the 10 largest members of RISDIC. For Marquette, the largest member of RISDIC, losses equivalent to a payout of as little as 8 percent of total deposits would have been sufficient to exhaust the RISDIC fund. It should be noted that the RISDIC failure was triggered by the failures of Jefferson and Heritage, institutions with combined assets of only $39 million at the end of 1989, substantially less than those of any of the 10 largest RISDIC-insured institutions.

If an insurer has a large potential exposure to loss, it can spread risk by enrolling new insureds with low claim-making probabilities, or it can variably price its insurance coverage, substantially raising premiums for members with characteristics that increase the probability of making a claim. For example, some health insurers deny insurance to individuals with pre-existing health problems and deny coverage or charge higher premiums to individuals who smoke. RISDIC, however, behaved perversely for an insurance fund, encouraging membership by institutions that posed high risks to the fund and allowing riskier behavior without requiring higher premiums.

Start-up institutions with low capital, such as Pierbank and Heritage, received RISDIC insurance after failing to qualify for federal insurance. Greater Providence Deposit and Jefferson also sought RISDIC insurance as the insurer of last resort, as their finan-

[4] Appropriate reserving alone, however, could not have prevented the RISDIC failure, given the sizable risks and the limited funding sources available to RISDIC. Thus, even with more appropriate reserves, RISDIC was viable only if greater restrictions were placed on lending by member institutions.

Table 2
RISDIC Fund Exposure to the 10 Largest RISDIC-Insured Institutions, December 1989

RISDIC Member	Assets ($ Millions)	Deposits ($ Millions)	Deposit Payout Sufficient to Exhaust RISDIC Fund[a] (Percent)
1. Marquette Credit Union	344	311	8
2. Rhode Island Central Credit Union	262	231	11
3. Greater Providence Deposit Corporation	226	206	12
4. Davisville Credit Union	157	141	18
5. Pawtucket Credit Union	135	105	24
6. East Providence Credit Union	115	107	23
7. Rhode Island State Employee Credit Union	111	102	25
8. Union Deposit Loan and Investment Bank	111	100	25
9. Columbian Credit Union	91	85	29
10. Westerly Community Credit Union	68	59	42

[a]Based on $25 million fund in 1990.
Source: Rhode Island Department of Business Regulation, *Eighty-Third Annual Report of the Division of Banking*, 1990.

Table 3
Asset Categories of Depository Institutions, as of September 30, 1990 Statement of Condition

Institutions	Real Estate Loans as a Percent of Total Assets	Installment Loans as a Percent of Total Assets	Other Real Estate Owned (OREO) as a Percent of Total Assets
Ten Largest RISDIC-Insured	59.7	9.2	3.0
New England Commercial Banks FDIC-Insured	29.0	6.2	1.5
U.S. Credit Unions NCUA-Insured	21.9	42.0	.1

Source: Rhode Island Department of Business Regulation, Federal Reserve Board, National Credit Union Administration.

cial position would not qualify them for federal insurance. Despite their problems, these higher-risk companies paid no higher premiums than less risky institutions in the RISDIC pool.

RISDIC's limited ability, or proclivity, to garner sufficient loss reserves and thereby counteract insurance risk concentrations warranted the minimalization of risk by influencing the investment exposure of the insured institutions. Table 3 highlights the failure of RISDIC to control high-risk investment strategies of its members. The largest RISDIC-insured institutions were much more concentrated in real estate lending than were federally insured credit unions or commercial banks.[5]

While the real estate loans are not broken out in their call reports, internal documents indicated that a majority of the real estate loans held by the largest RISDIC-insured institutions were in categories generally considered risky (real estate loans other than one- to four-family residential mortgages). The risk is reflected in the percentage of loans transferred to other real estate owned (OREO) status, which represents foreclosed property. As of September 30, 1990, the largest RISDIC-insured institutions had 3 percent of their assets in OREO, compared to 1.5 percent for FDIC-insured commercial banks and only 0.1 percent for NCUA-insured credit unions. Allowing high concentrations in risky assets can be assumed to have been a conscious decision by RISDIC, since many types of loans held by RISDIC institutions were prohibited or limited by federal insurers of credit unions. RISDIC regulations were silent or less stringent than federal provisions about limits on lending to insiders and individual borrowers, for business

[5] While savings and loans and savings banks often have high levels of real estate lending relative to total loans, they are usually concentrated in one- to four-family mortgages.

Table 4
CAMEL Rating and Financial Status of the 10 Largest RISDIC-Insured Institutions, 1989–90

RISDIC Member	CAMEL Rating	Classified Assets as a Percent of Total Assets	Classified Assets as a Percent of Total Capital[a]
1. Marquette Credit Union	2	9.7	128.7
2. Rhode Island Central Credit Union	2	12.1	131.9
3. Greater Providence Deposit Corporation	4[b]	4.2	99.9
4. Davisville Credit Union	4	11.8	150.3
5. Pawtucket Credit Union	1[b]	n.a.	n.a.
6. East Providence Credit Union	2	3.4	58.8
7. Rhode Island State Employee Credit Union	2[b]	n.a.	n.a.
8. Union Deposit Loan and Investment Bank	1	1.9	16.6
9. Columbian Credit Union	3	8.5	130.0
10. Westerly Community Credit Union	1	n.a.	n.a.

[a]Capital includes loan loss reserve, equity, undivided earnings, and the funds held in RISDIC.
[b]Exam 1988.
n.a. = not available (institutions still in operation in 1993).
Source: CAMEL ratings taken from Vartan Gregorian, 1991, *Carved in Sand*, Report of Rhode Island Governor's Commission on the RISDIC Failure, March 14, Appendix 23. All ratings are for 1989–1990 unless otherwise noted. Classified ratios taken from Call Reports–9/30/90.

purposes and by type of credit. The RISDIC-insured institutions were heavily exposed to commercial real estate construction and land development projects, which contributed significantly to their ineligibility for federal insurance and ultimately to their failure.

Insurer Controlled by the Insured

A private insurer employs incentives to prevent the insured from engaging in particularly risky behavior. For example, life insurance frequently does not cover accidents resulting from parachuting, and homeowners policies often limit coverage of jewelry located in the home. RISDIC behaved quite differently, however, allowing or assuming risks greater than those assumed by other industry insurers. Allowing risky investments prohibited or curtailed by federal regulations, insuring deposits in excess of the federal limits, limiting the requirement for independent examinations, and paying large dividends on the insurance fund rather than increasing the insurance pool all benefited the insured institutions at the expense of the insurance fund.

This countenance of increased risk by the insurer to the benefit of the insureds' operating profitability can be tied to the structure of RISDIC. The board of directors consisted of 15 representatives of member institutions and could, but was not required to, include up to three outside directors. The inside members included representatives from most of the largest and most troubled institutions. Table 4 provides both the CAMEL rating (an examiner evaluation of banks, with 1 representing the strongest institution and 5 representing the weakest)[6] by the DBR, as reported in *Carved in Sand*, and classified asset ratios[7] for the 10 largest members of RISDIC. The four of these institutions with classified assets that exceeded 100 percent of capital (Davisville, Marquette, Rhode Island Central, and Columbian) were all represented on the board of directors of RISDIC.

An independent bank insurance system should properly manage and price risk, acting in a manner that assures the solvency of the insurance fund and the safety of customer deposits. This principle was clearly violated by RISDIC, which served as an advocate for many of its member institutions. Of the 15

[6] Banks are rated by examiners according to the condition of the capital adequacy, asset quality, management quality, earnings potential, and liquidity of the institution (CAMEL). One is the highest rating, indicating a strong, performing bank with no need for supervisory concern. Two indicates a stable and safe bank that can withstand a downturn in the economy. Three indicates a bank with a remote probability of failure that is nonetheless experiencing some difficulties. Four indicates a bank with potential for failure whose current performance could impair viability. Five indicates a bank with high probability of failure and critically deficient performance. Ratings can vary by regulator and in fact many of the institutions rated 2 by DBR were unable to qualify for federal insurance.

Table 5
Structure of Insurer

	National Credit Union Administration	Rhode Island Share and Deposit Indemnity Corporation
Board Composition	3 appointed government officials	18 members (3 outside members and 15 CEOs of member institutions)
Audits	Inspector General Semiannual reports to Congress	Outside auditor Department of Business Regulation
Reserve	Deposit 1 percent of insured shares	Deposit 1 percent of insured shares
Premium	One-twelfth of 1 percent of insured shares	One-twelfth of 1 percent of insured shares
Coverage	Maximum $100,000	Unlimited with RISDIC Board approval

RISDIC members of the Board of Directors as of April 1990, eight were representatives from institutions that failed to get federal insurance and represented over 60 percent of RISDIC-insured deposits. RISDIC's operational decisions were made by a five-member executive committee. Included on this committee were representatives of three of the more troubled institutions: the chairman of Heritage, who later fled the state; the chairman of Rhode Island Central Credit Union, the first company to become illiquid as a result of deposit withdrawals during the banking crisis; and the Chairman of Providence Teachers, which also failed to obtain federal insurance.

Having the management of troubled institutions in a position to influence the operation of the insurance and supervisory functions compromised the efficacy of the RISDIC insurance system, and meant that the interests of the insurer and of the depositors were not assured of receiving appropriate consideration. The closed circle of RISDIC officials, both elected and appointed, were beholden to the leaders of the troubled credit unions. The absence of an effective external audit and oversight process facilitated the continued operation of the insurance fund and its weak members. Over long periods during the 1970s and 1980s, RISDIC provided extended and undisclosed assistance to a large troubled institution, Marquette Credit Union, which because of its size was critical to the survival of RISDIC. The resolution of any one of the large, troubled insured institutions could have rendered the insurance fund insolvent, thereby subjecting all the weakened institutions to possible closure, as many would not have qualified for federal insurance.

Regulatory Design

Table 5 compares the structure and insurance provisions of RISDIC with those of the National Credit Union Administration (NCUA), the federal insurer of credit unions. While the two insurers have several similarities, they also have critical differences, the most significant being the degree of oversight of the two insurance funds. The NCUA board members are appointed government officials, while RISDIC's board was large, and often dominated by troubled member institutions. While the NCUA had an internal inspector general, RISDIC relied on external audits by private auditors and the DBR. Although RISDIC had a external auditor, it switched accounting firms after the original auditor qualified its opinion, citing concerns with the potential losses should one of the larger member institutions fail.[8] This ability to replace the company that had expressed reservations about the insurance fund helped RISDIC keep problems from members' depositors and the DBR.

[7] Loans are classified by bank management and examiners based upon the probability of the bank incurring losses. Classifications range from substandard loans (which pose some exposure to loss if conditions are not corrected) to doubtful (where collection or liquidation of the full balance is improbable) to loss (where the loans are considered uncollectible and should be charged off as loan losses).

[8] The risks of a large failure were particularly acute because of the financial condition of Marquette Credit Union. Throughout the 1980s, RISDIC was providing assistance to Marquette. Because of its size, Marquette's survival was critical to the survival of RISDIC.

Institutions insured by RISDIC and NCUA were similarly required to maintain a deposit of 1 percent of insured shares and pay insurance premiums of one-twelfth of 1 percent of the value of insured shares. However, RISDIC often paid dividends to its member institutions of up to 50 percent of the insurance premium, while NCUA has never paid any dividends to its insured members. In addition, while NCUA limited its coverage to $100,000 per account, it was possible for RISDIC members to receive unlimited insurance coverage.

The governing and insurance structure of RISDIC exposed it to a somewhat greater insurance risk than that experienced by the NCUA. The RISDIC insurance fund was, however, far more exposed as a result of the risky lending opportunities allowed by RISDIC regulations, which made many of its institutions unable to qualify for NCUA insurance. RISDIC regulations were silent regarding appraisal standards and several other risk control measures critical to the safety and soundness of its members. They did not address loan limits with respect to insider relationships, concentrations by type of loan or to related borrowers, or collateral value limits, all areas that contributed to the failures of the members.

The riskier lending activities of the RISDIC-insured institutions and the substantial concentration of risk to which RISDIC itself was exposed demanded substantially better capitalization for RISDIC than was needed for the NCUA. The failure of RISDIC to appreciate the relationship between reserves and the proper management of insurance risk resulted in a significantly underreserved insurance fund.

In addition to insuring financial institutions, RISDIC also served as a bank supervisor and examined its member institutions. However, with most of the troubled institutions represented on the board of directors, RISDIC examiners had little incentive to aggressively pursue problem institutions. While the CAMEL acronym used for rating institutions was the same as for other federal regulators, the actual implementation was quite different. Despite having classified assets in excess of capital, both Marquette and Rhode Island Central had a CAMEL rating of 2, which should designate an institution that poses relatively little risk of failure.

Table 4 has provided the CAMEL rating of the 10 largest RISDIC-insured institutions and their levels of classified assets. Only three institutions had ratios of classified assets to capital low enough to qualify for federal insurance. For many of the other institutions, the CAMEL ratings provided little indication of the degree of their problems and their inability to qualify for federal insurance. A CAMEL rating of 2 usually designates fundamentally sound institutions that are stable and able to withstand normal business cycle fluctuations. Not only are 2-rated institutions considered to be in satisfactory condition, regulators consider 3-rated companies to have only a remote possibility of failure. Nevertheless, of the four 2-rated institutions listed in Table 4, only Rhode Island State Employees' Credit Union qualified for federal insurance; the other three did not. To give an example, Marquette's management was rated satisfactory or strong from 1986 until its failure, despite serious problems with Marquette's loan portfolio and the heavy, but undisclosed, RISDIC involvement in the operations of the credit union.

Even allowing for the poor state of the economy, the ultimate inability of these institutions to qualify for federal insurance indicates that the RISDIC and DBR examination process was unable to distinguish the extent of the underlying financial weakness of these institutions. This ineffectual examination function resulted from the absence of the necessary supervisory "clout," as demonstrated by a lack of appropriate support and follow-through on examiner concerns, inadequate budget resources, underpaid and inadequately trained staff, and the presence of conflicts of interest resulting in the management of insured companies unduly influencing the examination process.

III. RISDIC's Impact on Private Insurance and Government Policy

The RISDIC crisis had a major impact on private insurers of credit unions, many of whom were financially much healthier than RISDIC, as is shown in Table 6. In 1985, 13 private insurers provided insurance for 3,100 credit unions with $18 billion in deposits. In addition, private insurance funds operated in Massachusetts for 196 state chartered savings and cooperative banks with over $16 billion in deposits.[9] By early 1993, private insurers provided primary deposit insurance for only 536 credit union member

[9] "Excess insurance" programs offered in Massachusetts by private deposit insurers have effectively protected depositors of failed savings and cooperative banks from incurring losses. The insurance risk covered by these insurance funds is far less than that of primary deposit insurers, and the supervision of these insured institutions is the responsibility of independent federal and state supervisors, not the insurers.

Table 6
Private Credit Union Insurers

	6/30/85	6/30/90	1993
Number of insurers continuing in operation	13	10	4
Number of insurers dissolving the fund or terminating primary deposit insurance	0	0	3
Number of privately insured member institutions	3,100	1,484	536
Value of deposits (billions)	$ 18.0	$ 20.8[a]	$ 7.5

[a]Assets rather than deposits were used.
Sources: Phone contacts with private insurers by Monitoring Department, Federal Reserve Bank of Boston.

institutions representing $7.5 billion in deposits, and many of these were in the process of converting to federal insurance.

Of the nine private insurers other than RISDIC operating when the Rhode Island crisis developed, five had members convert to federal insurance after the failure of RISDIC. The orderly resolution of many of these private insurers would indicate that they were financially much stronger than RISDIC. Despite the healthier financial position of many of these insurers, the movement away from private insurance is not surprising given the significant costs of the RISDIC failure. The movement away from small, localized insurance funds reflects the increasingly held belief that the dominant issues of risk dispersion and reserve adequacy can best be dealt with by a move to a national insurance system that has access to government support at times of systemic weakness.

The effect on Rhode Island of the loss of depositor access to frozen accounts for up to 18 months also was damaging. Consumers and businesses could not pay bills or purchase needed goods and services. This resulted in increased layoffs during what would have been difficult economic times even without the RISDIC crisis. In addition, Rhode Island taxpayers are left to cover the high financial cost of unwinding a collapsed insurance system.

Table 7 documents the costs to state taxpayers. DEPCO had $659 million ($680 million less $21 million other liabilities) in bondholder and depositor claims outstanding as of January 31, 1993, with maturities extending out nearly 30 years. Loans and foreclosed properties with a loan value of $395 million have been assumed by DEPCO from the failed institutions. These assets have a projected recovery value of only $225 million, a 44 percent discount that reflects the poor quality of the loans made by the RISDIC-insured financial institutions. A substantial amount of the $45 million due from the receivers of the closed credit unions represents the estimated recovery value of environmentally tainted properties on which RISDIC-insured companies had extended credit. Should DEPCO in fact receive $270 million for these properties and apply the proceeds entirely against depositor and bondholder claims, $389 million ($659 million less $270 million) in indebtedness would still remain.

The remaining DEPCO funds will be consumed in the disposition of troubled assets, the covering of

Table 7
Statement of Condition,[a] Depositors Economic Protection Corporation, January 31, 1993
(000)

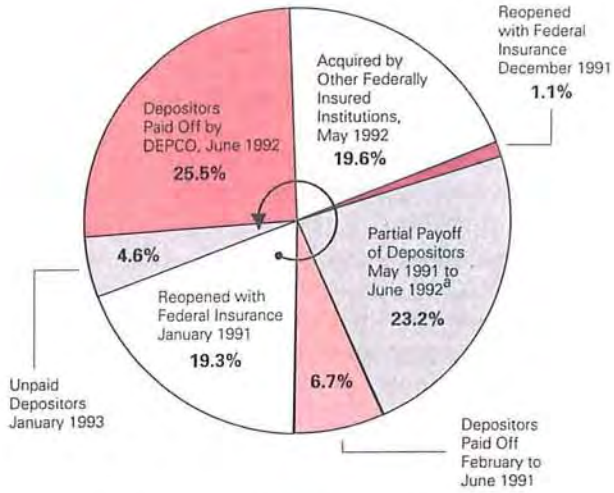
Loans and other real estate (net of reserve of $169,934)	$225,479	General obligation bonds	$ 511,753
Due from receiverships[b]	45,293	U.S. Treasury loan	74,299
Financing escrows, reserve and deferred finance costs	100,962	Guaranteed deposits	54,949
Other assets	45,810	Accrued interest payable	18,052
		Other liabilities	21,003
		Total indebtedness and other liabilities	$ 680,056
		Negative equity	(262,509)
Total Assets	$417,544	Total Liabilities and Equity	$ 417,547

[a]Column totals are not equal because of rounding.
[b]Primarily environmentally tainted properties.
Source: DEPCO unaudited balance sheet.

Figure 1

Rhode Island Banking Crisis
The Return of the Depositors' Money

Percent of Deposits Frozen on January 1, 1991



[a]Emergency withdrawals, and partial paybacks from institutions resolved in May and June 1992.
Source: R.I. Banking Department, *Providence Journal*.

any remaining exposure on loans sold to other financial institutions, and the financing of DEPCO indebtedness, as well as operating and litigation costs that could continue for several years. While court judgments and other settlements could reduce the ultimate cost of cleaning up after the RISDIC crisis, Rhode Island taxpayers will be paying the interest and principal on DEPCO's indebtedness for many years to come.

Figure 1 details the outcome of the deposits frozen at the outset of the RISDIC crisis. In the first month only 19.3 percent of the deposits became available from institutions reopening after qualifying for federal insurance. The bulk of the deposits were in larger institutions that were unable to obtain federal insurance because of their poor financial condition. While depositors could petition for emergency withdrawals, many of the deposits remained frozen until the failed institutions were sold or until DEPCO was able to make payouts. As of January 1993, only 4.6 percent of the deposits remained unpaid. Nonetheless, many businesses and individuals were seriously disrupted by having their deposits frozen for such an extended period.

IV. Conclusion

While private insurance schemes in Ohio and Maryland as well as Rhode Island were not successful, RISDIC assumed risks that made it particularly vulnerable. The insurer covered institutions in a small geographic area and troubled institutions that were substantially larger than its entire insurance pool. Insured institutions were allowed to take unusually risky positions in real estate development activities. Such an unstable situation was allowed to continue by the insurance fund's governing members, many of whom had incentives to remain unfettered by their insurer. While the regulatory structure loosely resembled that of the NCUA, the industry-controlled insurer provided little regulatory oversight and many member institutions were uninsurable under federal guidelines because of their concentrations of risk and their weak financial condition.

The conditions contributing to the RISDIC crisis highlight four ingredients necessary for a safe and sound deposit insurance system: the maintenance of a proper degree of risk aversion by the insured depository institutions; the presence of an effective, prospective-looking, independent supervisory function; the required public disclosure of material financial weaknesses and operating irregularities; and an appropriately reserved insurance fund.

Lessons from New England Bank Failures

Richard E. Randall

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New England had until recently experienced few bank failures, only nine from the end of World War II through 1988. The situation has changed dramatically since then, as three banks insured by the Bank Insurance Fund failed in 1989, nine in 1990, 46 in 1991, and 31 in 1992.[1] Additional banks were heavily damaged, although a number of these have made a significant recovery. The failures include commercial and savings banks, Massachusetts cooperative banks (essentially savings banks), and federal savings banks. In addition, some savings and loans and credit unions, including some privately insured institutions in Rhode Island, failed in the 1989–92 period.

The true dimensions of the damage sustained by New England banks are distorted somewhat by focusing on the number of failed banks. Many of these banks were newly chartered in the 1984–89 period and were still relatively small, despite rapid growth. Other failures, however, involved institutions of great importance to the region. Most prominent was Bank of New England Corporation, with total assets in 1988 of more than $32 billion. The almost simultaneous failure of five of the seven largest banking institutions in New Hampshire damaged that state's economy severely. Failures of large and mid-size savings banks in Connecticut, Maine, and Massachusetts affected numerous customers. In Connecticut, Bridgeport's distressed economy, which forced the city into bankruptcy, was weakened further by large bank failures. The estimated cost to the Bank Insurance Fund (BIF) of handling New England bank failures is in the vicinity of $6.6 billion.

Thus, the rapid deterioration in the condition of New England banks during the late 1980s is a significant event in the history of the U.S. banking system, and the lessons from this episode should play a role when considering steps to protect the banking system from future shocks. One purpose of this study was to determine the causes of the New England bank failures and the sequence and manner in which various indicators of bank condition reflected growing problems. An-

Table 1
Asset Size and FDIC Estimate of the Cost of Resolving Failed New England Banks, 1989 to 1992

Group	Number of Banks	Size of Bank at Time of Failure[a]		FDIC Estimate of Cost[b]		
		Assets ($ millions)	Percent of Total Assets of Failed Banks	Cost ($ millions)	Percent of Total Cost	Cost as Percent of Bank Assets
Mature Commercial Banks	23	27,511	56.1	2,414	36.6	8.8[c]
Mature Savings Institutions Other than New or Converted	22	11,137	22.7	2,067	31.4	18.6
Mutual to Stock Conversions (1984 on)	17	8,452	17.2	1,551	23.5	18.4
New Commercial and Savings Banks (1984 on)	25	1,946	4.0	556	8.4	28.6
All Banks in Study	87	49,046	100.0	6,588	100.0	13.4

[a]Taken from final call report before failure.
[b]Cost to the Bank Insurance Fund, as estimated by the FDIC. These estimates are reportedly proving to be valid for groups of banks, if not for individual failed banks. See Brown and Epstein (1992) for a description of the methodology employed in the estimates.
[c]The estimated cost of resolving the three subsidiary banks of Bank of New England included here is only 5.0 percent of assets. The cost for all others in this group is 22.9 percent of assets.

other purpose was to place the New England experience in the context of other recent boom and bust banking cycles. It is hoped that the analysis of these cycles will provide insights as to how the calamities might have been mitigated, and offer lessons that will help supervisors forestall future large-scale bank credit problems.

The study covered 87 New England banks that failed in the 1989 to 1992 period, and involved individual analysis of the nature and timing of their developing risk exposures, the deterioration in their financial performance, and their eventual failure.[2] Most events are dated relative to the quarter when emerging loan problems should have been evident because nonperforming assets reached an abnormal level, referred to here as the nonperforming assets threshold.

The banks were divided into three groups as shown in Table 1: mature commercial banks, mature savings institutions, and recently chartered banks. An exceptionally large number of new banks were chartered in 1984 or later—89 banks, including 41 in Connecticut. Most grew rapidly, but 28 percent of these banks failed when the local economy weakened and the commercial real estate market collapsed. During the same period, 98 savings institutions converted from mutual to stock form, resulting in large influxes of often redundant equity capital. Most of these banks took advantage of the real estate boom to grow into their capital by acquiring risky assets and 17 failed as a result, including three in the $900 million to $2.4 billion asset range.

The study includes an analysis of commercial real estate loan concentrations in all BIF-insured banks in New England and of the degree to which banks that did not fail also developed serious problems as a result.

I. Summary of the Findings of the Study

Commercial real estate loans were the dominant factor in recent New England bank failures. The evidence shows this clearly. Of the 62 banks in existence before 1984 that failed from 1989 to 1992, commercial real estate loans were the dominant factor

[1] In 1989 Congress reorganized the deposit insurance structure, renaming the Federal Deposit Insurance Corporation (FDIC) fund the Bank Insurance Fund, and placing under FDIC administration a second fund, the Savings Association Insurance Fund, to cover thrift deposits.

[2] Appendix A describes the methodology of the study, and Appendix B presents selected details on each of the failed banks. Bank failures include any banks taken over by the FDIC or acquired by others with FDIC assistance.

in 58 failures, shared the blame in two, and were a non-critical factor in only two. In addition, real estate lending was a major if not dominant factor in 19 of the 25 failures of new banks.

Indirect evidence shows that the real estate loan problems in New England during this period were based almost entirely on construction and development lending and the resulting damage to the economics of existing commercial properties.[3] The sustained period of rapid growth in commercial real estate lending by both failed and surviving banks helped to create the excess capacity that eventually resulted in a major correction in property values. Those banks most exposed have either failed or sustained heavy damage. Commercial real estate loans exceeded 30 percent of assets in 47 of the 62 established banks in the study, and exceeded 20 percent in all but four. Such concentrations exceeded 50 percent of assets in eight banks. Prior to 1984, commercial real estate loans seldom exceeded 20 percent of assets.

A comparison of failed and surviving banks shows that high concentrations of commercial real estate loans led to either failure or poor supervisory ratings in all but a few cases. Most of the exceptions involved banks with a long-standing practice of lending on existing commercial structures rather than construction.

Progression of Credit Problems

The level of nonperforming assets used in this study as the threshold of the problem recognition phase, 1 percent of assets in most cases, was selected to be above the normal range for this ratio in each bank. It was not, however, a particularly high level for nonperforming assets in New England banks at the end of the decade and is well below the norm in the current environment. The banks in this study experienced a steady increase beyond 1 percent in the nonperforming ratio over the next year or two after reaching that threshold.

Significant provisions to reserves, at least those related to the particular loan type that caused the bank to fail, generally did not precede the jump in nonperforming assets to the threshold level. Relatively high but irregular provisions to reserves and write-offs of loans, beginning about the time banks reached the 1 percent threshold, had the net effect of increasing reserves. These increases were, however, generally less than the increase in nonperforming loans, and the foreclosed property component of nonperforming assets, after netting any reserves, also increased rapidly.

The increased provisions to reserves quickly hurt banks' net income, resulting in losses in some quarters.[4] The income lost as loans became nonperforming, together with the high costs of administering such loans, turned operating income negative, resulting in steady losses. (As used here, operating income is net income before loan loss provisions, taxes, and extraordinary items.) Capital ratios began to erode, despite loan shrinkage in most banks. But the decline in capital below acceptable levels came quite late, and it was only a landmark on the path to insolvency. Use of an adjusted capital-to-assets ratio, which nets out nonperforming assets from equity capital while including loan loss reserves, indicates negative capital about a year earlier than the conventional leverage ratio measure (less than a year earlier for the new banks).

Response of the Banks

When nonperforming loans began to exceed normal levels, most banks had already ceased making commercial real estate loans and commercial and industrial loans or, if not, they pulled back at the first sign of credit problems. Allowing a quarter or two for loans in process to clear the pipeline, few banks continued to expand loans after credit problems began to appear, and most of these were relatively small, new banks. Available evidence suggests that most decisions to discontinue lending were initiated by bank management rather than the supervisory authorities.

Lessons from the New England experience should play a role when considering steps to protect the banking system from future shocks.

[3] See Appendix C, "Evidence on the Relative Contributions of Commercial and Residential Real Estate to New England Bank Credit Problems."

[4] Net income of banks is reduced by provisions to the reserve for bad debts, rather than by the actual loan losses.

Substantially all of the loans that caused the failures of the 87 banks in the study were on the books before the credit problems began to appear. No evidence was found of efforts to "grow out" of lending problems, as was the case with some savings and loan institutions during the mid 1980s. To the contrary, the evidence suggests that New England bankers generally adopted conservative postures upon recognizing the emerging problem. It seems safe to conclude that few bankers faced with potential failure took "second gambles" to try to recoup their losses.

Timing of Supervisory Actions

Supervisory ratings show that the regulatory authorities did not downgrade these banks based on their large concentrations of commercial real estate loans. Supervisors began to react to the emerging credit problems at the time, or shortly after, nonperforming loans reached the relatively low thresholds used in this study. The seriousness of the problems became apparent to supervisors only gradually, however, in part because examinations of some banks focussed more on policies than on detailed review of credit quality and lending terms. There were numerous instances of two- or three-step drops in bank ratings, and infrequent examinations appear to have contributed to this to some extent. New banks often received less frequent examinations than established banks.

Based on Federal Deposit Insurance Corporation (FDIC) estimates, losses to the BIF for most failed banks will substantially exceed the total of nonperforming assets and the deficit in gross equity capital (which includes loan loss reserves) reported in the final report of condition before failure. This result is of interest because a presumption has been widespread among supervisors and others that only a fraction of nonperforming assets will eventually become losses. Banks failed to reflect their growing risk concentrations in loan loss reserves, and most were soon significantly underreserved relative to likely credit losses implied by rapidly escalating nonperforming loans.

The New England experience was typical of other recent banking problems in that risk concentrations developed over several years, but serious credit problems did not emerge until economic factors transformed a euphoric boom into a period of major adjustment. Banks did not show gradual, reversible deterioration, but were committed to substantial losses by the time problems became recognizable. The evidence shows that in most cases bank managements reacted appropriately during the problem recognition stage. It also shows that supervisors were aware of the emerging problems and reacting to them well before capital ratios became weak, but their actions came too late to prevent the failures.

Limitations on the Study

The story of the New England banking crisis has many important and fascinating aspects. This article focuses on the way in which the commercial real estate cycle contributed to bank failures, but it does not explore the economic factors underlying the real estate boom and bust. The reader should be aware, however, that the real estate boom occurred in the context of a seemingly very prosperous regional economy. The article does not weigh the importance of the 1981 liberalization of tax laws regarding real estate or the tightening of these same laws in 1986, although both changes were important to the New England story. It does not explore the role of life insurance companies and other nonbank lenders in financing commercial real estate.

The article touches only briefly on the issues of fraud and insider abuse, and the events surrounding speculative investment in bank stocks by some savings banks, even though these factors contributed to the magnitude of the banking problems. It also does not attempt to evaluate several important aspects of bank lending practices, including more liberal appraisal standards, looser loan terms, diminished use of take-out commitments by permanent lenders, and lending to realty subsidiaries on the financial strength of developers who do not guarantee the loans.

II. Detailed Findings Related to Mature Commercial Banks

Nearly all of the 23 mature commercial banks that failed displayed a typical pattern of risk concentration, problem recognition, and deterioration in earnings and capital, with only relatively minor variations.

Causes of Failure

Data on nonperforming assets from the failed banks' final call reports and data on cumulative loan losses provide significant insights into the sources of

Table 2

Causes of Bank Failure: The Sum of Nonperforming Assets and Three Years of Cumulative Loan Losses, for the Real Estate and Commercial and Industrial Loan Categories, as a Percentage of Total Assets at the Time of Bank Failure

Number of Banks

Nonperforming Assets plus Cumulative Loan Losses as Percent of Total Assets	Mature Commercial Banks		Mature Savings Banks: Other than Recent Conversions		Mature Savings Banks: Recent Conversions		New Banks		All Failed Banks	
	RE	C&I	RE	C&I	RE	C&I	RE	C&I	RE	C&I
30 or more	1		3		4				8	
25–29.9	3		1		1		2	2	7	2
20–24.9	4		7		5		1		17	
15–19.9	4		7		4		4	4	19	4
10–14.9	6	1	4		3		6	8	19	9
5–9.9	3	8		2		3	7	4	10	17
0–4.9	2	14		20		14	5	7	7	55
Totals	23	23	22	22	17	17	25	25	87	87

Note: These data on nonperforming assets (from the failed banks' final call reports) and data on three years of cumulative loan losses provide significant insights into the sources of bank losses. Real estate loans, essentially commercial real estate loans, were the dominant cause of failure in 19 of the 23 mature commercial banks, and shared that role with commercial and industrial (C&I) loans in two other cases. Problems in real estate loans, again largely commercial real estate loans, were sufficient to cause the failure in all 39 mature and converted savings banks. Real estate loans were the dominant cause of failure in nine of the new banks, C&I loans in six others, and a combination of the two in the remaining 10. Fraud apparently contributed significantly to loan losses in four of these new banks.

losses (Table 2). Comparing the real estate loan category with the commercial and industrial loan category in terms of the combination of nonperforming assets (including foreclosed property) and cumulative net loan losses for three years prior to failure strongly suggests that real estate loans, essentially commercial real estate loans, were the dominant cause of failure in 19 of the 23 banks.[5] In two other cases, real estate loans shared that role with commercial and industrial loans. Only in two cases were commercial and industrial loans or still another loan category more influential.[6] In all but one case, the magnitude of likely loan losses in real estate and commercial and industrial loans, together with the related loss of interest income associated with nonperforming loans, clearly was sufficient to have caused the failures. The evidence is less conclusive in the remaining case.

Risk Concentrations

Focusing on the 21 failures where real estate loans played a major role, each bank experienced a period of rapid growth in commercial real estate loans, sometimes interrupted by a pause for two or three quarters. These periods of rapid growth lasted from seven quarters to six years: up to three years for six banks, three to five years for 11 banks, and five or six years for four banks. During these prolonged periods of rapid growth, the banks built concentrations in commercial real estate loans ranging from 16 percent to 59 percent of total assets. Even higher concentrations resulted later, as other loans ran off more rapidly. The distribution of commercial real estate concentration ratios and the dramatic increase since early 1984 are displayed in Table 3.

Emerging Credit Problems

As long as real estate prices continued to rise, the very high loan concentrations generally were not a

[5] In several cases throughout the article, the numbers presented in the text cannot be derived from the tables. The text is based on a detailed analysis of individual banks.

[6] One bank had problems centered in commercial and industrial loans and credit card loans. The other had mostly commercial and industrial loan problems, although its larger affiliate, a savings bank that also failed, had primarily real estate loan problems.

Table 3
Risk Concentrations: Commercial Real Estate Loans as a Percentage of Total Assets of Failed Banks, in March 1984 and at Highest Point Prior to Threshold (T)
Number of Banks

Commercial Real Estate Loans as Percent of Total Assets	Mature Commercial Banks		Mature Savings Banks: Other than Recent Conversions		Mature Savings Banks: Recent Conversions		New Banks	All Failed Banks
	March 1984	Peak	March 1984[a]	Peak	March 1984[a]	Peak	Peak	Peak
50 or more		4		1		3	1	9
40–49.9		1		5	1	7	5	18
30–39.9		8		12		5	3	28
20–29.9	4	7	2	3		2	6	18
10–19.9	5	1	4	1	10		5	7
0–9.9	14	2[b]	3		4		5	7
Total	23	23	9	22	15	17	25	87

[a]1984 data were not readily available for 15 savings banks. Earliest data examined ranged from December 1985 to March 1988 and showed five of the 15 already in the 30–39 percent range and four others in the 20–29 percent range.

[b]These two banks had peak concentrations in commercial and industrial loans of 32 and 44 percent of assets.

Note: Risk concentrations were built during periods of rapid growth in commercial real estate lending. The periods of rapid buildup ranged from one to six years, but in many cases the concentrations were built in two to four years.

problem. During the periods of rapid growth in commercial real estate loans, nonperforming real estate assets (including foreclosed property) seldom exceeded 0.75 percent of total assets in 18 of the 21 banks, and were usually below 0.5 percent in most banks.[7] But as market conditions worsened, first in condominium construction and conversions, then in tract housing, and eventually in commercial property, banks experienced sharp increases in nonperforming real estate assets. In many cases a sudden jump in nonperforming loans in one quarter was followed by continued increases in subsequent quarters.

The starting point of the "problem recognition phase" for this study was taken as the quarter end when nonperforming real estate assets first exceeded 1 percent of assets and remained above that level thereafter (1.2 percent in the three cases mentioned in footnote 7). One bank that was particularly aggressive in condominium lending reached that point by the end of 1986, six others did so in the first half of 1988, and 14 other commercial banks exceeded this threshold during the four quarters ending in September 1989. One bank exceeded the threshold in late 1990.

Anecdotal evidence indicates that a few banks masked their developing credit problems for a time, either by questionable accounting practices or deliberate falsification of records. Four failed commercial banks that were examined in the threshold quarter, or the prior quarter, received supervisory rating (CAMEL) downgrades to 3 (fair) or 4 (marginal) and reported large increases in nonperforming assets, suggesting that examiners may have found previous nonperforming data understated.[8] Thus, a few of the threshold quarters used in this study might have come a quarter or two earlier had more accurate nonperforming data been reported.

Banker Reaction

Much has been made of the efforts by managers of some damaged or insolvent savings and loans in

[7] The exceptions were two banks in southern Connecticut and one in Massachusetts, which reported nonperforming real estate assets slightly in excess of 1 percent for a few quarters near the end of their period of rapid growth in commercial real estate loans.

[8] Banks are rated by supervisors on five factors: Capital, Asset quality, Management, Earnings, and Liquidity, giving rise to the acronym CAMEL. Each individual component, as well as a composite rating of all five factors, is assigned a score from 1 (strong) to 5 (likely to fail).

Table 4
Timing of Events for 23 Failed Mature Commercial Banks Relative to the Threshold Quarter (T) When Nonperforming Real Estate Assets Exceeded 1 Percent of Total Assets[a]
Number of Banks

	Quarters before Threshold					Quarters after Threshold							
Event	Earlier	−3	−2	−1	T	+1	+2	+3	+4	+5	+6	Later	Never
Peak in Problem Loan Category	1	1	1	5	6	5		2	1	1			
Nonperforming Real Estate Loans													
3% or more of assets					2	6	8	2	2	2		1	
6% or more					1		1	7	4	2	1	4	3
9% or more							1		5	2	3	6	6
Real Estate Net Write-offs (0.4% or more of assets)					2	2	3	4	3	3	1	3	2
Loan Loss Provision (0.8% or more of assets)				1	3	4	4	4	3	1	1	2	
Negative Net Income			1	1	3	6	5	3	1		2	1	
Negative Net Operating Earnings						3	1	8	2	1	2	5	1
Ratio of Tier 1 Capital to Assets													
Weak (below 5.2%)[b]			1	2		3	3	3	2	1	2	5	1
Negative											2	12	9
Ratio of Adjusted Tier 1 Capital[c] to Assets													
Weak (below 5.2%)	3		1	4	4	6	1	2		1		1	
Negative					3	3	2	6		1	2	4	2

[a]Based on commercial and industrial nonperforming loans in two cases; 1.2 percent nonperforming threshold used in three cases.
[b]A lower threshold for weak capital was used for two banks.
[c]Full loan loss reserves added to capital and nonperforming assets deducted from capital.

the mid 1980s to try to "grow out of their problems" by rapid growth in risky lending areas. In this regard, it is interesting to review the actions of New England commercial bankers as evidence began to mount that they had serious credit problems. Table 4 shows the timing of peaks in each bank's most troubled loan category, relative to the nonperforming asset threshold of 1 percent of total assets.

In two banks, commercial real estate loan totals peaked more than one quarter before nonperformance reached the 1 percent threshold. In 15 banks, the peak in commercial real estate loans occurred within one quarter before or after the rise in nonperforming assets. In the four remaining banks where commercial real estate loans were a significant factor, such loans peaked three to five quarters after nonperforming assets reached the 1 percent threshold. In three of these banks, however, the loan increases were small and the increases in nonperforming loans during this period were moderate. In those banks with significant problems in commercial and industrial loans, such loans peaked well before a significant increase in nonperforming assets in six of 12 banks, and within one quarter, earlier or later, in the others.

Generally, when credit problems first appeared, bankers either were already shrinking loan portfolios, both in total and in troublesome categories, or quickly began to do so. Considering that commercial real estate loans and commercial and industrial loans may be booked some time after commitments are made, and that the measurement was made from the first point when the level of nonperforming assets became abnormal, the evidence suggests that the commercial bankers adopted conservative postures promptly upon recognizing the emerging problem.

While no definitive evidence is readily available to show whether the cessation of lending in critical categories was initiated by bankers or bank supervisors, inferences can be made from supervisory (CAMEL) ratings. Of the 19 mature commercial banks

for which such ratings were available, 12 ceased to expand loans in critical categories (generally commercial real estate) while the bank was rated in the top two rating categories. It is unlikely that supervisors pressured such banks to stop lending, and even questionable that they did so for three additional banks when the composite rating was 3 (fair). Thus it is presumed that lending restraints were voluntary actions in most cases. The prospect of supervisory intervention if problems were not contained may have given management an added incentive.

Generally, when credit problems first appeared, bankers either were already shrinking loan portfolios or quickly began to do so.

An analysis of the investment portfolios of these banks showed no evidence of new risk-taking after the loans began to run off. Conversations with supervisors produced no anecdotal evidence of late risk-taking in any of these banks. While the possibility of isolated cases cannot be ruled out, it seems safe to conclude that, in general, these commercial bankers did not take "second gambles" in an effort to recoup losses from their earlier bets.

Timing of Changes in Financial Indicators

Once the level of nonperforming real estate assets (assumed to be primarily commercial real estate) exceeded 1 percent, it moved rapidly higher in most cases. As shown in Table 4, in 16 of the 23 mature commercial banks, nonperforming real estate assets (commercial and industrial loans in two banks) reached 3 percent of assets within two quarters, and they did so in all but one of the remaining banks within three more quarters. Such assets reached 6 percent of total assets in 13 of the banks within one year, and 9 percent of assets in 11 banks within one and one-half years. Nonperforming real estate assets ultimately reached 6 percent of assets in all but three banks prior to failure, and 9 percent in all but six banks. Four banks had nonperforming real estate loans in the 20 to 25 percent range just prior to failing.

None of the banks took significant real estate write-offs (0.4 percent of assets or more) before the benchmark quarter, but 14 did so in that quarter or during the following year. Only one bank made a significant provision for loan losses (0.8 percent of assets or more) prior to the benchmark quarter, and this provision did not necessarily relate to commercial real estate loans. Eighteen banks took such provisions in the benchmark quarter or during the following year. Additional provisions followed, for most banks.

The initial large provisions for loan losses resulted in negative net income for a quarter in 21 banks and a substantial reduction in net income in the other two. Four banks had experienced isolated quarters with negative net income prior to the benchmark quarter, which were unrelated to the ultimate problem area and are not reflected in Table 4. Operating earnings (here, before provisions for loan losses and before taxes and extraordinary items) generally became negative two or more quarters after net income did, reflecting the loss of interest income, losses in the disposition of foreclosed property, and related costs.

Increasing losses eroded capital funds, and despite the rapidly shrinking loan volume, a slower decline in total assets permitted the ratio of capital to assets to decline. Table 4 shows the quarter in which the ratio of tier 1 capital to assets dropped below 5.2 percent, relative to the nonperforming real estate asset threshold.[9]

Three banks showed a sudden drop in their capital ratio to levels below 5.2 percent one or two quarters before the benchmark, one because of a sharp increase in loans, another due to a large provision for loan losses that was not real-estate-related, and the third as a result of marking equity securities to market. Thus, no commercial banks developed weak capital ratios prior to the nonperforming threshold as a consequence of the credit problems that were to destroy them. Eleven others showed deterioration in capital ratios below 5.2 percent, due primarily to large loan loss provisions, in the four quarters following the nonperforming asset benchmark. Six others did not fall below the 5.2 percent criterion for one and one-half years or more, because of slow development of losses, deferred recognition

[9] The 5.2 percent of assets threshold for capital was chosen because it was significantly below the normal range for nearly all banks, and yet was high enough to represent a level that might, at the time, have been considered minimally adequate for banks with satisfactory risk profiles. For two banks where tier 1 capital ratios were chronically under 5.2 percent, the timing of a major drop from the usual range was used instead.

of losses through loan loss provisions, or injections of fresh capital. One bank showed a ratio of capital to assets of more than 5.2 percent in its final call report before failure.

Capital did not turn negative until long after the initial increase in nonperforming assets: in two banks after six quarters, in eight after seven, and in four between nine and 15 quarters later. Nine banks still showed positive capital on their final call report before failure. Of those that reported negative capital, nine failed in the next quarter and the remaining five in the second quarter after so reporting.

The capital ratio used above excludes the loan loss reserves from capital and does not take asset quality into account. As will be shown later, most of these banks were underreserved for the loan losses that were to come. This becomes immaterial if reserves are included in capital and gross equity capital is related to a measure of potential credit losses. The best that can be done in this regard with call report data is to use nonperforming assets as such a measure.[10] Accordingly, a measure of tier 1 capital, plus loan loss reserves, minus nonperforming assets, as a percentage of total assets, has been applied to each of the failed banks.[11]

As shown in Table 4, this adjusted capital ratio became weak (below 5.2 percent) before the threshold quarter in eight of the 23 banks. In each case this occurred as a result of factors unrelated to problem real estate loans (or commercial and industrial loans in the case of one bank). But weakness in this ratio attributable to commercial real estate loans showed up in 10 commercial banks in the threshold quarter or the one following. Fourteen banks were insolvent within a year of the threshold on the basis of this ratio, whereas none were insolvent according to the conventional leverage ratio.

Most of the commercial banks were underreserved for the loan losses that were to come.

Using the quarter in which the 1 percent nonperforming threshold was reached as a benchmark, the time until bank failure ranged from one and one-half years to five years, with 11 of the 23 banks failing by the seventh or eighth quarter. In some cases the overhang of nonperforming assets was so great that the banks were clearly nonviable long before capital became negative and they were closed.

Comparison to Banks That Did Not Fail

While the evidence presented earlier strongly links commercial real estate concentrations to bank failures, it does not shed light on the relative importance of concentrations and qualitative factors such as underwriting standards and management capabilities. To the extent that the study only considers failed banks, it does not eliminate the possibility that other banks with similar concentrations escaped unscathed by utilizing better lending practices.

Figure 1 and Table 5 offer some insight into this question by comparing failed and surviving banks in terms of peak commercial real estate loan concentrations and peak nonperforming real estate assets. While the figure shows a number of nonfailed banks with both high concentrations and delinquencies, most of these banks developed sufficient problems to be rated 4 (marginal) or 5 (likely to fail) in the supervisors' composite rating system (CAMEL). This distinction cannot be shown on the figure because individual bank ratings could be identified, but it is summarized in the table.

Of 147 current commercial banks (nonfailed and still in existence), 54 developed poor supervisory ratings during the 1986–92 period. Of the 93 that did not develop such serious problems, 11 had commercial real estate loan concentrations of 30 percent of assets or more. A review of these banks and six others with concentrations between 28 and 30 percent disclosed that only 5 of the 17 banks reported construction and development loans (a component of commercial real estate loans as used in this study) exceeding 5 percent of assets. Only one had construction and development loans exceeding 10 percent of assets. For the most part, banks that had large commercial real estate portfolios, but escaped relatively unscathed, did not become heavily involved in the development boom. In contrast, 18 of the 32 mature

[10] Although not publicly available, a weighted ratio of examiner classifications (problem assets) to capital would be a superior indicator of asset quality. But since such a ratio is only developed in the examination process, it is often so out of date in a time of rapidly deteriorating credit quality that the quarterly nonperforming data are more useful for the purposes of this study.

[11] The appropriateness of deducting 100 percent of nonperforming assets will be explored later by testing a derivative of this capital measure against FDIC loss estimates for individual banks.

Table 5
Mature New England Commercial Banks Reaching Specified Levels of Commercial Real Estate Loan Concentrations and Nonperforming Real Estate Assets, 1986 to 1992[a]
Number of Banks

Peak CRE Loan Concentration (Percent of Assets)	Peak in Nonperforming Real Estate Assets as Percent of Total Assets						
	Failed Banks		Current Banks				
			Troubled[b]		All Other		
	<6%	≥6%	<6%	≥6%	<6%	≥6%	Total
≥40%		5		4	1	1	11
30–39.9%		9	8	10	6	3	36
20–29.9%	1	5	10	10	24	2	52
10–19.9%	1	1	9	3	33		47
0–9.9%	1				23		24
Total	3	20	27	27	87	6	170

[a]Excludes banks chartered in 1984 or later (both failed and current) and banks that failed before 1989. Peak levels were determined from quarterly reports over the 1986 to 1992 span, except that the second highest level was used to avoid data distortions.
[b]Had a composite CAMEL rating of 4 or 5 at some point during the period studied.

commercial banks that either failed or received poor supervisory ratings, and had commercial real estate concentrations in excess of 28 percent, had peak construction and development loan concentrations in excess of 10 percent of assets and 26 of the 32 had such concentrations in excess of 5 percent. The overall conclusion is that high commercial real estate concentrations led to substantial damage as evidenced by poor supervisory ratings, if not actual failure.

III. Detailed Findings Related to Mature Savings Institutions

All 39 savings banks in this group failed as a result of heavy involvement in commercial real estate loans, and they displayed essentially the same pattern as the mature commercial banks. The 12 largest savings banks in this group ranged in size from $800 million to $2.4 billion in assets. Thirteen others were in the $300 million to $800 million range, nine held assets of between $100 million and $300 million, and five had less than $100 million in assets.

Causes of Failure

It is clear from Table 2 that real estate loan problems were predominant in each case and were sufficient to cause the failure. The total of nonperforming real estate assets plus cumulative net charge-offs of such loans over the three years prior to failure ranged from 10 percent of total assets to 48 percent, with 21 banks exceeding 20 percent. The corresponding numbers for commercial and industrial loans were under 1 percent for 13 banks and under 3 percent for 14 others. The highest was 8.3 percent. No other loan category contributed significantly to the problem, and only one bank appeared to be significantly damaged by negative earnings unrelated to nonperforming assets. As with the commercial banks, it can be assumed that the bulk of these real estate loan problems relate to commercial real estate loans rather than residential loans.

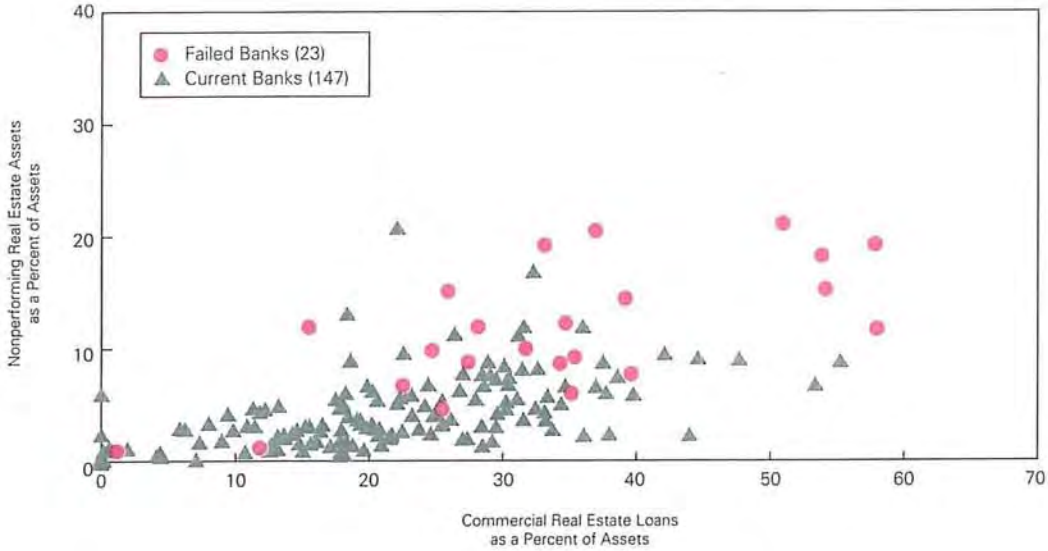
Risk Concentrations

Like the commercial banks, the savings banks showed rapid growth in commercial real estate loans, resulting in the high concentrations shown in Table 3.[12] The period of rapid growth in commercial real estate loans typically ranged from one and one-half to four years, sometimes interrupted by a brief period of decline in such loans.

[12] The table does not fully reflect the amount of growth from 1984 because 14 banks converted to FDIC insurance from a private Massachusetts deposit insurer in the 1985–87 period, and earlier data were not solicited. Another savings bank converted from a federal to a state charter in 1988. Some of these banks had already achieved significant concentrations prior to becoming FDIC-insured.

Figure 1

Mature New England Commercial Banks, Peak Concentrations in Commercial Real Estate Loans and Nonperforming Real Estate Assets, 1986 to 1992[a]



[a] Excludes banks chartered in 1984 or later (both failed and current) and banks that failed before 1989. Peak levels were determined from quarterly reports over the 1986 to 1992 span, except that the second highest level was used to avoid data distortions

Emerging Credit Problems

The 1 percent of assets "threshold" for nonperforming real estate loans was appropriate for 29 of the 39 savings banks in this group. The 10 others experienced higher nonperforming levels preceding and continuing into the years of rapid growth in commercial real estate loans, perhaps representing chronic delinquencies in residential loans. Therefore, in order to capture the point at which the growth in commercial real estate loan problems first began to stand out, thresholds ranging from 1.6 to 3 percent of assets were employed for these banks.

Five failed savings banks that were examined in the threshold quarter, or the prior quarter, received supervisory rating (CAMEL) downgrades to 3 (fair) or 4 (marginal) and reported large increases in nonperforming assets in the threshold quarter. This suggests that earlier nonperforming data may have been understated and that the threshold quarter should have been earlier in some cases.

Commercial real estate loans peaked one or more quarters before the threshold in eight banks, in the threshold quarter or the following quarter in 12 banks, and in the second quarter after the threshold in 11 banks (Table 6). The eight others continued to increase the level of commercial real estate loans for a time—for six quarters, in one case. Six of the eight savings banks that continued to expand more than two quarters after the threshold did so in negligible amounts, or while the amount of nonperforming loans was growing slowly after exceeding the threshold.[13] Although three situations here suggest inappropriate behavior in continuing to aggressively expand commercial real estate loans after serious problems became clear, the other savings banks in the group generally reflected the same conservative reaction to emerging problems as did the commercial banks. No evidence of "second gambles" in other areas of risk-taking was noted.

In 18 of the 36 banks for which supervisory ratings were examined, commercial real estate loan growth ceased while the bank was rated in one of the

[13] The extent of continued lending in the riskier loan categories by three mature savings banks is summarized in Table 9 below.

Table 6

Timing of Events for 39 Failed Savings Banks Relative to the Quarter (T) When Nonperforming Real Estate Assets Exceeded a Threshold Percentage of Total Assets[a]

Number of Banks

	Quarters before Threshold					Quarters after Threshold							
Event	Earlier	−3	−2	−1	T	+1	+2	+3	+4	+5	+6	Later	Never
Peak in Problem Loan Category	1	2	3	2	5	7	11	2	4	1	1		
Nonperforming Real Estate Loans													
3% or more of assets					12	13	7	5	1	1			
6% or more					1	4	4	14	5	8	1	1	1
9% or more						1	3	5	7	9	5	8	1
Real Estate Net Write-offs (0.4% or more of assets)						6	6	5	3	7	4	8	
Loan Loss Provision (0.8% or more of assets)					4	5	8	6	3	4	5	4	
Negative Net Income				1	6	12	8	6	5			1	
Negative Net Operating Earnings				1	2	6	6	5	9	3	2	5	
Ratio of Tier 1 Capital to Assets													
Weak (below 5.2%)		1				1	7	8	1	6	3	12	
Negative									2	3	3	10	21
Ratio of Adjusted Tier 1 Capital[b] to Assets													
Weak (below 5.2%)[c]	2			1	17	8	3	2	1	3	2		
Negative					1	4	5	8	6	4	6	5	

[a]The nonperforming real estate threshold as a percent of assets was 1 percent for 29 banks, 1.6 percent for one bank, 2 percent for three banks, 2.5 percent for four banks, and 3 percent for two banks. The higher thresholds were required because some banks had occasional quarters with relatively high nonperforming loans, apparently stemming from temporary problems with residential mortgages.

[b]Full loan loss reserves added to capital and nonperforming assets deducted from capital.

[c]For one bank that had adjusted capital below 5.2 percent of assets throughout the period of rapid growth, the timing of the drop below 3.7 percent was used.

top two CAMEL rating categories, and therefore the action was presumed to be voluntary. In 11 others such loan expansion ceased while they were rated 3 (fair).

Timing of Changes in Financial Indicators

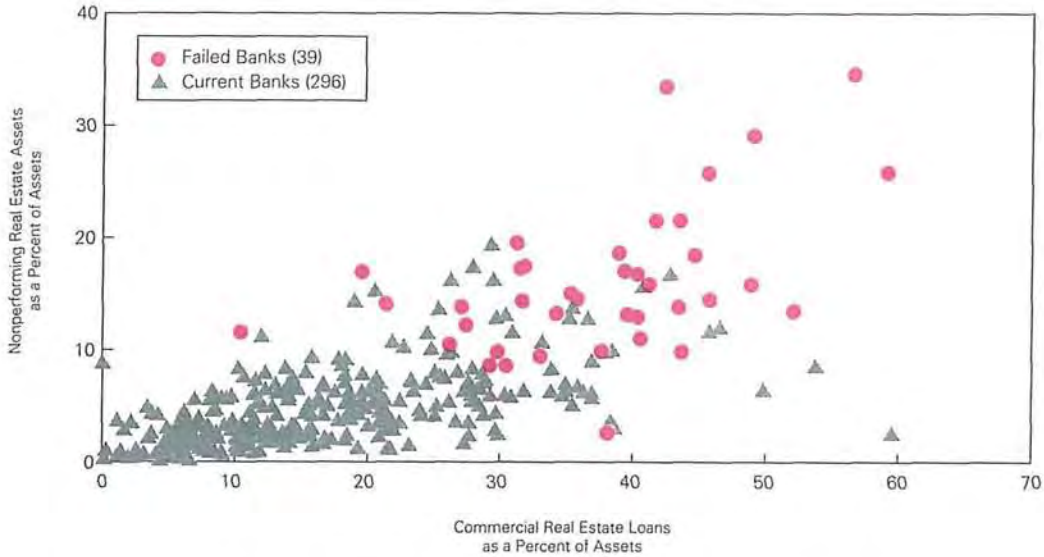
Once nonperforming real estate loans reached the threshold (1 percent of assets for most savings banks), they generally rose more rapidly than in the commercial banks (Table 6). The progression to 6 percent and to 9 percent or more was more rapid in the savings banks that did not convert to stock form than in those that did. As shown in Table 6, the initial upsurge in the threshold quarter went above 6 percent in one bank and above 3 percent in 11 others. Within two more quarters, all but seven savings banks had reached 3 percent, nine had reached 6 percent, and four had nonperforming real estate loans above 9 percent of assets. Within a year 16 of the 39 savings banks had reached 9 percent, and all but one did so before failure.

After the threshold quarter, significant real estate loan write-offs began to show up, and nearly one-half of the banks reported such loss recognition in the first year. Significant provisions to loan loss reserves began in the threshold quarter and generally preceded loan write-offs by about one quarter. These provisions to loan loss reserves resulted in negative net income in most cases, and operating earnings quickly turned negative as well, leading to negative net income in still more banks. Nineteen of the 39 savings banks had negative net income by the quarter following the threshold period, and all but one did within a year.

Tier 1 capital fell below 5.2 percent of assets in one bank before the threshold as a result of operating weaknesses. Emerging commercial real estate problems produced weak capital in one bank one quarter

Figure 2

Mature New England Savings Banks, Peak Concentrations in Commercial Real Estate Loans and Nonperforming Real Estate Assets, 1986 to 1992[a]



[a] Excludes banks chartered in 1984 or later (both failed and current), federal savings banks, and banks that failed before 1989. Peak levels were determined from quarterly reports over the 1986 to 1992 span, except that the second highest level was used to avoid data distortions.

after the nonperforming threshold and in 15 additional banks in the second or third quarter after the threshold. Capital weakness did not appear for at least a year and a half after the nonperforming threshold in 10 banks. Capital turned negative in two banks in the fourth quarter after the threshold. Only eight banks in this group reported negative capital as late as a year and a half after the threshold, and 21 still showed positive book capital in the final call report before they failed.

Applying the adjusted capital ratio, however, which deducts nonperforming assets from gross equity capital, all but four of the nonconverted savings banks had weak capital by the threshold quarter and all but three were insolvent within a year afterward. The converted savings banks took longer to work through their capital funds; 13 did not exhaust adjusted capital until the second year after the threshold had been reached.

Comparison to Savings Banks That Did Not Fail

Figure 2 and Table 7 compare failed mature savings banks to surviving banks in the same manner that Figure 1 and Table 5 did for the commercial banks. It is clear that nearly all mature savings banks with high concentrations in commercial real estate loans either failed or developed serious problems, as evidenced by poor supervisory ratings. It is also clear that these problems tended to relate to high levels of nonperforming real estate.

As with the commercial banks, some savings banks with relatively high commercial real estate loan concentrations did not develop serious problems. Of the 17 banks with commercial real estate loan concentrations in excess of 28 percent of assets that did not develop serious problems, only three had concentrations in construction and development loans of 10 percent or more of assets, and only seven had more than 5 percent of such loans. Thus, like their commercial bank counterparts, most mature savings banks with high commercial real estate loan concentrations that avoided problem status appear to have shunned the more aggressive development lending of the others. In contrast, of the 50 mature savings banks that either failed or received poor supervisory ratings, and had commercial real estate concentrations in excess of 28 percent, 39 reported peak con-

Table 7
Mature New England Savings Banks Reaching Specified Levels of Commercial Real Estate Loan Concentrations and Nonperforming Real Estate Assets, 1986 to 1992[a]
Number of Banks

Peak CRE Loan Concentration (Percent of Assets)	Peak in Nonperforming Real Estate Assets as Percent of Total Assets						
	Failed Banks		Current Banks				
			Troubled[b]		All Other		
	<6%	≥6%	<6%	≥6%	<6%	≥6%	Total
≥40%		17		5	1	1	24
30–39.9%	1	13	4	16	3	1	38
20–29.9%		6	3	19	33	15	76
10–19.9%		2	2	16	77	14	111
0–9.9%			1		84	1	86
Total	1	38	10	56	198	32	335

[a]Excludes banks chartered in 1984 or later (both failed and current), federal savings banks, and banks that failed before 1989. Peak levels were determined from quarterly reports over the 1986 to 1992 span, except that the second highest level was used to avoid data distortions.
[b]Had a composite CAMEL rating of 4 or 5 at some point during the period studied.

struction and development loans of 10 percent of assets or more, while 48 out of 50 reported such loans exceeding 5 percent of assets.

Converted Savings Banks

Of the 17 savings banks that converted to stock ownership after 1983 and then failed, two converted in 1985, nine in 1986, five in 1987, and one in 1988. Each of these banks expanded rapidly in order to grow into its suddenly enlarged capital base. The increase in capital ratios attributable to conversion was substantial except in the case of one bank, where the increase was minor and the resulting ratio of tier 1 capital to assets was 9 percent. Following conversion, the capital ratios of the other banks ranged from 9 to 29 percent, with six banks between 14 and 19 percent and five others at 20 percent or more.

Nine banks experienced an increase in nonperforming assets to the threshold level from four to eight quarters after converting, six banks from nine to twelve quarters, and two from 13 to 16 quarters after converting. Rapid growth, and eventually provisions to reserves, eroded capital ratios, but it was some time before such ratios declined to the 5.2 percent threshold used in this study. Two banks saw capital ratios decline to this point in the second year after conversion, two banks in the third year, seven banks in the fourth year, and six banks even later. In terms of the adjusted capital ratio described earlier, rising nonperforming loans (not covered by reserves) caused the ratio to go negative in three banks as early as the second year after conversion.

IV. Findings Related to New Banks

This group consists of 23 commercial banks and two savings banks; 13 were chartered in Connecticut, seven in Massachusetts, and the others in New Hampshire and Vermont. Charter dates ranged from 1984 to 1989, with seven chartered in 1987. Life spans from start-up to failure were as follows:

Years	*Number of Banks*
3	2
4	7
5	6
6	5
7	5

One bank grew to $307 million in assets in its four and one-half years of existence, and three others topped $100 million. Thirteen never grew beyond $50 million in assets.

Causes of Failure

Real estate problems appear to have been the dominant cause of failure in nine of the new banks, commercial and industrial loans in six others, and a

combination of the two in the remaining ten. Several of these banks had contractors and developers on their board of directors, and loans to such insiders reportedly figured heavily in some failures. Fraud reportedly played a significant role in four of the Connecticut banks, contributing to loan losses. Unreliable reporting in some of the new banks may have distorted the picture of how much particular loan categories contributed to failures. It may also have deferred recognition of the nonperforming threshold as four new banks experienced supervisory rating (CAMEL) downgrades to ratings of 3 (fair) or lower in the threshold quarter, accompanied by large increases in nonperforming assets.

Both real estate problems and commercial and industrial loans were dominant causes of failure in the 25 new banks studied.

Risk Concentrations

As shown in Table 3, six of the new banks that failed developed concentrations in commercial real estate loans in excess of 40 percent of assets. Seven others had concentrations in commercial and industrial loans ranging from 40 percent of assets to 75 percent. The duration of the rapid buildup in these concentrations ranged from one to six years, but 15 of the 25 new banks built their concentrations within two to four years.

Emerging Credit Problems

In most cases it was not practical to apply separate thresholds of 1 percent nonperforming assets to total assets for real estate and for commercial and industrial loans, because both loan categories were significant in a number of the new banks and apparent reclassifications between loan categories were frequent. Instead, the point where nonperforming assets became abnormal was determined for 11 banks by combining the two loan categories. A 2 percent threshold for nonperforming assets was used in five banks that had chronically high levels of nonperforming assets.

Fourteen of the 25 new banks discontinued growth in the troubled loan categories prior to, or within one period following, the nonperforming threshold (Table 8). Unlike the banks in the other groupings, however, a number of the new banks continued to expand loans in the troubled categories long after the emerging problems were obvious. Five banks increased loans between two and four quarters beyond the threshold quarter, four others did so for five or six quarters, and two others for as long as nine and 13 quarters.

Timing of Changes in Financial Indicators

As with the other bank groups, once nonperforming assets exceeded the threshold, they increased fairly rapidly in subsequent quarters. As shown in Table 8, the initial jump in nonperforming assets in the threshold quarter exceeded the 6 percent level in two banks and 3 percent in two others. Over the next year, seven banks exceeded 9 percent and another eight exceeded 6 percent.

Fifteen of the 25 failed new banks took significant write-offs of loans within two quarters after the threshold, but loan loss provisions generally preceded these write-offs by a quarter or two. Net income turned negative somewhat sooner in this group, apparently because weak operating earnings were less able to absorb loan loss provisions. Three of these new banks had never been profitable, despite the rapid growth in loans that caused their demise.

The ratio of Tier 1 capital to equity fell below the 5.2 percent level in the threshold quarter for two banks and for several others soon after, but quite late for a number of others. Several of the new banks entered the period of credit problems with high capital ratios that were only gradually eroded. In general, capital ratios became weak shortly after nonperforming assets reached 3 percent of assets, and negative about the time they reached 6 percent.

Using the adjusted capital ratio, six banks had weak capital by the threshold quarter, and all but five within a year afterward. Five banks were insolvent on this basis by the second quarter after the level of nonperforming assets became abnormal, and five others by the fourth quarter.

Table 8

Timing of Events for 25 Failed New Banks Relative to the Threshold Quarter (T) When Nonperforming Real Estate Assets or Nonperforming Commercial and Industrial Loans Exceeded 1 Percent of Total Assets[a]

Number of Banks

	Quarters before Threshold					Quarters after Threshold							
Event	Continuous	−3	−2	−1	T	+1	+2	+3	+4	+5	+6	Later	Never
Peak in Problem Loan Category		2	1	3	6	2	1	3	1	3	1	2	
Nonperforming Loans in Problem Category													
3% or more of assets					4	5	5	5	2	3	1		
6% or more					2		3	2	8	4	1	5	
9% or more							1	2	4	5	3	8	2
Real Estate Net Write-offs (.4% or more of assets)					2	5	8	2	1	3	1	3	
Loan Loss Provision (.8% or more of assets)			1		4	6	9	1		1		3	
Negative Net Income	3		1	1	4	4	8	2		1		1	
Negative Net Operating Earnings	2			1	1	3	3		3	2	2	8	
Ratio of Tier 1 Capital to Assets													
Weak (below 5.2%)					2	2	2	4	3	2	1	9	
Negative								1	2	2	1	8	11
Ratio of Adjusted Tier 1 Capital[b] to Assets													
Weak (below 5.2%)					6	3	4	2	5	1	3	1	
Negative							5	1	4	6	2	7	

[a]The nonperforming threshold was based on real estate loans and foreclosed property in nine banks, C&I loans in six banks, and a combination of the two in the other 10.

[b]Full loan loss reserves added to capital and nonperforming assets deducted from capital.

Banker Reaction

Even among the new banks, most reacted promptly to reduce risk exposure at the first sign of emerging credit problems. A few slowed but did not immediately halt loan growth, where nonperforming loans were not increasing rapidly. There were, however, seven new banks that continued to increase the combination of commercial real estate and commercial and industrial lending for more than one quarter after total nonperforming assets exceeded and remained above 3 percent of total assets. At this level of nonperforming assets, nearly all associated with commercial real estate or commercial and industrial loan problems, it should have been obvious that loss exposure was significant and that further loan expansion in these areas of high concentration was very unwise.

Table 9 presents data on these seven new banks along with one mature commercial bank and three mature savings banks. Two banks continued to report loan expansion in their final call reports before failure, and three others were within one or two quarters of failure before such expansion ended. When nonperforming assets are deducted from tier 1 capital plus loan loss reserves, eight of the 11 banks listed in Table 9 were insolvent by the time loan expansion ceased. One bank continued to expand its loan portfolio even after being rated 5 (likely to fail) by the examiners. Several of these situations appear to reflect inappropriate behavior by bankers and raise questions about the quality of supervision given these new banks.[14]

Focusing again on just the new banks, 10 of the 21 banks for which supervisory ratings were available

[14] It is important to note, however, that together these 11 banks account for only 4.7 percent of the total assets of the failed banks in this study, and that the six banks that continued to expand beyond three quarters account for only 1.6 percent of total assets in the study.

Table 9
The Exceptions: Eleven Failed Banks That Continued to Increase Commercial Real Estate and Commercial and Industrial Loans After Total Nonperforming Assets Exceeded 3 Percent of Total Assets[a]

Failed Bank	Expansion after Nonperforming Assets Exceeded 3% of Total: Number of Quarters	Increase as Percent of Assets	Resulting Level of CRE and C&I Loans as Percent of Assets
Mature Commercial Banks			
Bank A	3	27.3	76
Mature Savings Banks			
Bank B	3	6.3	52
Bank C	6	16.9	50
Bank D	3	4.8	59
New Banks			
Bank E	7	18.7	79
Bank F	3	14.0	65
Bank G	5	13.9	70
Bank H	6	31.4	62
Bank I	8	24.8	67
Bank J	3	14.8	65
Bank K	12	16.0	49
Total		10.9% (Equals $251 million in assets, or 4.7 percent of the $2,313 million total assets of the 87 failed banks studied)	

[a]This group excludes banks where loan expansion continued only into the following quarter or the loan increase was negligible. The expansion is measured from the quarter in which total nonperforming assets exceeded 3 percent and remained above that level until failure. Asset size is also taken from the call report for the quarter in which nonperforming assets reached this level.

ceased expansion in troubled loan categories while they were rated in the top two categories by supervisors. Three others did so while rated in the third supervisory rating category, suggesting that most of those banks that curtailed their lending in timely fashion did so on their own initiative.

Comparison to New Banks That Did Not Fail

Table 10 compares the 25 failed new banks to the 55 new banks that have survived, including 27 that received composite supervisory ratings of 4 or 5. While the majority of failed new banks had both high commercial real estate loan concentrations and high nonperforming real estate assets, several failed banks had relatively low commercial real estate exposures, and commercial credits or other factors were the main cause of failure.

Of the banks that have not failed, nine of the 26 banks where commercial real estate loans exceeded 25 percent of assets have avoided adverse composite supervisory ratings (4 or 5). None of these nine had construction and development loans in excess of 10 percent of assets, and none developed high levels of nonperforming real estate assets. As noted earlier, the patterns that are so distinct with the mature banks are somewhat muted in the case of the recently chartered banks.

V. Additional Findings

The following aspects of the study are best reported and discussed without segregation by bank groupings.

Timing of Supervisory Concerns about Failing Banks

The level of supervisory concern is reflected in the ratings assigned individual banks. The CAMEL ratings were obtained for 76 of the 87 banks in the study and the timing of changes in the composite rating was analyzed, relative to the quarter in which the level of nonperforming real estate assets (commercial and industrial loans for some banks) exceeded the 1 percent of assets threshold.[15] As shown in Table 11, no bank received a composite 5 (likely to fail) until after the threshold quarter, and only three banks (two of them related) received a composite rating of 4 (marginal) before the threshold. Most of the 13 banks that received a less serious 3 rating (fair) before the threshold did so because of weaknesses unrelated to the developing credit problems. In general, these early downgrades do not appear to have foreshadowed the serious problems to come. Nearly all rating downgrades to levels of concern occurred after evidence of actual loan problems began to emerge. At this point, loan concentrations were already fully developed. This timing indicates that supervisory evaluations focus on actual deterioration in loan performance, but not on risk concentrations.

In the threshold quarter six banks were rated 4 (marginal), five having previously been rated 2 (sat-

[15] The asset quality component of the CAMEL rating was also examined, but it generally moved in lockstep with the composite.

Table 10
New England Banks Chartered in 1984 or Later Reaching Specified Levels of Commercial Real Estate Loan Concentrations and Nonperforming Real Estate Assets, 1986 to 1992[a]
Number of Banks

Peak CRE Loan Concentration (Percent of Assets)	Peak in Nonperforming Real Estate Assets as Percent of Total Assets						
	Failed Banks		Current Banks				
			Troubled[b]		All Other		
	<6%	≥6%	<6%	≥6%	<6%	≥6%	Total
≥40%		5	1	4	2		12
30–39.9%		4	6	4	3		17
20–29.9%	2	7	6	2	8		25
10–19.9%	2		2	2	6		12
0–9.9%	3	2			9		14
Total	7	18	15	12	28	0	80

[a]Excludes federal savings banks. Peak levels were determined from quarterly reports over the 1986 to 1992 span, except that the second highest level was used to avoid data distortions.
[b]Had a composite CAMEL rating of 4 or 5 at some point during the period studied.

Table 11
Timing of the Deterioration in Failed Banks' Composite CAMEL Ratings
Number of Banks

New CAMEL Rating	Quarter When Rating Dropped, Relative to Threshold Quarter[a]					
	More Than a Year Earlier	−4 to −1	Threshold Quarter	+1 to +4	+5 to +6	More Than 18 Months Later
3 (Fair)	4	9	4	12	3	
4 (Marginal)		3	6	18	7	7
5 (Likely to Fail)				19	13	41

[a]For most banks, the quarter in which the bank's nonperforming real estate assets exceeded 1 percent of total assets.

isfactory). In the year following the threshold quarter, numerous ratings were downgraded. Only two failures occurred, however, as most failures took place in the second or third year after the threshold quarter (Table 12). All but three of the banks for which ratings data were available eventually received a 5 rating before failure, but more than half of these ratings were given at least seven quarters after the threshold quarter.

Few banks passed through each rating level as they deteriorated, and 17 of the 76 banks for which CAMEL ratings were available went directly from a rating of 2 (satisfactory) to a 5 (likely to fail). Eight of them were new banks. The plunge in ratings appears to have been more the result of long intervals between examinations than a sudden deterioration in asset quality. Most of the two- or three-level drops in ratings followed examination intervals of at least six quarters. The intervals were particularly long for new banks, the longest noted being 10, 11, and 12 quarters. A tenet of bank supervision is that new banks should receive more frequent examinations.

The Cost of Bank Failures

In order to gain some perspective on the extent of ultimate losses to the BIF as a result of these failures, the loss estimates prepared by the FDIC liquidators at the time of failure and updated periodically were obtained for all but one of the banks

studied.[16] FDIC officials report that relatively recent estimates are proving to be valid, at least for groups of failed banks if not for individual banks. Since it takes some time to liquidate banks, it is difficult to say now whether current estimation techniques are optimal for the particular loan problems of New England banks. Nonetheless, these estimates can be used to make some broad generalizations.

For purposes of this article a new measure was introduced, the ratio of equity capital plus loan loss reserves (gross equity capital) minus nonperforming assets, to total assets. The validity of deducting 100 percent of nonperforming assets might be questioned, since losses on such assets historically have probably been much lower. We can test this validity by relating equity capital plus the loan loss reserve just prior to failure to the FDIC estimate of loss. If the difference between the two equaled nonperforming assets, it would mean that the deduction of 100 percent of nonperforming assets was just right. It turns out that the difference is well over 100 percent of nonperforming assets for most failed New England banks. The median is 143 percent of nonperforming assets, the mean 156 percent, and the range is from 31 to 587 percent. This wide range implies that gross equity capital less nonperforming assets is not a reliable indicator of ultimate losses in *individual* failed banks (assuming the FDIC estimates are reasonable). But the fact that the difference between gross capital and estimated losses substantially exceeds nonperforming assets in the great majority of failed banks also demonstrates that the deduction of 100 percent of nonperforming assets in computing the adjusted capital ratio for this study certainly did not understate adjusted capital.

The adjusted capital ratio is used in this article as a tool for generalizing about the real capital ratios for failing New England banks. It shows (in Tables 4, 6, and 8) that for nearly all such banks, capital-to-asset ratios did not become weak (as defined here) before the actual credit problems became evident, even when capital was adjusted for reserves and nonperforming assets.

Adequacy of Reserves for Loan Losses

Accounting theory suggests that the reserve for loan losses should equal the anticipated future loan losses in the current loan portfolio. These failed banks did not build up their reserves in response to the developing concentrations in commercial real estate loans or emerging concerns about overbuilding. This is not just a generalization: no individual failed bank attempted to compensate for the abnormal risk by increasing reserves prior to the buildup in nonperforming loans.

Table 12
Timing of Bank Failures Relative to the Threshold Quarter[a]
Number of Banks

Number of Quarters after Threshold	Commercial Banks	Savings Banks	New Banks	Total Banks
+1 to +4		2		2
+5 to +8	12	10	10	32
+9 to +12	6	11	10	27
+13 or more	5	16	5	26
Totals	23	39	25	87

[a]For most banks, the quarter in which the bank's nonperforming real estate assets exceeded 1 percent of total assets.

The first abnormal loan loss provisions began to appear about the time that nonperforming assets first exceeded their usual range. But the increased provisions barely covered net loan losses in many banks, and the level of reserves did not keep pace with rapidly rising levels of nonperforming loans in most banks. In those banks where reserves did for a time essentially keep up with nonperforming loans, it was because so many properties were seized and the loans on them transformed into foreclosed property, which is not included in loans. Reserves against foreclosed property were generally minimal, and the ultimate losses in disposing of foreclosed property reportedly were high, despite the write-downs absorbed by the loan loss reserves at the time of foreclosure.[17]

The ratios of loan loss reserves to nonperforming loans just prior to failure had a median value of 0.44, with 80 percent of the observations falling between 0.25 and 0.71. In general, savings banks had lower reserves relative to nonperforming loans than did commercial banks. Since, as shown earlier, the ultimate losses for these failed banks will substantially exceed total nonperforming assets, while reserves typically covered less than half of the nonperforming

[16] These loss estimates are shown for individual banks in Appendix B, and are summarized by bank grouping in Table 1 in terms of dollars and as a percent of bank assets.

[17] For most banks, the costs of carrying and administering foreclosed property reportedly are greater than the write-downs taken after the initial charge at the time of foreclosure.

loans and none of the foreclosed property, it seems reasonable to conclude that the banks were severely underreserved at the time of failure. It is in part because of the general underreserving, as well as the inconsistency among banks in reserving, that this study has used a capital measure that adds the reserve for bad debts back into capital. Thus, the adjusted capital measure is unaffected by the level of reserving.[18]

Mismanagement and Fraud

This study did not focus on the mismanagement and fraud aspects of recent failures, but a few observations can be made. The emphasis on concentrations in commercial real estate loans here is not meant to imply that bank losses came solely from providing too much credit to a sector that became overbuilt. In the process of accommodating so many builders, developers, and speculators, these banks, as well as others that have not failed, often lowered underwriting standards and failed to exercise prudent loan administration. Anecdotal evidence suggests that the aggressive actions of converted savings banks may have contributed significantly to a liberalizing spiral of easier terms on construction loans. A number of banks were reported to have financed 100 percent of costs and advanced even more to cover interest payments.

A significant increase in fraud occurred during this period. For the most part, the banks were victims of fraud by outsiders, sometimes with an officer or employee involved. Instances of fraudulent behavior on the part of senior bank management and directors apparently were rare. In one notable case, top officials of one savings and loan and six banks, including four of the new banks in this study, are currently subject to civil enforcement actions for an alleged series of crisscrossing insider loans that contributed to heavy credit losses. In another case, a stockbroker specializing in new-issue stocks of converted savings banks reportedly developed a network of interlocking stock ownerships among such banks leading to investment losses at several institutions.[19] While mismanagement by bankers and bank vulnerability to fraud by outsiders undoubtedly were important contributors to loan losses in New England failed banks, they were another manifestation of the overaggressive lending psychology that produced this costly banking cycle.

A pattern of risk-taking and subsequent severe credit problems was characteristic of the S&L crisis and of current banking problems in some foreign countries, as well as the New England and Southwest crises.

VI. Comparison with Other Recent Banking Crises

The New England banking crisis shares several fundamental features with other recent banking traumas, including the overexposure of the money center banks to lending to less developed countries (LDCs) at the beginning of the 1980s and the high concentrations in energy and real estate lending by commercial banks in the Southwest in the mid 1980s. In each of these situations, a significant segment of the banking industry engaged for several years in exceptional risk-taking, becoming heavily exposed to borrowers with common vulnerabilities. This occurred in an atmosphere of exuberance and competitive pressures on the banks not to miss the parade. In each case such lending led to excessive expansion in particular sectors, and often to the financing of uneconomic projects. The eventual result was a major correction that caused heavy loan losses.

In a sense, these events were akin to the financing of a speculative bubble that eventually burst, although the timing of the recognition of these problems was not instantaneous or uniform among institutions. But in each case, severe damage to the banks was essentially built in and inevitable well before the

[18] Prior to the recent introduction of the risk-based capital measure, supervisors fully included loan loss reserves in capital. Under the new guidelines, such reserves are not included in tier 1 capital (essentially the equity of the bank) and only 40 percent is included in tier 2. (The balance of tier 2 consists of debt instruments.)

[19] At least two of the banks in this study were severely damaged as a consequence of involvement in this network, although the principal cause of failure was commercial real estate. It has been suggested that savings banks damaged by losses on their investments in other such banks took a second gamble by rapidly increasing their real estate exposure after the value of bank shares fell in mid-1987. While some bankers were probably motivated by recouping earlier losses, it does not appear that losses on stocks alone threatened the survival of any of these banks.

turn of the cycle. This pattern of risk-taking and subsequent severe credit problems was also in many respects a characteristic of the savings and loan crisis of the mid 1980s and of current banking problems in such countries as Australia, Canada, Japan, and Norway. Furthermore, such boom and bust patterns in financial institutions and markets are not a new phenomenon, although we have seen an exceptional number in recent years. Charles Kindleberger, in his history of financial crises, *Manias, Panics, and Crashes*, demonstrates the persistency of such crises in the Western world over more than two and one-half centuries.

In the problem recognition phase of each of the U.S. banking problems, managements generally pulled back from further aggressive risk-taking and prepared to ride out a period of stress.[20] These actions are in sharp contrast to the behavior attributed to many savings and loans in the mid 1980s. A number of such thrifts sought to grow their way out of their credit problems by engaging in a new wave of risk-taking, which added significantly to the cost of resolving several of these thrifts.

In each of the U.S. banking crises, once the cycle turned, the credit problems escalated rapidly. Yet bank managements and supervisors were uncertain about how much more the situation would deteriorate, and they were slow to realize that in many cases the wounds were fatal. Both New England and the Southwest endured a long period of uncertainty as to which banks would survive and which would fail.

The LDC crisis differed in that the exposure was largely sovereign risk and the perception was widespread that countries seldom repudiate their debt. Moreover, the uncertainties were so protracted that the money center banks were able to absorb the losses over a decade, avoiding any failures. In retrospect, it is evident that the eventual loan write-downs were very high for some money center banks at the point where LDC lending was discontinued. One issue in the current New England bank crisis is whether some damaged banks will be forced into failure even though they might be viable given sufficient time to recover.

Another common feature of the three recent waves of distress in U.S. banks is that capital ratios did not deteriorate until after the risk concentrations were fully developed and a change in the economic environment had begun to produce sharp increases in nonperforming loans, loan loss provisions, and write-offs. Table 13 compares the failed New England banks with five of the large Texas bank holding companies (BHCs) that failed in the 1980s, in terms of the timing of the first sign of capital weakness relative to the development of serious credit deterioration.[21] The 5.2 percent threshold of tier 1 capital to assets used earlier was applied to the Texas BHCs. The table shows when each institution's capital ratio fell below 5.2 percent, relative to the quarter in which nonperforming assets exceeded first 3 percent, then 6 percent, and then 9 percent of total assets.

Table 13 demonstrates that capital weaknesses seldom appeared before nonperforming assets exceeded 3 percent of assets, which would be a very high level in normal times.[22] Of the 23 mature New England commercial banks, one saw its capital-to-asset ratio fall below 5.2 percent a year before nonperforming loans exceeded 3 percent. Thirteen dropped below 5.2 percent within a quarter, plus or minus, of nonperforming loans passing the 3 percent mark; but nine did not see capital ratios fall below 5.2 percent until two or more quarters after nonperforming loans exceeded 3 percent of assets. Six did not experience low capital ratios until more than a year after passing the 3 percent threshold. Mature savings banks and new banks were even later in experiencing weak capital. Of 39 mature savings banks, 30 did not have weak capital ratios until at least two quarters after nonperforming assets exceeded 3 percent of total assets; 23 did not have weak capital ratios until two or more quarters after nonperforming loans exceeded 6 percent, and a fair number still had strong capital positions when nonperforming loans surpassed 9 percent.

The lag was particularly long in the Texas BHCs, which had reported high levels of nonperforming energy loans for a time before losses on real estate loans overwhelmed capital. The first of the five large Texas failed BHCs to experience a decline in the capital ratio below 5.2 percent did so three quarters after nonperforming assets exceeded 3 percent. At the point when nonperforming assets reached 6 percent of total assets, four of the five still had capital ratios in excess of 5.2 percent. Erosion of capital comes very late in cyclical banking problems. It can, perhaps, be characterized as the first revolution of a bank's death spiral.

[20] One might question whether this was so in the case of the large Texas banks, to the extent that they continued to finance speculative real estate after the energy boom abruptly ended.

[21] The Texas BHCs are First City Bancorp, First RepublicBank, MCorp, National Bancshares, and Texas American Bancshares.

[22] As noted earlier, the 1 percent of assets threshold was chosen for most banks because it was well above the normal range of nonperforming assets.

Table 13

Comparison of New England Failed Banks and Five Large Texas Failed Bank Holding Companies: Timing of Decline in Tier 1 Capital below 5.2 Percent of Assets,[a] Relative to Quarter in Which Total Nonperforming Assets Exceeded 3, 6, or 9 Percent of Assets

Number of Institutions

Group	Percent of Nonperforming Assets	Timing of Decline in Capital Ratio below 5.2 Percent of Assets (Quarters Before or After Nonperforming Assets Exceeded Level Indicated)													
		Earlier	−5	−4	−3	−2	−1	0	+1	+2	+3	+4	+5	+6	Later
New England Failed Banks															
23 Mature Commercial Banks[b]	3			1			4	5	4	2	1		3		3
	6	1	2		3	2	3	5	3		1		1		1
	9	3	1	1	4	2	2	2	2		1				1
39 Mature Savings Banks[b]	3			1			2	2	4	3	8	4	3	2	10
	6	1				1	4	3	6	5	6	2	4	1	5
	9	1	1	2	2	2	3	6	6	4	1	6		3	1
25 New Banks[b]	3						3	2	1	3	6	2		1	7
	6			1	1	2	1	6	3	6	1	1		1	2
	9		1	2	3	1	4	7	1	2	1	2			
Five Large Texas Failed Bank Holding Companies	3										1	1	1	1	1
	6						1		3			1			
	9		1	1	1			1	1						

Note: The first signs of capital weakness seldom appeared until after nonperforming assets reached the abnormally high level of 3 percent of assets. Capital weakness often became evident about the time that nonperforming assets reached 6 percent. This was not just a New England phenomenon, but was clearly evident in the large Texas banking institutions as well.

[a]A capital ratio below 5.2 percent was used for three New England banks with chronically weak ratios.

[b]Some rows do not add to total number of banks because nonperforming assets never reached 6 percent of assets in two New England banks, and never reached 9 percent in four others.

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Appendix A: Methodology of the Study

An individual analysis was made of each of 87 New England banks that failed in the 1989 to 1992 period. The study included all failed Bank Insurance Fund-insured commercial banks, savings banks, and Massachusetts co-operative banks. Two failed BIF-insured federal savings banks were excluded because of reporting differences.

The cause of bank failure was determined by considering the level just prior to failure of nonperforming real estate loans (including foreclosed property) plus the cumulative write-offs of real estate loans, net of recoveries, for the previous three years. (No data were available on the losses incurred in disposing of foreclosed property.) While the bank reporting system did not distinguish commercial real estate loans from residential in terms of nonperforming loans and write-offs of loans until recently, New England banks had few problems with home mortgages until very late in the period under study. Based on the evidence presented in Appendix C, nonperforming real estate assets and losses on real estate loans were assumed to stem from commercial real estate, including construction loans.[23] The sum of nonperforming loans and cumulative write-offs on real estate loans was compared to the corresponding calculation for the probable losses on commercial and industrial loans, in order to determine the relative importance of each. In only one case was it necessary to examine additional categories of loans in order to explain the bulk of the bank's total nonperforming loans or loan write-offs. Loan problems were serious enough in every case to fully explain the bank's failure and a large measure of the expected losses to the BIF.

The study examined the timing of various phases of the developing problem, using quarterly call report data (required reports of bank condition to supervisors) from March 1984 to the final report before failure. Periods of rapid growth and subsequent run-off of commercial real estate loans, commercial and industrial loans, and total loans were identified by inspection of quarterly loan data. These periods were related to the appearance in the call report of abnormal levels of nonperforming assets and net write-offs for the same loan categories. They were also related to abnormal provisions of reserves for loan losses and to any sharp declines in net income, both before and after considering the provision for loan losses. All items were measured as percentages of total assets except when determining periods of loan growth or shrinkage, when dollar changes by quarter were examined.

In order to demonstrate that commercial real estate loan concentrations were closely associated with the development of credit problems that led to problem status and often to failure, failed banks were compared to all surviving banks, both those that became problems and those that did not, in terms of commercial real estate loan concentrations and nonperforming real estate assets. Changes in capital ratios were analyzed using the ratio of tier 1 capital to assets.[24] A modified measure was also employed, adding the full reserve for bad debts to capital and deducting nonperforming assets, as a percentage of total assets. Changes in supervisory ratings were obtained for most banks in the study and related to the timing of other events. In addition, FDIC loss estimates were obtained for most failed banks and related to final call report data just prior to failure. Stock price changes before and after the nonperforming asset threshold were examined for those few institutions where data were readily available, as described in Appendix D.

[23] Data are reported separately in the call report for construction and land development loans and for real estate loans on nonfarm, nonresidential properties. In theory, a more sensitive measure of concentrations in particularly risky loans would focus on the construction and land development component. Much project financing is reported in the nonresidential properties component, however, and "commercial real estate loans" as used in this study is the combination of the two. Multifamily properties (5 or more units) are included in commercial real estate, although this was a major component in few banks.

[24] Tier 1 capital is essentially equity capital; it excludes loan loss reserves (reserves established against possible loan losses).

Appendix B:
Listing of Failed Banks Studied

Bank Name	Location	Nonperforming Threshold[a]	Asset Size at Threshold ($ millions)	Month of Failure	Estimated Cost to FDIC ($ millions)
Mature Commercial Banks					
Housatonic B&TC	Ansonia, CT	March 1989	$ 90	July 1991	$ 15
Citytrust	Bridgeport, CT	June 1989	2,567	August 1991	490
National Ind Bk of Conn	Meriden, CT	March 1988	77	November 1989	9
Merchants B&TC	Norwalk, CT	March 1989	335	February 1991	89
Fairfield County TC	Stamford, CT	March 1988	166	April 1992	19
Bank of New England[b]	Boston, MA	March 1989	15,030	January 1991	626
Connecticut B&TC NA[b]	Hartford, CT	September 1989	9,906	January 1991	417
Maine NB[b]	Portland, ME	September 1989	1,290	January 1991	35
Capitol B&TC	Boston, MA	December 1986	607	December 1990	163
Coolidge B&TC	Boston, MA	March 1989	385	October 1991	67
Massachusetts B&TC	Brockton, MA	December 1990	89	July 1992	7
University Bk NA	Cambridge, MA	June 1989	396	May 1991	117
Merchants NB	Leominster, MA	September 1989	198	December 1991	36
Malden TC	Malden, MA	March 1988	332	May 1992	18
Home NB of Milford	Milford, MA	June 1988	508	June 1990	90
Guaranty–First TC	Waltham, MA	March 1988	483	November 1992	55
Family B&TC	Allenstown, NH	September 1989	44	September 1991	10
City B&TC	Claremont, NH	December 1988	131	March 1991	43
Durham TC	Durham, NH	March 1989	80	November 1991	9
Bank Meridian NA	Hampton, NH	June 1989	136	October 1991	20
Nashua TC	Nashua, NH	June 1989	391	October 1991	65
Somersworth Bk	Somersworth NH	September 1989	163	June 1992	16
Eastland Bk	Woonsocket, RI	September 1989	129	December 1992	0[c]
Mature Savings Banks					
Bank Mart	Bridgeport, CT	December 1988	712	December 1991	87
Burritt Interfinancial Bancorp	New Britain, CT	September 1990	701	December 1992	60
Connecticut Svg Bk	New Haven, CT	March 1989	1,270	November 1991	112
Bank Five for Svg	Arlington, MA	September 1989	472	September 1991	97
First Mutual Bk for Svg	Boston, MA	March 1989	1,361	June 1991	223
Merchants Bk of Boston	Boston, MA	March 1989	496	May 1990	105
Workingmens Co-op Bk	Boston, MA	June 1988	254	May 1992	13
Beacon Co-op Bk	Brighton, MA	March 1989	31	June 1991	6
Coolidge Corner Co-op Bk	Brookline, MA	September 1988	97	March 1991	14
New England AllBk for Svg	Gardner, MA	March 1986	203	December 1990	34
Central Svg Bk	Lowell, MA	December 1988	424	February 1992	64
Milford Svg Bk	Milford, MA	September 1988	349	July 1990	142
Granite Co-op Bk	North Quincy, MA	March 1989	130	December 1991	39
Randolph Co-op Bk	Randolph, MA	December 1987	51	July 1989	0[d]
Winchendon Svg Bk	Winchendon, MA	September 1988	88	August 1992	5
Maine Svg Bk	Portland, ME	September 1988	1,748	February 1991	215
New Hampshire Svg Bk	Concord, NH	September 1988	1,104	October 1991	197
Amoskeag Bk	Manchester, NH	June 1988	1,494	October 1991	150
Bankeast	Manchester, NH	March 1989	1,085	October 1991	105
Dartmouth Bk	Manchester, NH	March 1988	535	October 1991	336
Iona Svg Bk	Tilton, NH	December 1989	36	October 1991	5
Attleboro–Pawtucket Svg Bk	Pawtucket, RI	December 1987	809	August 1992	60

Appendix B:
Listing of Failed Banks Studied continued

Bank Name	Location	Nonpeforming Threshold[a]	Asset Size at Threshold ($ millions)	Month of Failure	Estimated Cost to FDIC ($ millions)
Recently Converted Savings Banks					
Brooklyn Svg Bk	Danielson, CT	September 1989	150	October 1990	25
Central Bk	Meriden, CT	December 1989	800	October 1991	222
First Constitution Bk	New Haven, CT	March 1989	2,336	October 1992	127
Suffield Bk	Suffield, CT	June 1989	353	September 1991	96
Eliot Svg Bk	Boston, MA	December 1988	529	June 1990	223
1st American Bk for Svg	Boston, MA	December 1987	688	October 1990	182
Southstate Bk for Svg	Brockton, MA	December 1988	343	April 1992	16
Heritage Bk for Svg	Holyoke, MA	June 1989	1,906	December 1992	15
Vanguard Svg Bk	Holyoke, MA	December 1988	516	March 1992	102
First Service Bk for Svg	Leominster, MA	December 1987	785	March 1989	265
Lowell Inst for Svg	Lowell, MA	September 1988	470	August 1991	127
Bank for Svg	Malden, MA	March 1988	452	March 1992	12
Plymouth Five Cents Svg	Plymouth, MA	December 1988	339	September 1992	10
Landmark Bk for Svg	Whitman, MA	June 1988	94	June 1992	10
Woburn Five Cents Svg Bk	Woburn, MA	March 1988	268	June 1991	68
Seacoast Svg Bk	Dover, NH	March 1989	107	August 1992	4
Eastland Svg Bk	Woonsocket, RI	September 1989	855	December 1992	48
New Banks					
Greenwood Bk of Bethel	Bethel, CT	June 1990	35	November 1992	8
Harbor NB CT	Branford, CT	March 1990	29	October 1991	4
Brookfield Bk	Brookfield, CT	September 1989	62	May 1992	22
Connecticut Valley Bk	Cromwell, CT	March 1990	33	October 1991	10
Bank of East Hartford	East Hartford, CT	September 1990	53	December 1991	13
Enfield NB	Enfield, CT	June 1990	31	August 1991	5
Community NB	Glastonbury, CT	March 1988	107	January 1991	28
Whitney B&TC	Hamden, CT	December 1989	52	April 1991	30
Landmark Bk	Hartford, CT	September 1989	286	March 1991	51
Sentinel Bk	Hartford, CT	September 1989	97	January 1992	17
Norwalk Bk	Norwalk, CT	March 1990	88	April 1992	8
Saybrook B&TC	Old Saybrook, CT	September 1988	103	December 1991	23
Summit NB	Torrington, CT	September 1989	94	April 1992	23
Vernon Bk	Vernon, CT	December 1989	26	June 1992	2
Colony Svg Bk	Wallingford, CT	September 1988	46	February 1992	7
Blackstone B&TC	Boston, MA	June 1989	68	March 1991	15
Boston Trade Bk	Boston, MA	June 1989	351	May 1991	143
Olympic Intl B&TC	Boston, MA	June 1989	226	June 1992	39
New Heritage Bk	Lawrence, MA	March 1989	70	March 1992	12
Shore B&TC	Lynn, MA	March 1989	156	April 1992	17
Midcounty B&TC	Norwood, MA	March 1988	37	September 1991	21
Hillsborough B&TC	Milford, NH	September 1989	64	August 1991	34
Atlantic TC	Newington, NH	June 1987	19	January 1992	8
United States Svg Bk	Seabrook, NH	March 1987	12	July 1990	2
Valley Bk	White River Jnct, VT	June 1989	43	September 1991	13
Totals			$60,162		$6,588

[a]Quarter end when nonperforming commercial real estate assets (commercial and industrial loans or the total of the two categories in some cases) should have been recognized as above the normal range.
[b]Bank of New England Corporation subsidiary.
[c]Apparently included in cost for affiliated Eastland Savings Bank.
[d]A Massachusetts private insurer will absorb the entire loss in this case.

Appendix C: Evidence on the Relative Contributions of Commercial and Residential Real Estate to New England Bank Credit Problems

Bank call reports (quarterly reports of condition to supervisors) began in March 1991 to show nonperforming and charge-off (write-off) data for real estate loans by type of property. These data were examined for the 62 banks that failed after filing at least one report following the change. The data confirmed for 34 of these banks that commercial real estate was far greater a problem than residential real estate. In one bank, the mix of nonperforming real estate assets was relatively balanced, 40 percent in one- to four-family residential, 9 percent in multifamily, and 51 percent in other commercial real estate loans and properties. Six new banks included in the 62 banks reporting were primarily damaged by commercial and industrial loans, but the data confirmed that secondary real estate problems in two of these were attributable to commercial real estate loans.

The new data were not sufficient to confirm the type of real estate that caused the failure of the remaining 21. The new data began so late in the development of these problems that most of the nonperforming loans were already in the form of foreclosed property, for which no breakdown was available, and major real estate write-offs were not taken in the final quarters before failure. Since each of these 21 banks had a very high concentration in commercial real estate loans prior to the surge in nonperforming real estate, a strong basis exists for the assumption that commercial real estate loans were the cause of their failure.

Additional direct evidence obtained from annual reports of bank holding companies demonstrated the dominance of commercial real estate problems in five more banks, and various supervisory materials and press reports show the same for additional failed banks. No evidence was found that any of the banks failed because of residential real estate problems, although that cannot be ruled out entirely.

Indirect evidence on the subject includes the following:

1. Annual report schedules for several of the larger surviving bank holding companies that experienced severe real estate loan problems show breakdowns by type of property for nonperforming loans, foreclosed property, and/or write-offs. In each case the damage was overwhelmingly attributable to commercial real estate loans.

2. FDIC data (*Quarterly Banking Profile*) show that noncurrent loans and charge-offs in banks in the Northeast region were much higher for commercial real estate loans than for residential loans in the past three years. Also, a disaggregation of foreclosed property, incorporated into call reports in June 1992, shows a preponderance of commercial property.

3. Residential mortgage delinquency data published by the Mortgage Bankers Association (*National Delinquency Survey*) show that New England had the lowest delinquency and foreclosure rates in the country in 1988 and 1989. Although these measures deteriorated steadily in New England from 1988 to 1991, the region's delinquency rate was still below the national average at the end of 1991, although by that time the foreclosure statistics had moved above the average.

To some extent the earlier deterioration in these statistics may reflect problems with investor-owned condominiums. By 1991, the regional recession, with widespread layoffs and an illiquid housing market, was causing higher numbers of foreclosures. Thus, most of the problems related to owner-occupied residential properties came after the banks in this study were close to failure.

Appendix D: Stock Market Reaction

In an earlier study the author demonstrated that stockholders and debt rating agencies consistently failed to act against risk concentrations until actual credit problems emerged (Randall 1989). That study covered 40 large BHCs that failed or experienced serious difficulties in the period from late 1979 to mid 1987. The current study of New England bank failures did not systematically analyze the timing of stockholder reactions or debt rating changes. Sixteen banks with assets of approximately $4.3 billion were mutual institutions, and several others were relatively small banks whose stock prices were not readily available. Nonetheless, some observations can be made based on a review of seven failing New England BHCs whose bank assets represent 62 percent of the assets of all stockholder-owned banks in the study.[25] In each case all, or nearly all, of the ultimate decline in stock prices took place after the level of nonperforming assets had moved above the thresholds used in this study.

Bank of New England's average stock price was generally somewhat lower in 1988 than in the previous two years, but did not penetrate the lows of those years until late in 1989, about the time that its shockingly large loan loss provision was announced, and well after the March 1989 nonperforming threshold used here. Two New Hampshire BHCs experienced sharp drops in the price of their stocks in late 1987 as a result of losses in equity investments unrelated to their subsequent credit problems, but the big declines came after the credit problems emerged. Another experienced a similar drop in stock price in late 1987, apparently for the same reason.

While this analysis of stock prices was not rigorous, the results are consistent with the earlier study, in that no evidence was found that the stock market anticipated major credit problems despite the heavy loan concentrations and increasingly overbuilt real estate markets.

[25] The seven BHCs are Amoskeag Bank Shares, Inc., Manchester, NH; Bank of New England Corporation, Boston, MA; BankEast Corporation, Manchester, NH; City Trust Bancorp, Inc., Bridgeport, CT; Dartmouth Bancorp, Inc., Hooksett, NH; 1st American Bancorp, Inc., Boston, MA; and New Hampshire Savings Bank Corporation, Concord, NH.

Taxes, Income Distribution, and the Real Estate Cycle: Why All Houses Do Not Appreciate at the Same Rate

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The volatility of housing prices in the United States since the 1970s has attracted considerable attention. Real housing prices in much of the country rose substantially during the 1970s; then, this trend reversed itself in many areas during the 1980s. For example, real prices in Los Angeles rose more than 70 percent in the late 1970s, then fell 10 percent during the 1982 recession; they increased by another two-thirds in the late 1980s, and now are down more than 20 percent and may still be falling. In Boston, real prices increased 130 percent between 1982 and 1988 and then fell by one-third before stabilizing in 1991.[1] Figure 1 shows the behavior of real house prices in four other metropolitan areas across the country.

When the housing market is separated into tiers based upon value, prices are seen to be even more volatile. In Chicago, between 1970 and 1978 the real value of high-priced homes (those in the top one-third) increased over 40 percent, while the prices of low-priced homes (those in the bottom one-third) increased less than 25 percent. On the downside, the real value of high-priced homes in Oakland fell by almost one-quarter (in real terms) between 1980 and 1985, while prices of low-priced homes remained almost flat.

The issue of how relative prices move is important in determining the affordability of owner-occupied housing, particularly for first-time homebuyers. Many groups calculate affordability indices based upon aggregate price movements. To the extent that low-priced ("starter") homes do not appreciate at the same rate as the whole market, these indices can lead to poor policy decisions on such issues as subsidies for home purchases and tax changes. Differences in long-run appreciation rates of high-priced and low-priced homes are also indicative of movements in the distribution of wealth, by income group as well as by generation.[2]

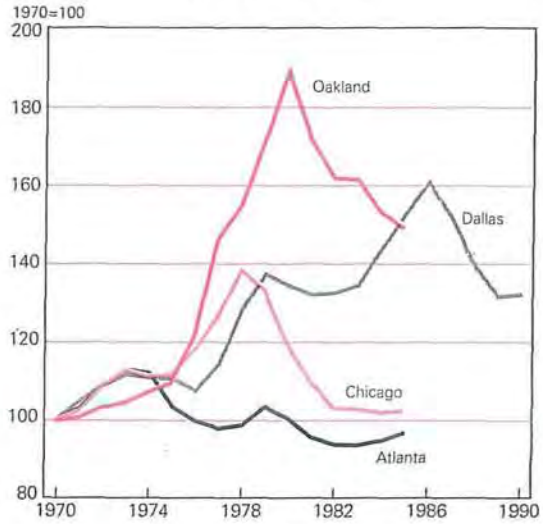
Data on relative price changes are important to individual homeowners who follow trends in the real estate market to keep track of the

latest price of their property. Price and sales volume numbers from the U.S. Bureau of the Census, the National Association of Realtors, and various national and state industry groups are reported prominently by the media.[3] These data are usually broken down by geographic area and property type, but rarely by value.

A simple comparison of changes in prices and sales in two neighboring communities suggests that significant variation in market conditions exists within a given metropolitan area, which may be attributable to changes in the value of differently priced homes. In the Boston area, according to *Banker & Tradesman*, sales of single-family homes in the upscale town of Wellesley fell 2.2 percent in 1992, with an increase in the median sales price of 8.6 percent. In nearby Malden, a lower-middle-class town, single-family home sales grew 8.3 percent, but median prices fell 2 percent.[4]

Figure 1

Indices of Real House Prices in Four Cities



Source: See Table 1.

I. Taxes, Income Distribution, and Real Estate Cycles

This paper explores economic explanations of why high-priced and low-priced homes appreciate at different rates.[5] Poterba (1991) first addressed this question in the context of a study looking at how tax and demographic changes may have affected the housing market. He shows that high-priced properties appreciated at a faster rate than low-priced properties during the late 1970s, and he attributes the difference in appreciation rates to the fact that the late 1970s were a time of both high marginal tax rates and expectations of rising inflation. The latter particularly benefited high-income homebuyers with high marginal tax rates, because of the increased nominal tax deductions. A demographic explanation would predict the opposite. The baby boomers were just coming into the housing market, suggesting that demand for starter homes should have increased.

Consistent with the tax hypothesis, Poterba found that the highest priced one-quarter of homes appreciated 1 to 2 percent per year faster than homes in the bottom one-quarter of the price distribution. However, the late 1970s were also a time of generally rising real house prices and widening spreads in the income distribution. Either of these factors may also have caused the values of high-priced and low-priced houses to change at different rates, which Poterba attributed to differences in marginal tax rates.

Much discussion has taken place recently about changes in the distribution of income. For example, Bradbury (1990) finds that while the average non-elderly family's real income rose 7.1 percent between 1979 and 1988, income for the poorest one-fifth of families fell 12.5 percent and income for the richest fifth rose 14.3 percent. If rich and middle-income families typically shop for different types of houses, the increasing spread in the income distribution could have significant effects on the appreciation rates of high-priced and low-priced homes.

[1] These data are from Case, Shiller, and Weiss, Inc.

[2] Older households tend to be wealthier and to own larger homes.

[3] In Massachusetts, *Banker & Tradesman* publishes median prices and the number of sales by city and town, and the same data are available for realtor transactions from the Massachusetts Association of Realtors.

[4] Meese and Wallace (1991) found similar variation in prices for cities in the San Francisco/Oakland area using indices calculated with a non-parametric model.

[5] The alternative view is that buyers' tastes have changed. For example, the relative value of a ranch versus a colonial probably does not change very much in a year, but could change further over longer time horizons. Similarly, buyers seem to prefer more bathrooms now than in the past, but this may be due to lower relative construction costs rather than changing tastes.

Price differences over the real estate cycle might also explain relative changes in house values. Stein (1992) argues that price declines can combine with down payment constraints to prevent some owners from selling their properties. According to Stein, sellers who rely on the equity in an existing house to purchase another property may not be able to move if their house declines in value. He develops a model in which some owners who would benefit from selling and moving (for example, owners who are offered a better job) are "locked in" to their properties and choose not to sell, rather than be in a position of losing the tax and other benefits that accompany owning a home. A survey by the Chicago Title and Trust Company supports the Stein view, finding that about one-half of the down payment for repeat buyers comes from the proceeds of the sale of an existing home.

In Massachusetts, the "lock-in" effect may have exacerbated the recent real estate downturn by substantially reducing the number of transactions while at the same time increasing the inventory of unsold homes. Stein notes that, in a down market, constrained sellers may "go fishing" by listing a property at a high price, hoping that a buyer arrives who is willing to pay that high price.

Although the Stein model analyzes a market with one type of house, an extension would suggest that the higher-priced "trade-up" market would suffer disproportionately if housing prices turned down. Some potential purchasers of high-priced units would be unable to realize sufficient funds from the sale of their current home, while first-time buyers would not be so constrained. The Stein model could also be extended to an up market, when down payment constraints are still binding, especially for many first-time buyers. When prices are rising, owners of highly leveraged units earn a large return and are in a relatively better position to purchase a new property than a buyer who does not currently own a home. This explanation suggests that high-priced homes might have above-average appreciation rates during housing booms, but below-average appreciation rates in a bust.

Local growth could also have a differential impact on the markets for high-priced and low-priced homes, so this paper will include a variable measuring the growth in the adult population. A demographic explanation similar to that in Mankiw and Weil (1991) would predict that (adult) population growth should be correlated with increases in prices of low-priced properties.[6]

II. Evidence from Previous Studies

Several papers in addition to Poterba (1991) show that various types of houses do not appreciate at the same rate. Clapp and Giacotto (1992) compare appreciation rates for properties that sell only once or twice (trade-up homes) with rates for properties that sell more frequently (starter homes) in a given period of time. They show that high-turnover properties have lower average sale prices than properties that sell less frequently; they also find systematic short-run differences in the appreciation rates of properties grouped by frequency of sale in all five cities included in their study. The authors conclude that starter homes with a high turnover rate are a biased sample of all homes that sell in a market. This evidence is consistent with the hypothesis in the current analysis that high-priced properties do not appreciate at the same rate as low-priced units.[7]

Smith and Tesarek (1991) develop a methodology to estimate a price index for different quality levels. Using data from Houston for several years between 1970 and 1989, they find that high-quality properties appreciated faster than average during the boom of the 1970s, but their prices fell faster during the oil bust of the 1980s. Delaney, Seward, and Smith (1992), examining St. Petersburg, Florida, find that high-priced property appreciates more than its low-priced counterpart in a boom, but find no difference in rates of change during downturns. When units are stratified by size, rather than value, they find no statistical difference in appreciation rates.[8] The conclusions of both these studies are roughly consistent with the Stein hypothesis, in which high-priced, trade-up homes are more volatile over the course of the real estate cycle.

[6] Mankiw and Weil argue that the aging of the baby boom generation will increase the demand for housing, raising prices. As Poterba (1991) observed, an extension of this theory would predict that as the baby-boomers reached adulthood starting in the mid 1970s, they would enter the housing market by purchasing starter homes. This growth in demand should increase the price of low-priced homes relative to high-priced properties.

[7] Looking at Hartford, Connecticut between 1982 and 1988, Clapp and Giacotto (1992) find that the average price of a single-sale home is 15 percent above that of a multiple-sale property. They also show that average prices are significantly higher for properties that sell twice versus those that sell three or more times, using the Case and Shiller (1987) data for Atlanta, Dallas, Chicago, and Oakland from 1970–1986.

[8] There are some technical problems with the Delaney, Seward, and Smith (1992) paper, discussed below, that could negate its conclusions.

III. The Model and Data

This paper attempts to quantify the extent to which changes in taxes or other user costs, movements in the income distribution, and cyclical considerations affect the difference in appreciation rates between high-priced and low-priced properties. Of the papers reviewed above, only Poterba (1991) attempts to explain the differences in appreciation rates rather than just identify the differences. The current analysis uses data from the same four metropolitan areas as Case and Shiller (1987), but expands the Dallas index through 1990 using information from the Dallas County Appraisal District. Table 1 lists the cities, sources, and the relevant time periods. The data are annual, and the coverage dates vary because of the availability of data.

Table 1
Sample Summary for Four Cities

City	Years	Source
Atlanta	1970–1985	Case and Shiller (1987)
Chicago	1970–1985	Case and Shiller (1987)
Dallas	1972–1990	Case and Shiller (1987) and Dallas County Appraisal District
Oakland	1970–1985	Case and Shiller (1987)

Based on the hypotheses outlined earlier, the rate of price appreciation for high-priced housing units from year t−1 to year t is modeled as a function of the rate of growth of earnings of high-income households and the percentage change in the user cost of high-priced properties. A similar equation exists for low-priced homes.[9] Because the two series are likely to be affected by common factors in the housing market, the difference between the lagged levels of these two series is also added to the right-hand side of both equations.[10]

Although each housing tier's price movements may be of interest separately, this study begins by explaining the difference in appreciation rates between high-priced and low-priced housing units. This difference is modeled as a function of the differences in income growth, growth in user costs, and the levels of the indices for high-priced and low-priced homes.[11] Note that in this equation it is the differences between the values for the high and the low tiers that are measured, rather than the differences over time. The regression also includes the rate of growth in the adult population.

Price Indices

The price indices are created using the value-weighted, arithmetic resale price methodology proposed by Shiller (1991).[12] A resale price index uses data from units that sell more than once to estimate a market appreciation rate for a given type of property.[13] It is superior to the more routinely used index of median prices because the latter is affected by the changing mix of properties sold over the cycle. Also, the resale price index does not suffer from the omitted variables problem common to the hedonic price index.[14] The arithmetic index is computed as the average appreciation rate of properties sold during a given period.[15] The value-weighted index is interpreted as the change in the value of a representative portfolio of all houses.[16]

[9] In a paper looking at the San Francisco area housing market, Meese and Wallace (1993) show that prices are I(1), or stationary in differences. For this reason, the equations are formulated as time differences in order to get consistent estimates. For ease of interpretation, appreciation rates are used instead of the difference between price levels in year $t-1$ and year t.

[10] For example, the value of high-priced homes may increase more than the value of low-priced homes in a given year because of some random factor such as a short-term demand shock. Because the demand shock is temporary, the value of low-priced homes should catch up in the next year, suggesting that low-priced homes would appreciate faster than high-priced units when a large difference exists in the lagged price levels of high-priced and low-priced homes. In formal terms, the two series are probably cointegrated, meaning that they are affected by some one or more common factors that pull the series together in the long run. A test of cointegration is not provided because of the small number of yearly observations in each city.

[11] User costs are constructed to be exogenous with the appreciation rate of housing by assuming that expected house price appreciation is the same as expected inflation.

[12] The value-weighted arithmetic index is analogous to indices used for other financial assets and is much less susceptible to outliers than the equal-weighted geometric index used in Case and Shiller (1987).

[13] See Case and Shiller (1987), Haurin and Hendershott (1991), and Shiller (1991) for a complete discussion of resale price indices.

[14] The hedonic price index is formed by regressing a property's sale price on various characteristics (number of bedrooms, number of bathrooms, square footage, and the like) and a set of time dummy variables.

[15] In this case, the regression calculates the price index vector that minimizes the sum of the squared errors in the estimate of the appreciation rate for each property.

[16] An equal-weighted index looks at a portfolio consisting of a fixed dollar amount invested in each house. Consequently the equal-weighted index oversamples low-priced houses relative to their impact on the overall value of housing. The final price index

The data consist of pairs of sale prices and sales dates, with each pair representing two consecutive sales of the same property. For each city, two types of price indices are created: an aggregate index using all sales, and three tiered indices. Each tiered index is computed using only price pairs whose average sale price was in the corresponding third of all sale prices, measured in constant dollars.

Specifically, each sale price is divided by the aggregate index value for that quarter, so that all prices will be in comparable terms. The price for each property is the average of the indexed prices from the first and second sales. That is, if aggregate house prices increased 10 percent between the first quarter of 1980 and the first quarter of 1981, sales prices in 1981 would be indexed by dividing the 1981 price by 1.1. A house that sold in the first quarter of both 1980 and 1981 would have an average indexed price that equals $(P_{1980} + P_{1981}/1.1)/2$. Price pairs are divided into three equal groups, based on where their average indexed price falls in the distribution of all indexed prices.

This method is similar to that used by Poterba (1991), and it avoids the potential bias present in the technique used by Delaney, Seward, and Smith (1992). The latter study separates properties into groups based upon the percentile of the first sale price. If prices are measured with error, some properties will have a low first sale price because of details of the sale rather than because the house truly has a low value. For example, the seller may have been transferred or lost his or her job and needed a quick sale. By causing the house to have a low first sale price, these circumstances would also cause that unit to have a greater than average rate of appreciation later.[17]

After grouping the paired sales into three tiers, separate price indices were calculated for low-, middle-, and high-priced housing. The index for the high-priced tier, for example, can be interpreted as showing price changes for the portfolio of properties whose sale prices were in the upper one-third of all units sold. Computation of a separate index for each price tier allows a comparison of price movements of these tiers over time.

Figure 2 graphs the indices for the high and low house-price tiers in each of the four metro areas, measured in real terms. Consistent with Poterba's (1991) tax and expected inflation hypothesis, these figures show that high-priced homes appreciated significantly faster than low-priced homes in the 1970s, with the possible exception of Oakland. This was a period of rapid (real) appreciation for all types of homes, however, so the Stein real estate cycle hypothesis is consistent with the same pattern. These data show quite a bit of variation between the high-priced and low-priced markets in the different metropolitan areas and over time, suggesting that the other factors discussed earlier may also be important in explaining the relative movements of these two tiers.

Income Distribution

Income growth rates are calculated for three tiers of the income distribution intended to represent the owners of homes in each of the three house-price tiers. These income statistics are drawn from the Census Bureau's Current Population Survey (CPS) from 1969 to 1990 and adjusted for inflation using the urban consumer price index. Ideally, income growth rates would be calculated for the four metropolitan areas being studied. Unfortunately the CPS does not have enough observations to make reliable calculations, so the income growth rates are calculated for the Census division (group of states) in which each metropolitan area is located.[18]

The calculations assume a homeownership rate of 67 percent and that all households with income above the 33rd percentile own their own home. Within the class of homeowners, higher-income households are assumed to purchase higher-priced housing. That is, among homeowning households, the one-third with the highest incomes are assumed to own homes in the highest price tier, and the one-third with the lowest incomes are assumed to own homes in the lowest price tier. Dropping the poorest one-third of households and dividing the rest into three groups would imply that households in the lowest homeowner group are between the 33rd and

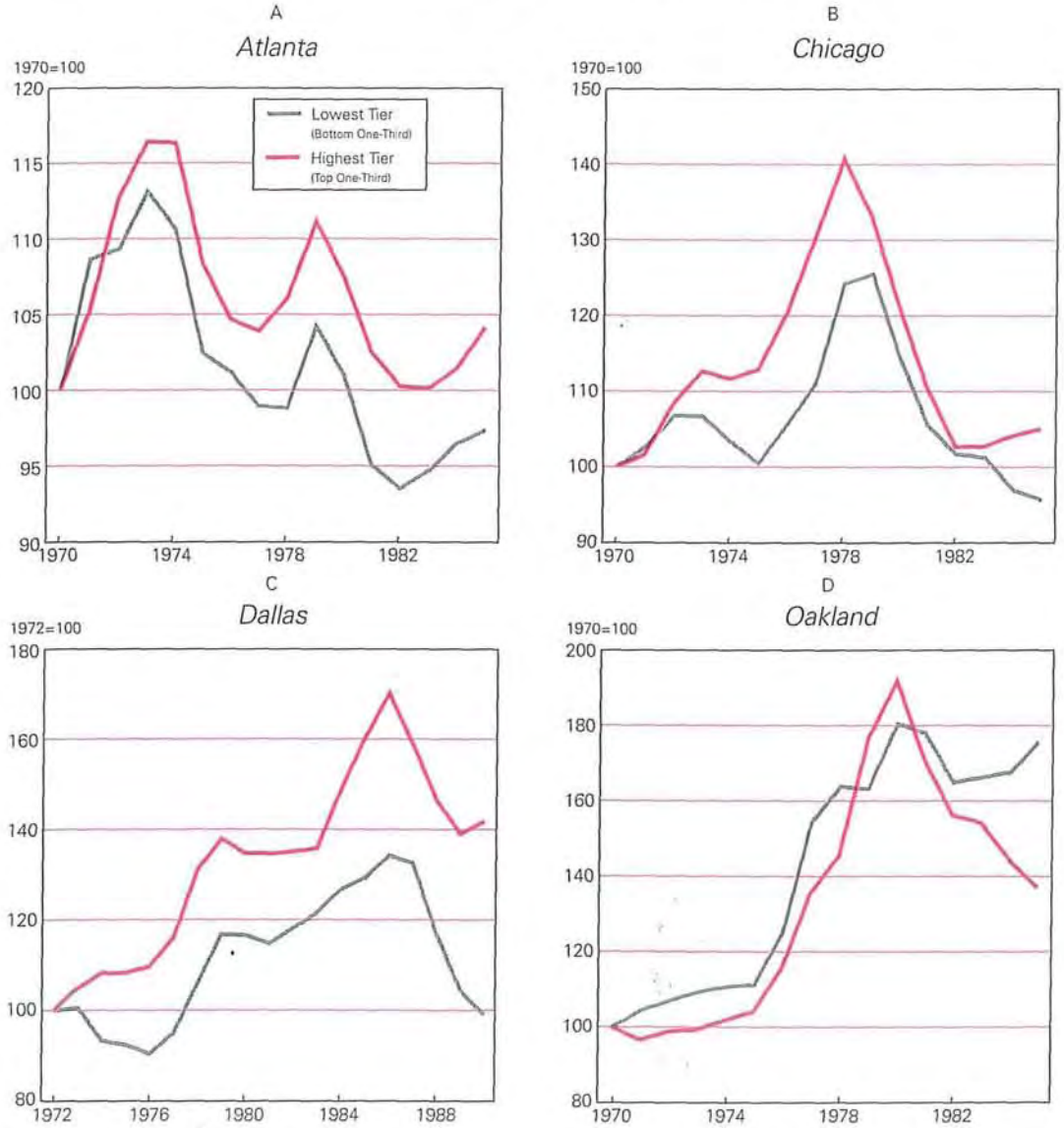
was calculated using a procedure that downweights units that appreciated much faster or slower than the rest of the market.

[17] Simulations of prices in these four cities show that about one-quarter of all properties would change tiers between the first and second sale if tiers were defined as one-third of houses sold each quarter. Consequently, using the first sale price to classify houses would cause the index for low-priced units to overstate their true rate of appreciation, whereas the appreciation of high-priced properties would be underestimated. Using the second sale price to divide homes has the opposite effect. This paper, by using an average of both sale prices to classify properties, minimizes the bias caused by properties changing tiers.

[18] Dallas (West-South Central); Oakland (Pacific); Chicago (East-North Central); and Atlanta (South Atlantic).

Figure 2

Indices for Lowest and Highest Tiers of Real House Prices



Source: See Table 1.

56th income percentiles, the middle from the 56th to 78th, and the highest above the 78th percentile. The median income level within each of these groups is used to define the "typical" household income in each price tier. Thus, the lowest tier's income is tracked at the 44th income percentile and the highest tier's at the 89th percentile.

Figure 3 shows that the spread between the 44th and 89th percentiles in the income distribution grew between 1970 and 1990 in the West-South Central Census division that includes Dallas. Other divisions have a similar pattern, although the actual level of income varies. Notice, however, that the incomes for the high and low tiers do not change very much

relative to the magnitude of the house price changes in Dallas for these same tiers (Figure 2c). This finding is consistent with other research that has found house price changes much more exaggerated than income shifts and has concluded that income changes alone do not satisfactorily explain house price appreciation.[19]

User Cost

The total cost of living in a house for a given period of time equals the user cost multiplied by the value of the house. The user cost is a function of the tax and interest costs of owning the home, as well as maintenance costs, physical depreciation, and potential changes in a home's resale value. This research uses Poterba's (1991) definition of user cost, as follows:

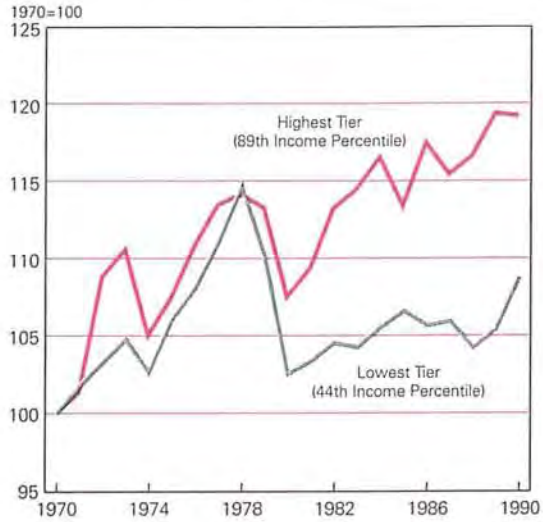
$$(1) \qquad C = [(1 - \theta)(i + \tau_p) + \delta + \alpha + m + \pi^e],$$

where θ is the owner's marginal tax rate, i is the nominal interest rate on mortgages, τ_p is the property tax rate as a percent of total value, δ is the housing depreciation rate, α is the risk premium, m is the maintenance cost per unit of value, and π^e is the expected rate of nominal house price appreciation. The calculations assume an annual property tax rate of 2 percent, a risk premium of 4 percent, maintenance costs of 2.5 percent, and an average real depreciation rate of 1.4 percent. Tax rates were calculated from imputed taxable annual income for the median household in each house price group, as described above. To compute house price appreciation, this study assumes that houses appreciate at the same rate as other goods.[20] The variable for expected inflation is measured as a weighted average of past inflation rates using the urban consumer price index for each city.[21]

Figure 3

Index of Real Household Income

Dallas



Source: U.S. Bureau of the Census, *Current Population Survey*, data for the West-South Central division.

According to theory, housing demand is a function of rents, which equal the user cost multiplied by the house value. Because of movements in housing supply, rents will adjust to, but not fully offset, changes in the user cost. Since the estimated price difference equation is of reduced form, it is reasonable to use the growth rate of user costs as a right-hand-side variable to explain changes in appreciation rates. (See Poterba (1984) for a structural model of this adjustment process.)

Figure 4 shows the movement of user costs for the median household that would occupy a house in the high and in the low price groups in Dallas. It is clear that movements in marginal tax rates and expected inflation had large effects on the user cost of buying a home. The maximum marginal tax rate was 70 percent after 1971, and it did not drop substantially until the 1981 Tax Act started reducing tax rates. Since nominal interest payments are tax-deductible and nominal interest rates rise at about the same rate

[19] For example, see Case and Shiller (1989).

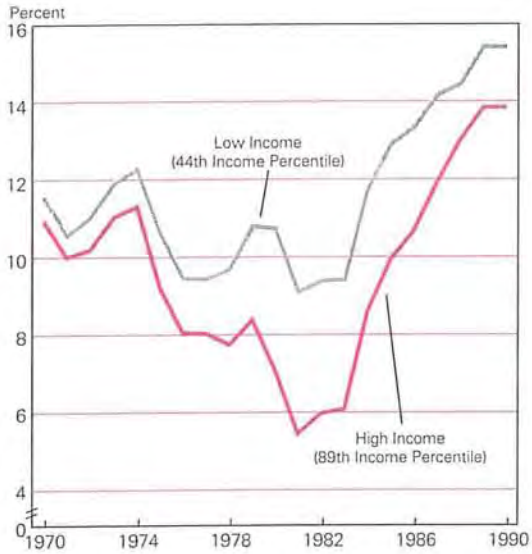
[20] An alternative that others have tried is to estimate future housing appreciation as a function of current and lagged appreciation rates. Such a method would result in very high expected future appreciation rates during housing booms and low or negative housing appreciation rates during busts, which might not be realistic in the long run. To look for the possibility of misspecification, later regressions were also run using lagged housing appreciation instead of expected inflation. The coefficient on the user cost variable was small and not statistically different from zero, so this specification was dropped.

[21] The consumer price index for all goods comes from the Bureau of Labor Statistics. Unfortunately, the shelter component is not separated for these cities until 1977. Expected inflation is a five-year weighted average with weights calculated by the declining sum of the digits method. Because the tax variable in the subsequent regressions is measured as the difference in user costs between high- and low-priced homes, the results are not very sensitive to the method by which expected inflation is calculated.

Figure 4

Annual User Cost

Dallas



Source: See the text.

as expected inflation, expected inflation disproportionately benefits households with high marginal tax rates. As the user cost equation indicates, an increase of 1 percentage point in expected inflation raises interest payments by $1*(1-\theta)$, where θ is the owner's marginal tax rate, but raises house price appreciation 1 full percentage point.

IV. Regression Results

Table 2 presents regression results from estimating the equation explaining the difference in real appreciation rates between the high-priced and low-priced housing tiers. The data pool all the yearly observations for the four metropolitan areas. In the equation, the coefficient on the difference in the growth of user cost is negative as expected, but is significantly different from zero with only 85 percent confidence. Nonetheless, the results provide some evidence that relative changes in user costs have effects on the relative appreciation rates of high-priced and low-priced homes. The negative sign confirms that an increase in user costs is associated

Table 2

Regression Estimates for Differences in Price Appreciation between High-Priced and Low-Priced Tiers of Housing in Four Metropolitan Areas

Item	Equation 1
Dependent Variable	DRAPR
Estimation	OLS
R^2	.2120
N	63
Variable	
Constant	.0147
	(.0263)
DRINCG	−.1985
	(.3001)
DUSERG	−.1439
	(.0935)
DLRI	−.0032
	(.0011)
POPG	−.7882
	(.9679)
CHIDUM	.0102
	(.0292)
DALDUM	.0365
	(.0175)
OAKDUM	−.0241
	(.0230)

Standard errors in parentheses.

Notes to Tables 2 and 3

Variable Definitions:

DRAPR = Difference in real appreciation rates between high- and low-priced properties

DRINCG = Difference in the growth rate of real income for high- and low-income households

DUSERG = Difference in the growth rate of user costs for high- and low-priced properties

DLRI = Error correction term—difference in the lagged level of real price indices for high- and low-priced properties

RAPRLOW = Real appreciation rate for homes in the low tier

RAPRHIGH = Real appreciation rate for homes in the high tier

RINCGLOW = Growth rate of real income for low-income households

RINCGHIGH = Growth rate of real income for high-income households

USERGLOW = Growth rate of user costs for low-priced properties

USERGHIGH = Growth rate of user costs for high-priced properties

POPG = Growth rate of population

CHIDUM = Dummy variable for Chicago

DALDUM = Dummy variable for Dallas

OAKDUM = Dummy variable for Oakland

with a decline in house values. The size of the coefficient suggests that if the user cost for the low-price tier grew 1 percent faster than that for the high-price tier, low-priced homes would appreciate 0.14 percent more slowly relative to the high-priced tier.

The income distribution hypothesis does not fare well. The coefficient is statistically indistinguishable from zero. The variable's poor showing may reflect the small movement in the income distribution relative to the magnitude of the changes in user costs and housing prices. The coefficient on population growth has a negative sign and is not statistically different from zero at any reasonable confidence level.[22]

Also included in the equation is an error correction term that is measured as the difference in the lagged level of the (real) price index for high-priced and low-priced homes. The coefficient is negative, and is significantly different from zero with greater than 99 percent confidence. This estimate provides evidence that the markets for high-priced and low-priced homes are not always in equilibrium. The negative sign means that a larger price difference between high-priced and low-priced homes at the beginning of the period leads high-priced homes to appreciate less quickly. In other words, the two series have a long-run relationship that ties them together over time.[23] If the high-priced and low-priced markets were both in equilibrium, the price difference between them would depend only on factors like relative user costs and income changes.

The coefficients on the city dummy variables indicate that other factors not included in these regressions affect the relative movements of differently priced homes in the four cities. For example, the prices of low-tier homes grew much more slowly in Dallas than in the other three cities. (See Figure 2.)

Sorting out the relationship between the real estate cycle and rates of price appreciation is more difficult, for statistical reasons. In particular, the overall market rate of appreciation is the most natural indicator of the cycle's stage (boom or bust), but the overall market appreciation rate is not independent of movements in the two tiers' price indices, which the analysis is trying to explain.

One possibility is to examine directly the relationship between rates of appreciation in the two indices by regressing (real) appreciation rates of high-priced homes on (real) appreciation rates of low-priced homes and vice versa. These regressions show to what extent contemporaneous shocks in the appreciation rates in one price range affect the appreciation rate of the other price range. The Stein hypothesis would predict that shocks to the low end of the market should have a significant effect on the high end of the market because of trade-up buyers, whereas the reverse effect should not appear. These equations are presented as the first two regressions in Table 3, also controlling for the lagged and current growth in user costs for the respective markets, as well as for changes in their respective real income levels. Consistent with the Stein hypothesis, the estimated coefficient on the appreciation rate of high-priced homes in equation 2 is somewhat larger than the estimated coefficient on low-priced homes in regression 1, although it is not possible to reject the hypothesis that the coefficients are equal with any confidence.

Endogeneity may present a problem in the first two regressions: some shocks to the housing market undoubtedly affect both high-priced and low-priced homes similarly. To control for common shocks, the current and lagged growth rates in user costs and income for the high and low price tiers are used in a first stage regression to create predicted values of appreciation of high-priced and low-priced homes, respectively, that do not depend on common housing shocks that would affect both types of houses. The predicted appreciation rates are then used as explanatory variables in regressions that are otherwise the same as the first two equations in Table 3. These

The issue of how relative housing prices move is important in determining the affordability of owner-occupied housing, particularly for first-time homebuyers.

[22] To control for changes in the economy, unemployment was added in another regression that also included the other variables in this equation. The coefficient was quite small and not statistically different from zero, so the results are not reported here.

[23] The classic example is a person walking a dog. As the dog strays away from its master, the leash will pull them back together. The leash in this example is the arbitrage condition that keeps high-priced units from appreciating much differently from low-priced units for reasons such as random shocks to the prices of one type of property or the other.

Table 3
Regression Estimates for Price Appreciation of the High- and Low-Priced Tiers of Housing

Item	Equation 1	Equation 2	Equation 3	Equation 4
Dependent Variable	RAPRHIGH	RAPRLOW	RAPRHIGH	RAPRLOW
Estimation	OLS	OLS	IV	IV
Instrument	—	—	USERGLOW, RINCGLOW USERGLOW(−1) RINCGLOW(−1)	USERGHIGH, RINCGHIGH USERGHIGH(−1) RINCGHIGH(−1)
R^2	.5899	.6194	.5685	.5865
N	63	63	63	63
Variable				
Constant	−.0127	−.0392	.0105	−.0491
	(.0275)	(.0244)	(.0525)	(.0280)
RAPRLOW	.6718		.9883	
	(.1178)		(.6068)	
RAPRHIGH		.5666		.3365
		(.0977)		(.2781)
RINCGLOW		−.0191		.0702
		(.1732)		(.2080)
RINCGHIGH	.3251		.1993	
	(.1975)		(.3163)	
RINCGLOW(−1)		.3542		.5177
		(.2026)		(.2813)
RINCGHIGH(−1)	.3454		.0922	
	(.2307)		(.5348)	
USERGLOW		−.0531		−.0675
		(.0635)		(.0687)
USERGHIGH	−.0499		−.0297	
	(.0508)		(.0662)	
USERGLOW(−1)		−.0779		−.1082
		(.0587)		(.0705)
USERGHIGH(−1)	−.0251		−.0005	
	(.0446)		(.0662)	
DLRI	−.0021	.0025	−.0027	.0023
	(.0012)	(.0010)	(.0017)	(.0011)
POPG	.2665	1.811	−.6289	2.250
	(1.034)	(.9282)	(2.009)	(1.094)
CHIDUM	.0285	.0260	.0098	.0409
	(.0301)	(.0276)	(.0475)	(.0335)
DALDUM	.0297	−.0236	.0329	−.0191
	(.0171)	(.0156)	(.0192)	(.0172)
OAKDUM	.0057	.0547	−.0226	.0680
	(.0252)	(.0218)	(.0594)	(.0274)

Standard errors in parentheses.
Variable definitions are provided in the Notes to Tables 2 and 3.
Lagged value of a variable equals variable name (−1).

two-stage least squares estimates, presented in equations 3 and 4 in Table 3, are also evidence consistent with the Stein hypothesis. The estimated coefficient in regression 3 shows that a 1 percentage point increase in the appreciation rate of low-priced homes is associated with a 0.99 percentage point increase in

the appreciation rate of high-priced homes, a result that is statistically different from zero with approximately 90 percent confidence. In contrast, the estimated effect of the appreciation rate of high-priced homes on the appreciation rate of low-priced homes is small and not statistically different from zero. These results are consistent with the hypothesis that changes in prices for the high end of the housing market are correlated with contemporaneous changes that affect only the prices of low-priced homes, but that the reverse is not true.

The fact that the population growth variable is significantly different from zero with more than 95 percent confidence in the low-priced homes equation, but not significantly different from zero in the high-priced homes equation, suggests that growth in the adult population initially affects prices of low-priced homes, which then change the demand for high-priced units. This result supports the demographic hypothesis in Mankiw and Weil (1991). The low-priced homes equation also provides a bit of support for the income hypothesis. The coefficient for lagged income growth is positive and significantly different from zero with over 90 percent confidence. Since lower-income families are more likely to be buying their first home, income fluctuations may have a more direct bearing on their ability to buy a home than on that of richer residents, who may already possess housing assets and other wealth.

V. Conclusion

This paper has shown that significant differences exist in the relative appreciation rates of high-priced and low-priced homes, and these differences can persist over long periods of time. They are explained, in part, by changes in the user cost of owning a home and by cyclical factors that cause prices of expensive homes to be more volatile than those of low-priced homes, over the real estate cycle.[24] Because of the collinearity of these two factors during the 1970s and 1980s, studies that consider only changes in user costs may overestimate the effect of taxes on relative house prices. The evidence does not show that changes in the income distribution affect relative house prices, although this negative result may only indicate that regional income changes are a poor proxy for local income changes. Further evidence in favor of the real estate cycle hypothesis comes from the finding that changes in the appreciation rates of high-priced homes are correlated with movements in the appreciation rates of low-priced homes, while the reverse is not true.

Future research might attempt to separate two hypotheses about why the market for high-priced homes seems to depend on the market for low-priced homes. Stein (1991) hypothesizes that equity is important in relaxing the down payment constraint on a household's future home. When housing prices fall, some homeowners are "locked in," unable to realize enough from the sale of their house to purchase another home. Some of these locked-in households might otherwise have moved up to more expensive homes. An alternative view is that the exaggerated cycle for high-priced homes is not due to down payment constraints, but is instead related to wealth effects and the fact that real estate is a highly leveraged asset. Put another way, housing booms improve the balance sheet for many homeowners, increasing their consumption of all goods, including more expensive housing.

This paper presents evidence that homes do not appreciate at the same rate, but that more of the volatility occurs among high-priced homes. The evidence that the prices of low-priced homes increase more slowly than other properties during a boom should encourage potential first-time home buyers to look for a home, even if aggregate price indices show that market prices are increasing quickly. Also, government agencies should look specifically at the market for low-priced homes when proposing policy initiatives to make housing more affordable.

Other papers have shown that most households would benefit by diversifying their investment in real estate. By presenting evidence consistent with the possibility that many households are "locked in" to their homes in poor markets, this study provides another reason why households should hedge their real estate investments. About one-sixth of all people who purchased a home in Massachusetts between 1982 and 1992 now have less than 5 percent equity remaining in their property.[25] If these owners do not have substantial savings, they would be unable to purchase another home if they sold their house at today's market prices.

[24] The user cost effect is statistically different from zero with only 85 percent confidence.

[25] Data supplied by Case, Shiller, and Weiss, Inc.

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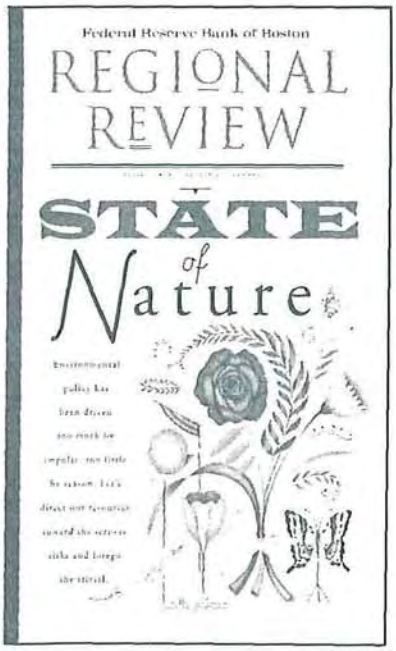

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