Understanding the Experience of Converted New England Savings Banks

by Jennifer L. Eccles and John P. O'Keefe*

Banking industry performance and failure rates since the mid-1980s have followed a pattern that is tied closely to regional economic conditions. The pattern begins with increases in bank loan concentrations in areas related to a region's growth, followed by deterioration in asset quality, earnings, and capital when regional recessions appear. Moreover, rapid growth in bank assets often accompanies the shifts in portfolio composition.

These events were repeated by financial institutions in New England.[1] When the regional economy expanded, many financial institutions grew rapidly, through increased lending (particularly in commercial real estate) and/or acquisitions. The subsequent collapse in real-estate prices, combined with a regional recession during the late 1980s and early 1990s, led to the demise of numerous New England banks.

Between January 1, 1990 and March 31, 1994, 88 FDIC-insured banks failed in New England, including a large number of converted savings banks. Of these 88 failures, 47 were commercial banks and 41 were savings banks. The 47 commercial banks represented 17 percent of the 276 commercial banks operating in New England at year-end 1989. The 41 savings banks[2] accounted for ten percent of the 396 savings banks at year-end 1989; 17 of the 41 were converted savings banks. The 17 converted savings banks that failed represented 22 percent of the total number of savings banks that converted to stock form between 1984 and 1990 and the remaining 24 savings banks that failed represented 7.5 percent of all other savings banks.

While many studies of the causes of bank failures have looked at the relationships among asset growth, portfolio composition and bank-failure rates, few studies have examined the influence of a related event in New England in the 1980s: the large influx of capital resulting from the conversion of many mutual savings banks to stock form.[3] There was a dramatic increase in the number of conversions in New England in the mid- to late 1980s, with a majority (48) of the conversions of state-chartered savings banks to stock form occurring in 1986.

The total capital raised by converted savings banks in Massachusetts alone in 1986 was approximately $1.1 billion — enough capital to support a 17.5 percent increase in the state's banking assets, assuming a 4.8 percent capitalization rate on the additional assets (the capitalization rate of the largest bank in Massachusetts at that time).[4] The total capital increase associated with all New England savings banks' conversions between 1984 and 1990 was approximately $2.4 billion.

The capital raised by converting savings banks should have served as a cushion when the economy fell into

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[1] New England is defined as Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont.

[2] The 41 savings banks include five cooperative banks and two federal savings banks.

[3] Another indicator of the influx of new capital into a region is bank chartering activity. In New England, the number of new commercial and savings banks chartered annually increased from one in 1980 to a peak of 26 in 1987, and averaged 19 annually from 1985 through 1991. This rate exceeded the average annual rate of seven new charters issued between 1970 through 1984. Of the 171 New England banks chartered since 1980, 29 (17 percent) failed. In all other regions, 419 of 4,534 (nine percent) of *de novo* banks failed since 1980.

[4] Stated differently, the largest bank in Massachusetts could have nearly doubled in size with the $1.1 billion capital injection. At year-end 1986, the largest bank in Massachusetts was the First National Bank of Boston, with assets of $25.1 billion and equity capital of $1.2 billion (4.8 percent capitalization).

recession. Yet, as noted above, those savings banks that converted between 1984 and 1990 had a higher failure rate than other savings banks and commercial banks. This paper examines why this discrepancy occurred.

The introduction of common equity required management at converted savings banks to be accountable to a new constituency — the shareholder. As part of that duty, management had a fiduciary responsibility to enhance shareholder value and generate an adequate return to investors. Capital raised during conversion led to high capitalization rates that reduced returns on equity. To increase returns on equity, management at newly converted savings banks had several options. The primary strategy employed was to leverage the bank by growing assets. This could be accomplished by growth in the loan or investment portfolio, or by acquisition of another institution. Other possible strategies included engaging in stock repurchase programs, increasing the dividend payout rate, or improving earnings by increasing efficiencies and, therefore, lowering noninterest expense.

Despite the use of these strategies, many converted savings banks were unable to earn competitive returns on equity. By the late 1980s, certain shareholder groups began to express their concerns about the low returns on equity. While management grappled with shareholder issues, the regional economy moved into a recession. The equity "cushion" secured by converted savings banks eroded as losses mounted, and ultimately proved to be insufficient to prevent the failure of many institutions.

This paper first reviews the experience of New England savings banks that converted in the 1980s. Topics to be discussed include the environment surrounding New England savings banks at that time, motivations for mutual-to-stock conversion, and the sequence of events following the rush of conversions. As part of this review, the strategies employed by converted savings banks are examined. The financial performance of converted savings banks is compared with that of non-converted mutual savings banks in the region.

Next, this paper examines shareholders' expectations of expected earnings growth rates (net income to common shareholders) for converted savings banks. These earnings expectations subsequently are related to banks' financial condition and the regional economy to make inferences about shareholders' expectations regarding banks' strategic plans.

The paper concludes that high asset growth rates were required by the New England converted savings banks in order to generate adequate returns on equity for stockholders. However, as has been demonstrated by previous examples of bank failures, rapid growth can be risky. The experience of converted New England savings banks suggests that a fundamental change in a bank's strategy requires careful planning and execution in order to be successful. These lessons are particularly relevant now, given the large number of mutual savings institutions that have been converting to stock form recently.

Background: New England Savings Banks

What Are Savings Banks?

There are two characteristics of savings banks that deserve consideration before engaging in a review of the environment surrounding New England savings banks in the 1980s. First, the historical origins and functions of savings banks were quite different from those of commercial banks and savings associations. For these reasons, savings banks were issued a unique charter type by bank regulators.

Savings banks originated in Europe as philanthropic institutions, as an attempt to offer the working class a mechanism for saving and investing funds.[5] The first savings bank in the United States was chartered in 1816. While the number of savings banks has grown over the years, the charter has not been permitted in all states.[6] State-chartered savings banks operated in 19 states as of December 31, 1993.[7]

Historically, state-chartered savings banks have been given broader lending and investment powers than savings and loan associations. Nevertheless, in recent years, savings banks have tended to have a balance sheet that more closely resembled a savings and loan association than a commercial bank. Savings banks have tended to concentrate their assets in long-term assets such as mortgages, rather than shorter-term loans such as commercial and industrial loans, yet their liability structure has tended to be weighted toward shorter-term funds such as deposits.[8]

The second point is that in New England, and in most other regions, savings banks have been predominantly mutual form.[9] Mutual form implies that there are no stockholders of the institution. The primary implications of this form of organization are two-fold. First, it is not possible to approach the capital markets for additional equity because the mutual has not issued any equity stock; hence, all equity-financed asset growth must be

[5] For a detailed history of savings banking in the United States, see Ornstein (1985) or Golembe and Holland (1986).

[6] Savings banks were all state-chartered until 1978, at which time mutual savings banks were permitted to convert to federal charters by The Financial Institutions Regulatory and Interest Rate Control Act of 1978.

[7] Source: Division of Research and Statistics, FDIC.

[8] Legislative changes involving expanded investment powers for banks and thrifts over the past 15 years have tended to blur the differences among savings banks, savings and loan associations, and commercial banks.

[9] The proportion of mutual-form savings banks in New England rose from 70 percent to 75 percent between year-ends 1988 and 1993. Nationally, the proportion of mutual-form savings banks rose from 66 percent to 72 percent over this same interval. This rise was due, in part, to higher failure rates among stock-form savings banks.

funded by retained earnings. Second, the control exerted over management is more limited with mutual ownership.[10]

The Changing Environment

The financial-services industry has been transformed significantly over the past 20 years. Two important factors that affected the savings bank industry were the economy and banking-related legislation and regulation. In particular, the rising interest-rate environment of the 1980s precipitated many changes in the industry. When interest rates rose significantly in the early 1980s, the subsequent asset/liability mismatch caused net interest margins to shrink dramatically. As a result, numerous thrift institutions sustained heavy losses and severe depletion of capital.[11] At the same time, deposit interest-rate ceilings imposed by Regulation Q created a disintermediation out of the banking system and into alternative but higher-yielding investments.

In response to these problems, legislation in the early 1980s was enacted to remove interest-rate ceilings[12] and to expand the powers of thrift institutions.[13] These laws were intended to help depository institutions evolve with the changing economy and compete with other financial institutions. New England states were on the leading edge of reform initiatives, allowing institutions to offer negotiable orders of withdrawal (NOW) accounts in 1972, and granting state-chartered savings banks a fair amount of latitude with respect to powers by the early 1980s:

> Of the six New England states, Massachusetts has done the most to expand the powers of its state-chartered thrifts. As of July 1, 1983, state-chartered mutual savings banks and cooperative banks in Massachusetts will have the same powers as commercial banks. In Vermont, savings banks may offer all services offered by commercial banks except trust services. Maine and New Hampshire have granted state-chartered thrifts parity with federal thrifts in most product lines, and have established more liberal lending limits for commercial, industrial and commercial real estate loans. Connecticut legislated approximate equality between federal and state thrifts, while Rhode Island has expanded thrift powers only in the area of consumer loans. The banking situation in Rhode Island is unique, however, since all state-chartered thrifts own commercial bank subsidiaries.[14]

Table 1
New England Savings Banks
($ Millions)

Year	Number of Conversions	Assets	Capital Ratio Before	Capital Ratio After
1985	5	$1,507	5.55%	12.70%
1986	48	$16,222	6.60%	16.77%
1987	14	$3,140	6.19%	14.04%
1988	5	$1,332	7.73%	11.56%

The Flurry of Conversions

New England states also authorized the conversion of mutual savings banks to stock form. New Hampshire allowed savings banks to convert beginning in 1969, with Maine following in 1975, Vermont in 1981, Connecticut and Rhode Island in 1983, and Massachusetts in 1985.[15]

The majority of conversions occurred in 1986, immediately following the 1985 authorization of conversions in Massachusetts. Table 1 shows the year of conversion, number of converted savings banks per year, total assets of converted savings banks as of the quarter-end after conversion, and median capital ratios as of the quarter-ends immediately before and after conversion. As seen in Table 1, these conversions increased book capitalization rates dramatically.

The Economic Boom

While authorized powers were expanded and mutuals were permitted to convert, the regional economy was heating up. In the 1980s, New England sustained a decade of strong economic growth. This growth increased the demand for bank lending, and created a rich environment for sustained growth at depository institutions. This growth-oriented environment is seen in the following graphs. Figure 1 shows the growth in nonagricultural employment for the New England region plotted against the national growth rate for 1981 through 1993. For every year between 1983 and 1987, except 1985, the rate of employment growth in New England exceeded the national average. This trend is also evident in Figure 2 — growth in Gross State Product *versus* GDP growth. Office vacancy rates in Boston and Hartford were low in the early 1980s, as shown in Figure 3.[16] Builders responded accordingly, as seen in the growth in office stock shown in Figure 4.

Interstate Banking and Acquisitions

While the booming economy provided incentives for growth in loan portfolios, another legislative development allowed banks to expand

[10] For a discussion of agency conflicts at mutual and stock institutions, see Cordell, MacDonald, and Wohar (1993), or Dunham (1985).

[11] In the 1970s, savings and loan associations were permitted to convert to stock form as a means of recapitalization. *See* Williams, Fleck, and Comizio (1987).

[12] The Depository Institutions Deregulation and Monetary Control Act of 1980.

[13] The Garn-St Germain Depository Institutions Act of 1982.

[14] FDIC (1983).

[15] Source: Conference of State Bank Supervisors.

[16] Data are available for Boston and Hartford, two large New England metropolitan areas.

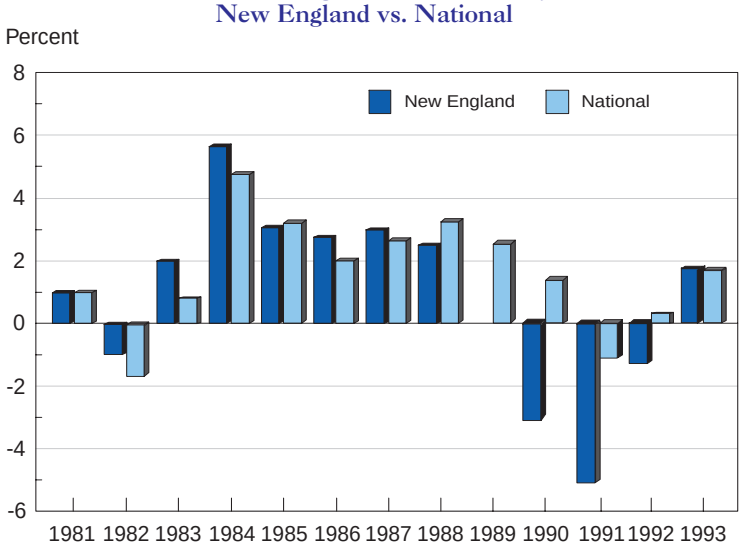
across state lines. In 1975, Maine became the first state to adopt nationwide interstate banking. The provision, effective in 1978, required the states in which acquiring banks were located to have a reciprocal interstate banking agreement. The reciprocity provision was dropped by Maine in 1983, and all of the state's largest commercial banks were acquired by emerging regional banks such as Bank of New England, KeyBanks, Fleet, and Norstar. Massachusetts and Rhode Island allowed regional interstate banking in 1983, with Connecticut following suit in 1984, and New Hampshire and Vermont in 1987. By 1990, all New England states had adopted nationwide interstate banking.

Given these new acquisition powers and the strong economy, New England depository institutions embarked on a wave of acquisitions. Recently-converted savings banks became excellent targets for those seeking to expand into new markets. Table 2 shows the number of transactions announced between 1986 and 1990 involving the acquisition of savings banks, as well as the median transaction ratios. Savings banks that were acquired during this frenzy rewarded existing shareholders amply, as institutions were sold at attractive premiums to current market prices and well above initial offering prices.[17] Of the 44 transactions announced between 1986 and 1990, 13 involved an interstate acquisition.[18] Acquisition multiples tended to decrease after the stock market crashed in October 1987. Multiples and the number of acquisitions declined as

[17] The transaction price announced per share was typically at a premium of 40 to 60 percent above the currently traded price. Of the 21 deals announced for which data are available, the premium of the acquisition price to initial offering price ranged from a low of two percent to 193 percent, with a median value of 90 percent. (Sources: Lyons, Zomback & Ostrowski and The Center for Research in Security Prices, University of Chicago.)

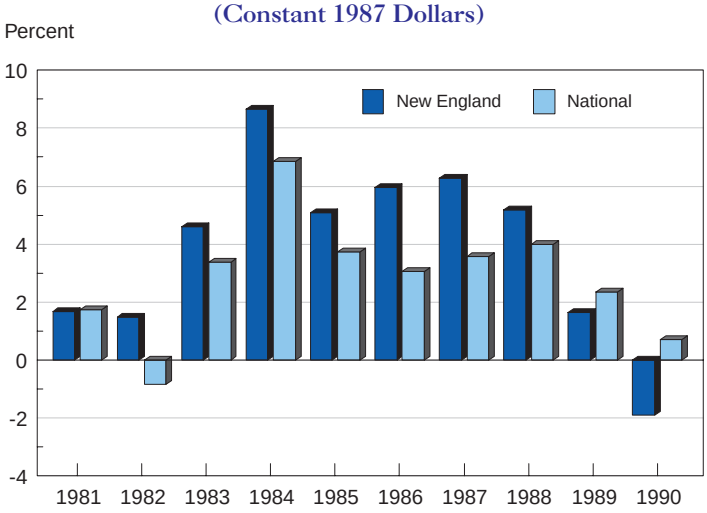
[18] There were 49 commercial bank transactions announced between 1986 and 1990, 19 of which involved interstate acquisitions.

Figure 1
Growth in Nonagricultural Employment
New England vs. National



Source: Commerce Department

Figure 2
Real Growth Rate in Gross State Product
(Constant 1987 Dollars)



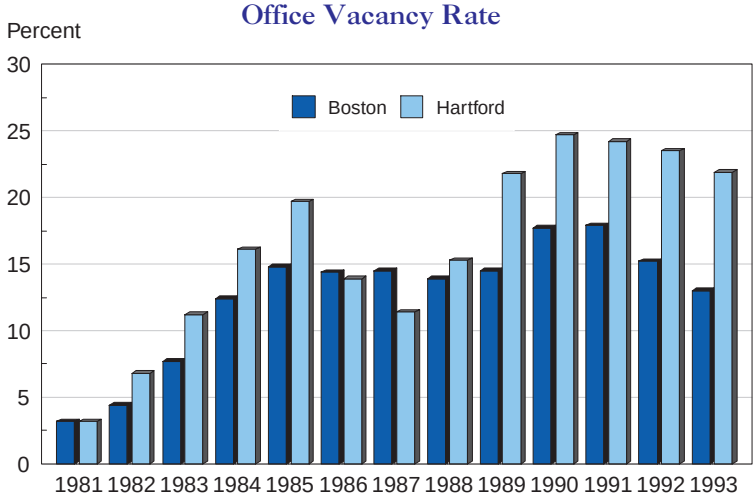
Source: Commerce Department

Table 2
Announced Acquisitions of New England Stock Savings Banks (Median Values)

Year	Price/ Earnings	Price/ Book Value	Premium Paid for Deposits[a]	Number of Deals Announced
1986	14.7x	163%	5.03%	6
1987 Q1-Q3	19.2x	129%	4.82%	8
1987 Q4	13.9x	120%	4.61%	5
1988	18.8x	123%	4.46%	12
1989	23.0x	105%	2.04%	8
1990	28.7x	90%	-1.78%	5

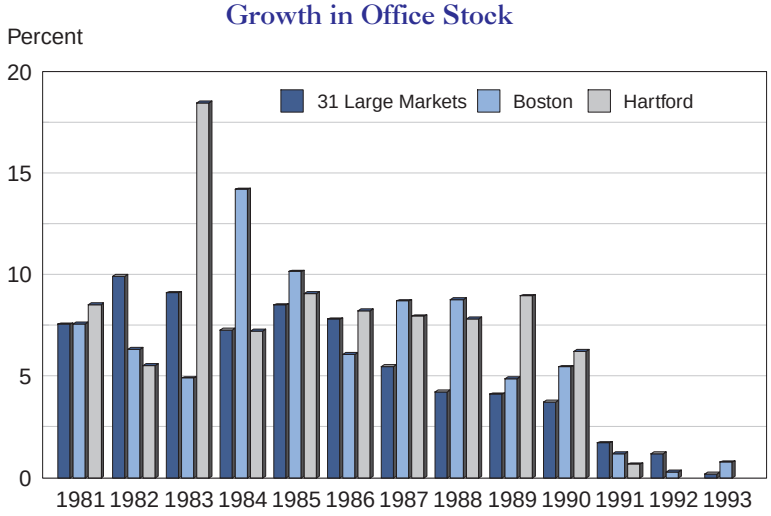
[a] Transaction price as a percentage of total deposits of acquired institution.
Source: Lyons, Zomback & Ostrowski.

Figure 3
Office Vacancy Rate



Source: CB Commercial Torto Wheaton Research

Figure 4
Growth in Office Stock



Source: CB Commercial Torto Wheaton Research

institutions began to suffer from asset quality problems in the late 1980s.

Motivations for Conversion

What were the motivations for conversion? First, many savings banks welcomed an additional source of capital. Once converted, an institution would have access to the equity markets — an option not available to mutual institutions. For some institutions, the asset/liability mismatch environment of the late 1970s depleted capital levels, and a public stock offering represented a faster means of obtaining capital than earnings retention. Many banks that chose to convert had lower pre-conversion capitalization rates than peers who did not convert.[19]

Capital injections and improved access to capital markets would be necessary also for banks with strategic growth plans. The booming New England economy fostered a widespread perception among bank management teams that there were tremendous growth opportunities, and asset growth was necessary in order to remain competitive. An institution dependent solely on internal capital generation such as a mutual savings bank would not have as much flexibility to expand its balance sheet or make acquisitions as an institution with access to external capital markets (a stock savings bank). Limitations on the amount of debt allowed to be counted as capital for regulatory purposes, along with the difficulty of tapping the debt markets as a mutual, made this alternative capital generation option less useful.

Financial rewards for stockholders were another motivator, and depositors and management could become stockholders.[20] An institution that converted would have the potential to pay dividends, to experience appreciation in its stock price, and to sell out to an acquirer at a change-of-control price representing a premium to the current share price. A mutual savings bank did not have the ability to offer these financial rewards to depositors and management. Rather, for mutuals, including mergers of mutuals, rewards to depositors would have to come through interest and noninterest cost savings, if any. In mergers of mutuals, management could only be rewarded through salaries and benefits.[21]

Conversion offered a new set of financial incentives for employees, in terms of additional forms of remuneration. For management, there were stock options; Employee Stock Own-

[19] For a sample of 54 savings banks that converted to stock form, the median capital-to-assets ratio averaged 6.78 percent over the four quarters prior to conversion. A comparison group of 54 peer banks, however, had average capitalization of 8.05 percent over the same period (see Figure 5).

[20] In some mutual-to-stock conversions, certain insider abuses involving self-dealing or excessive management remuneration have been prevalent. The FDIC has been concerned about such abuses, and on June 13, 1994, published a Proposed Rule on Mutual-to-Stock Conversions and a Notice and Request for Comment on how the conversion process should be changed. This is not the focus of this paper. *See* Federal Deposit Insurance Corporation, 12 CFR Part 333, Mutual-to-Stock Conversions of State Nonmember Savings Banks, *Federal Register*, Vol 59, No. 112, June 13, 1994.

[21] A mutual savings bank was not acquired in the traditional sense because there were no shares outstanding to be acquired.

ership Plans (ESOPs) were available for all employees. These incentives were considered beneficial in attracting and retaining the best employees, especially in a tight labor market such as that experienced by New England in the 1980s.[22] Senior management would have additional responsibilities and challenges with respect to managing a publicly held entity.

Finally, the markets were receptive. The stock market was generally strong, and the underwriters were successful in placing the new issues with investors.[23]

There were several disadvantages to conversion. A primary disadvantage was the necessary fundamental realignment of management responsibilities. After conversion, senior management, in its capacity as fiduciary, would have to report to and work in the interests of the shareholders. As a result, senior management faced increased monitoring by being under the scrutiny of shareholders and analysts. The strategies employed by a mutual savings bank could no longer apply. While increased monitoring could have beneficial results — improved efficiencies at the savings banks — as discussed later, noninterest expense ratios did not improve in the case of converted New England savings banks.

Stockholder scrutiny resulted in a "loss" of management control and an overall change in corporate culture. The possibility existed for an outside group, unhappy with the performance of existing management, to force a change of control and an ouster of existing management *via* a proxy fight. Additionally, there were increased reporting requirements associated with being a stock institution, including filings with the Securities and Exchange Commission.

Moreover, conversions added substantial equity capital, thereby decreasing returns on equity (ROE). The ROE dilution encouraged bank managements to adopt strategies to bolster shareholder returns. It was not clear at the time of conversion that low shareholder returns and the implementation of strategies to improve returns would be a significant problem for managements.

Post-Conversion Strategies

The conversion process that savings banks were required to follow by bank regulators could force bank management to add more capital than might be needed. In short, converting savings banks were required to issue common stock in amounts based upon the appraised net worth of the bank. For details on the conversion process see Dunham (1985). The increase in capital ratios after conversion resulted in a proportional decrease in returns on equity. Management at converted savings banks engaged in several strategies to improve returns on equity. The primary strategy employed was asset growth, including growth in the loan and investment portfolios. This strategy will be analyzed in the next section.

Alternative strategies employed included stock repurchase programs, increasing the dividend-payout rate, and/or improving earnings by increasing efficiencies and therefore lowering noninterest expense. The evidence suggests that these strategies were not utilized extensively by converted savings banks.

Prior to conversion, mutual savings banks lacked stockholders to whom to pay dividends. Therefore, after conversion, dividend policies had to be established. State regulatory restrictions on dividend payouts typically prohibit an institution from impairing its capital surplus account and/or limit a savings bank to pay dividends from current earnings only. These restrictions effectively limited the use of dividend payouts as a serious leveraging tool.

A review of the 54 converted savings banks' dividend policy shows that dividend rates did increse during the post-conversion period. The converted banks' median quarterly dividend rate (stock dividends as a percent of net income) increased from 14.4 percent four quarters after conversion to 31 percent eight quarters after conversion. Dividend rates peaked at 32.8 percent ten quarters after conversion.[24]

Analysis of the converted savings banks' noninterest operating expense indicates no improvement in operating efficiency occurred in the post-conversion period. Total noninterest expense includes salaries and employee compensation, expense on premises and fixed assets, and all other noninterest expense. The median total noninterest operating expense of the converted savings banks had an average annualized value of 2.14 percent of assets for the four quarters prior to conversion. Post-conversion noninterest expense ratios were comparable, averaging 2.16 percent, 2.09 percent, and 2.15 percent for the first, second, and third years after conversion. Moreover, tests of the statistical significance of differences in converted and peer banks' operating expense ratios indicated they were not significantly different.[25]

Finally, stock repurchases were another means available to converted savings banks to reduce their capital ratios and offset ROE dilution. Stock repurchases are subject to approval at the state and federal levels because the strategy involves a direct reduction in capital. Analysis of the trend in net sales, conversions, and retirements of capital stock revealed that only 8.5 percent of converted savings

[22] The average unemployment rate for the six New England states in the finance, insurance and real-estate industries declined from 2.82 percent in 1984 to 0.93 percent in 1988, then rose to 5.68 percent in 1991. This unemployment rate remained relatively high in recent years, at 4.35 and 3.70 percent in 1992 and 1993. (Source: *Geographic Profile of Employment and Unemployment*, U.S. Department of Labor, Bureau of Labor Statistics.)

[23] See, for example, Zweig (1986).

[24] The dividend rates cited here are based upon quarterly net income and dividend expenditures.

[25] Specifically, no statistically significant difference in the mean operating expense ratios for converted and peer banks was found for most of the post-conversion period at the 95 percent confidence level.

banks engaged in net stock repurchases or retirements. The majority of converted savings banks (67.9 percent) had no net stock sales or retirements in the three-year period subsequent to conversion, while 23.6 percent of converted banks had net stock sales. It is important to note, however, that the average quarterly net stock sales in the post-conversion period were relatively small (about 0.06 percent of assets) compared to the average net stock repurchases and retirements (about 0.20 percent of assets).[26]

Post-Conversion Financial Trends

Sample

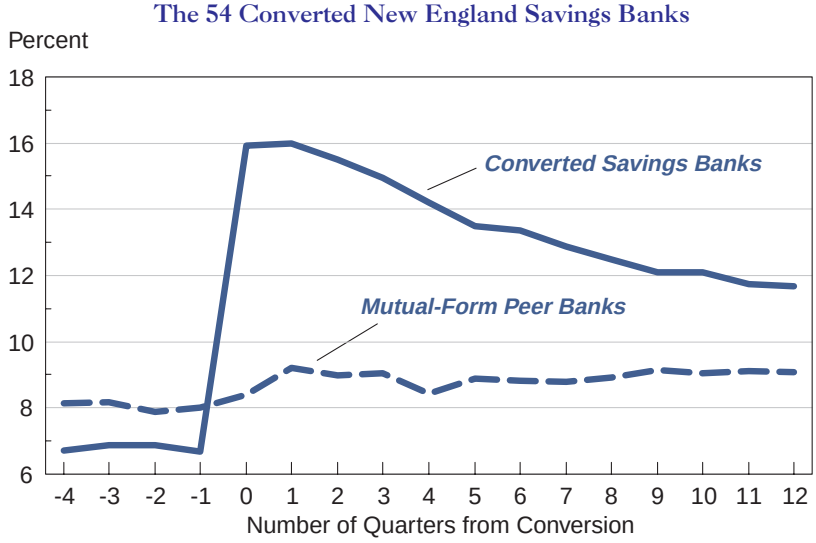
In order to investigate the motives and strategies behind mutual-to-stock conversions, the post-conversion financial performance of a sample of converted New England savings banks was studied. Approximately 77 New England savings banks converted from mutual to stock form between 1984 and 1992.[27] Of these 77 banks, a group of 54 banks had sufficient financial information for the analysis. Specifically, the financial condition of the banks was obtained over a period four quarters prior to conversion and 12 quarters subsequent to conversion, thereby allowing the sample to include the majority of conversions that occurred during the peak year of conversions, 1986.[28]

In order to learn whether the performance of the sample of converted banks differed materially from that of other banks in the region, a peer group of nonconverted (mutual form) savings banks was selected for analysis. The peer group consisted of other New England banks of similar size and timing of financial data as the group of converted banks.[29] Because financial trends were presented in terms of an abstract time measure, *i.e.*, the number of quarters from conversion, a given quarter actually consists of data for converted banks from several different calendar periods. Therefore, each converted bank's peer was selected to be another New England bank of similar size with contemporaneous financial data.

Financial Performance

As shown in Figure 5 and Table 1, conversions typically increased the book equity capitalization of banks substantially. For the 54 converted New England savings banks, the median capital-to-assets ratio increased from 6.69 percent one quarter prior to conversion to 15.91 percent upon conversion.

Figure 5
Median Capital-to-Assets Ratios
The 54 Converted New England Savings Banks



There are beneficial aspects to increased capitalization. All other factors held constant, an increase in capitalization improves the stability of earnings and reduces the risk of insolvency over the business cycle.[30]

Figure 6 shows that converted savings banks' returns on assets (ROAs) improved from being less than those of peers prior to conversion to rates comparable to those of peers after conversion. The improvement in ROA was primarily due to increased net interest margins. Converted savings banks' interest expense declined after conversion due to the increased capitalization (lower proportion of assets funded by interest-bearing liabilities). In addition, interest income increased after conversion, primarily because of increases in loans (see Appendix A for details on profitability trends). Despite this improvement in ROAs, converted banks' ROEs (Figure 7) generally remained less than those of peer banks for two years subsequent

[26] The average stock sales, conversions and retirements used were actual quarterly net additions.

[27] It is difficult to obtain a precise count of the number of conversions because complete records of conversions were not maintained by federal bank regulators.

[28] These 54 converted savings banks were relatively small in asset size: 33 had assets under $300 million and only two had assets over $1 billion at the time of conversion. In addition, most of the 54 banks were in Massachusetts (24) and Connecticut (17). Finally, nine of the 54 banks failed as of year-end 1993.

[29] Because the converted banks changed size substantially during the analysis period, peers of comparable asset size were paired with converted banks over time. To allow for these and other changes, a converted bank may have its peer replaced two or more times during the analysis period. This resulted in the selection of a group of 59 mutual-form peer banks, 54 of which are paired with the converted banks at a given point in time.

[30] A tenet of corporate finance (not proven here) is that as the proportion of equity finance a firm uses increases, the stability of earnings per share of equity is improved, all other things being equal.

Figure 6
Median Return on Assets (Annualized)
The 54 Converted New England Savings Banks

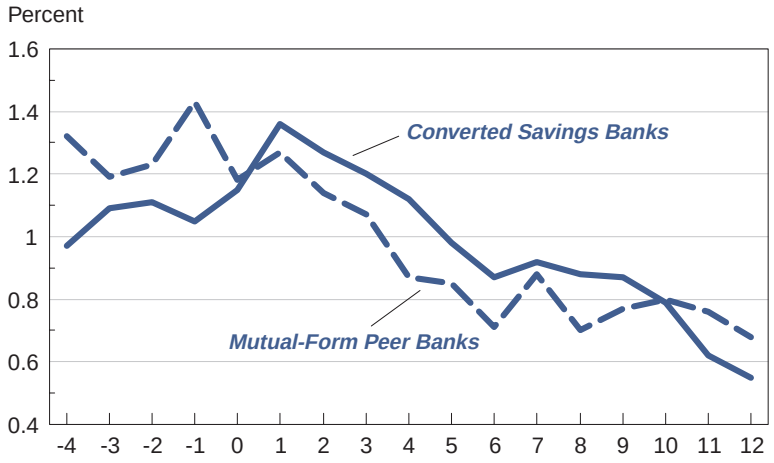


Figure 7
Median Return on Equity (Annualized)
The 54 Converted New England Savings Banks

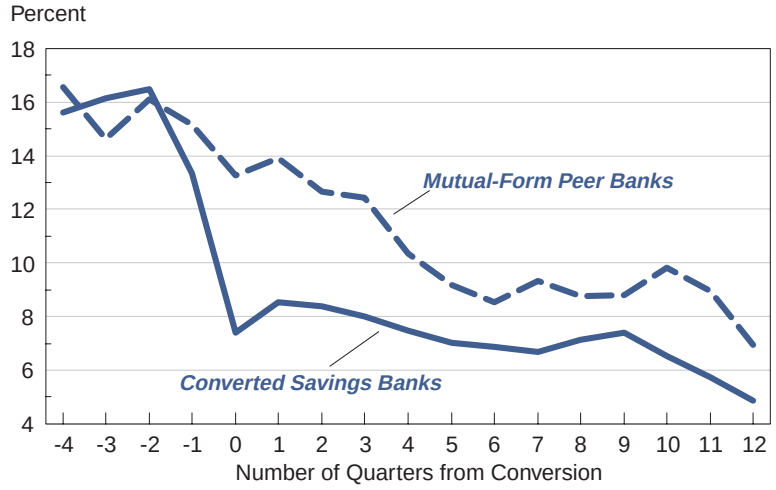


Table 3
The 54 Converted New England Savings Banks:
Quarterly Changes in Asset Composition
(As a Percent of Total Assets in Prior Quarter)

	Quarter from Conversion				
Asset Portfolio Item	**0**	**1**	**2**	**3**	**4**
Cash Balances Due	0.53%	-0.05%	-0.43%	0.22%	0.15%
Securities	**3.45**	**1.17**	**0.42**	**0.27**	**0.80**
Federal Funds Sold	3.74	-3.74	-0.48	-0.47	-0.26
Net Loans and Leases	**5.53**	**5.52**	**4.83**	**4.64**	**3.64**
Trade Account Assets	0.00	0.00	0.03	-0.01	0.02
Premises	0.05	0.04	0.07	0.01	0.08
Real-Estate Owned	0.02	0.00	0.02	0.03	-0.05
All Other Assets	0.06	0.17	0.15	0.25	0.17
Total Asset Growth	**13.38%**	**3.11%**	**4.61%**	**4.94%**	**4.55%**

to conversions. High post-conversion capitalization rates were a primary cause of converted savings banks' poor returns on equity capital.

It is unlikely that the managements of converted banks sought additional capital solely for the purpose of risk-reduction. Indeed, Figure 8 shows that managements acted quickly to try to offset the dilution of returns on equity by decreasing capitalization rates through leveraged asset growth. Figure 8 presents trends in the median quarterly asset growth rates of converted banks and the peer group. Among converted banks, asset growth rates rose dramatically upon conversion, rising to a median quarterly rate of 13.8 percent. This reflects the fact that the additional capital was used to support asset growth rather than to reduce liabilities. To see this, one can partition asset growth into the portions funded by increases in debt (deposit and nondeposit liabilities) and equity capital. In the quarter prior to conversion, the quarterly asset growth for the combined assets of the 54 converted banks was 13.38 percent. The converted banks' proportional liability and equity capital growth rates during this same interval were 1.28 and 12.1 percent, respectively.

In the conversion quarter approximately 54 percent of the asset growth occurred in liquid assets (cash balances and securities) and 41 percent in loans (Table 3). Subsequent asset growth among converted banks remained high for the two-year period following conversion. Nearly all of the converted banks' asset growth in quarters 1 through 12 was achieved through additional lending, although several savings banks nearly doubled in size by acquiring other savings banks. Loan growth fell during quarters 7 through 12 as the regional economy slid into recession.[31] The vast majority of converted banks' loan growth

[31] As shown in Table 1, a large portion of the conversions occurred in 1986. Indeed, 67 percent of the 54 conversions followed here occurred in 1986. Consequently, the average loan growth rates three years after conversions generally reflect activity in 1989.

was in traditional real-estate lending for residential dwellings. However, converted banks also increased lending in nontraditional areas as well. In particular, converted banks increased concentrations in construction and land development loans to a greater extent than peer banks (Figure 10).

Figures 8 through 10 indicate that converted savings banks had different post-conversion growth and portfolio strategies than mutual-form peer banks. Appendix A presents data on the statistical significance of these differences. Those tests showed that the converted savings banks' capitalization rates changed over time, moving from rates significantly lower than those of peer banks prior to conversion to post-conversion rates significantly higher than those of peer banks (see Appendix A, Table 4).

Converted savings banks' post-conversion loan growth also exceeded that of peer banks for a brief period after conversion. However, asset and loan growth rates of converted banks returned to levels similar to those of peers by about 18 months after conversion. Finally, converted savings banks increased concentrations in construction and land development loans significantly above those of peer banks in the post-conversion period. These results suggest that converted savings banks had more-aggressive post-conversion growth and portfolio strategies than mutual-form peer banks. It should be pointed out that very similar results were obtained for different samples of mutual-form peer banks. Therefore, it is felt that these results are fairly robust with respect to the choice of peer banks.

Converted savings banks funded asset growth primarily with liabilities in order to decrease capitalization rates and leverage earnings, but they were unable to match asset growth rates with deposit growth. Competition for deposits is seen in Figure 11, which shows the spread between the average rate for 6-month and 1-year certificates of deposit in the Boston market and the Bank Rate Monitor national average rate. The Boston market rate exceeded the national average rate for most of the late 1980s.

Figure 8
Median Asset Growth Rates (Quarterly)
The 54 Converted New England Savings Banks

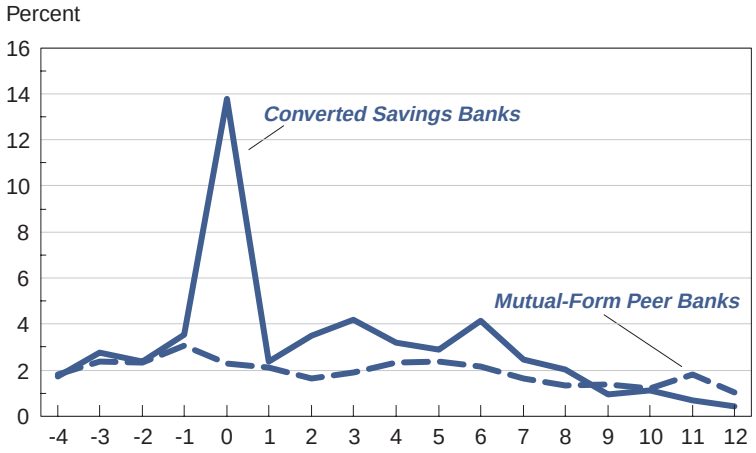


Figure 9
Median Growth in Total Loans (Quarterly)
The 54 Converted New England Savings Banks

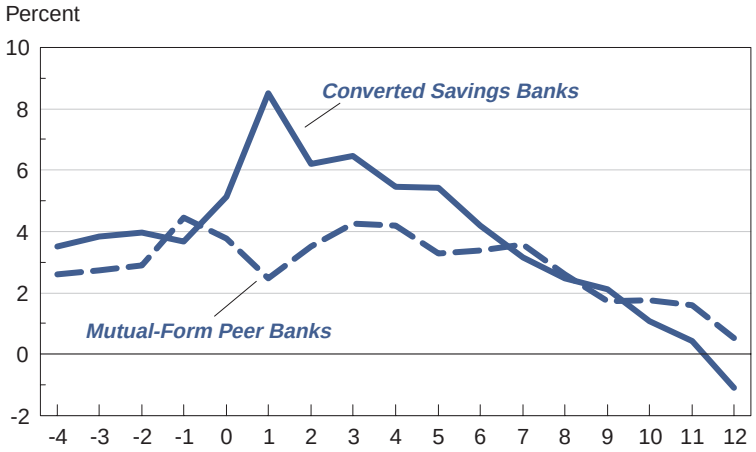


Figure 10
Median Construction and Land Development Loans
The 54 Converted New England Savings Banks

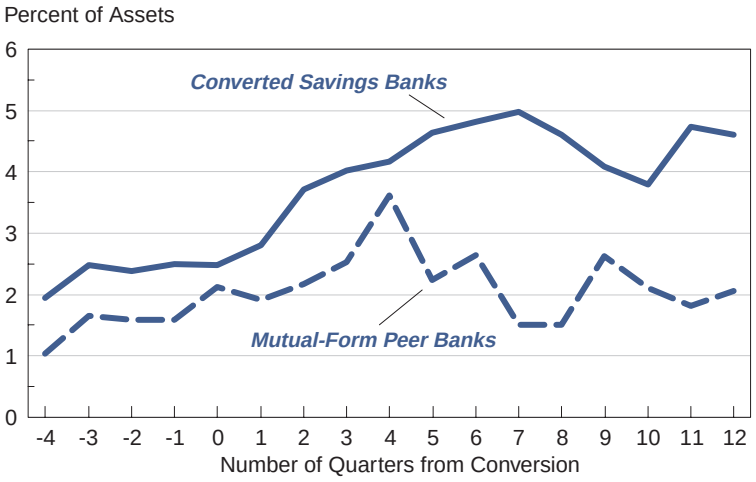
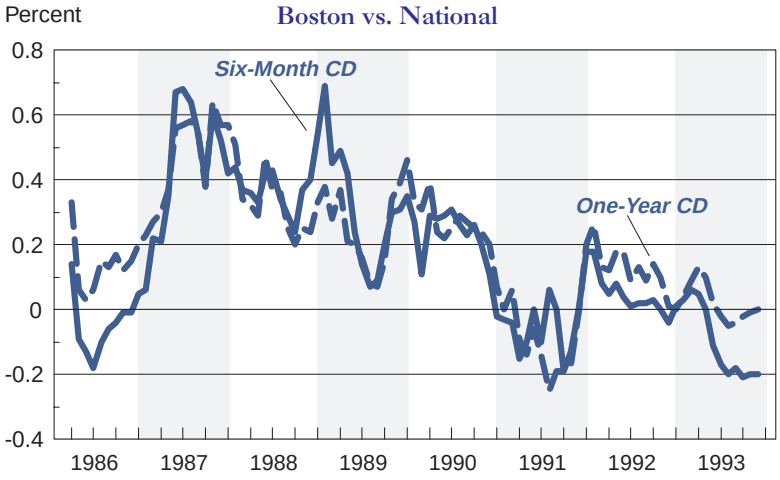


Figure 11
Annual Effective Yield Spread
Boston vs. National



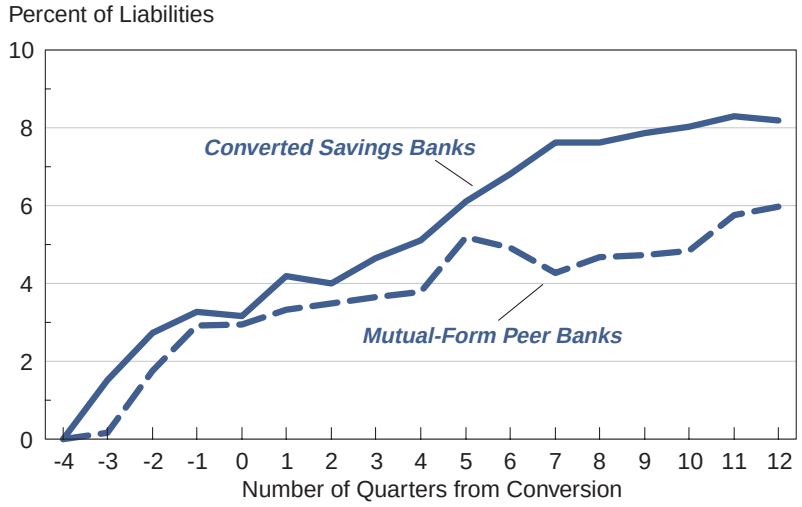
Source: Bank Rate Monitor

As a result, converted savings banks altered their liability composition in the post-conversion period. Converted savings banks increased their reliance on nondeposit liabilities, primarily through the reported item "other borrowed money."[32] For the sample of 54 converted savings banks, the median ratio of other borrowed money to total liabilities rose from 2.45 percent to 11.06 percent in the three-year period subsequent to conversion.[33] In contrast, for the mutual-form peer banks the median ratio of other borrowed money to liabilities remained fairly steady, varying between zero percent and 0.2 percent for the same period.

In the three-year period after conversion, the converted savings banks had an average quarterly asset growth rate of just over three percent, with 66 percent of that average growth financed by deposits and 35 percent funded with nondeposit liabilities.[34]

Figure 12 shows that converted savings banks also increased their reliance upon high-cost liabilities and did so to a greater extent than their peers. High-cost liabilities are defined as brokered deposits plus time deposits of $100,000 or more. For the sample of 54 converted savings banks, the median ratio of high-cost liabilities to total liabilities rose from 3.17 percent to 8.18 percent over the three-year period subsequent to conversion. For the comparison group of mutual-form peer banks, the high-cost liabilities ratio rose from 2.95 percent to 5.97 percent over the same period. Statistical tests of the significance of differences in liability composition between converted banks and the comparison group of mutual-form peers (not presented here) indicate that the differences in the two groups' reliance upon other borrowed money and high-cost funds were statistically significant at the 95 percent confidence level over most of the pre- and post-conversion periods.

Figure 12
Median High-Cost Liabilities
The 54 Converted New England Savings Banks



The reliance upon nontraditional sources of funding, such as high-cost deposits, by converted savings banks to fund asset growth has important implications. These changes in liability composition indicate that the converted savings banks were unable to expand their core deposit franchise quickly enough to support loan growth.[35]

[32] The funding category "other borrowed money" is used in the Reports of Condition and Income that banks are required to file with federal bank regulators.

[33] Banks only report the total value of "other borrowed money" and not its components. Other borrowed money includes items such as Federal Home Loan Bank (FHLB) advances, borrowings on a bank's own promissory notes, and borrowings from Federal Reserve Banks. Additional data supplied by the Federal Home Loan Bank of Boston were available on advances for 25 of the 54 converted savings banks between 1986 and 1993. For these 25 banks, advances as a percent of total liabilities increased from 5.45 percent to 12.28 percent between year-ends 1986 and 1988. For these same 25 banks, advances usage generally fell after December 1988, and was 7.49 percent of liabilities at year-end 1993. However, because advances data were not available for all 54 banks in our sample, it is not clear whether advances usage was the cause for the increase in other borrowed money.

[34] Stated differently, the average quarterly asset growth rate for the converted savings banks was 3.03 percent between quarters 1 and 12. Over this same period, average deposit growth was 1.99 percent of assets and nondeposit liability growth was 1.05 percent of assets. While some equity financing was used, the average value was negligible during this period.

[35] Core deposits commonly refer to a bank's stable deposit base. These deposits come from depositors who seek traditional banking services and are not as sensitive to deposit interest rates as those depositors who are not as concerned with banking services. Core deposits generally are defined as demand and other transaction accounts plus savings deposits of $100,000 or less. Core deposits are considered low-cost and have low volatility.

Required Growth Rates

So far we have seen that converted savings banks' ROEs after conversion were substantially below those of their peer mutual savings banks. Investors may tolerate lower ROEs in exchange for the risk-reducing effect of a higher level of capitalization, and converted savings banks generally had much higher capital ratios than their peers. However, the post-conversion growth of these institutions suggests that management attempted to increase ROEs and reduce capital ratios. This section uses a simple approach to determine the rate of leveraged asset growth that would have been required to achieve the same ROEs as existed prior to conversion, had asset growth been the sole strategy adopted. To do this, the target ROE is related to the banks' underlying profit rate on assets (ROA) and existing capitalization rate. By definition, the ROE equals the product of the ROA and the inverse of the capital-to-assets ratio (equity multiplier). That is,

$$ROE = \left(\frac{Net\ Income}{Assets}\right) * \left(\frac{Assets}{Capital}\right)$$

In the pre-conversion period (during quarters -4 to -1), the average ROE among both peer and converted banks was approximately 15 percent.[36] The overall profit rate on assets, ROA, averaged one percent for the converted savings banks in the year prior to conversion. Assuming converted banks expected this average ROA to persist, the banks would have needed to reduce equity capitalization from an average rate of 16 percent (at conversion) to 6.7 percent in order to achieve an ROE of 15 percent.[37] This reduction in capitalization could be achieved with various rates of asset growth over a long or short period. For example, target capitalization and ROE could be met with a compound annual leveraged asset growth rate of 15.5 percent for six years, or 19 percent for five years. The median annual asset growth rates shown in Figure 6 averaged 12 percent over the two-year period subsequent to conversions. As mentioned previously, lower capitalization rates decrease the stability of earnings per share of common stock. Therefore, banks' knowingly accept more risk when leveraging earnings.

It appears that many converted banks were following a strategy of leveraged asset growth over a period in excess of six years as a way to leverage earnings. The 12 percent median growth rate was high relative to the 7.71 percent average asset growth rate among all FDIC-insured savings banks between 1986 and 1988.

Epilogue

Managements at converted New England savings banks focused on leveraged asset growth to improve the rate of return on equity, which was a key measure of performance for the banks' new constituency, the shareholder. However, managements soon were required to confront a new issue: small groups of vocal, hostile shareholders. The booming market for converted thrifts had attracted a new set of investors. While most savings banks had converted *via* community offerings that placed the majority of stock in the hands of local depositors (and management), non-local or outside investors began to increase their stock holdings of converted savings banks. These investors sought to take advantage of the strong acquisitions market. Often, these groups accumulated sufficient stock in a given institution to solicit a board seat or otherwise influence management in an effort to elicit the sale of the institution. Sale often was viewed as the best way to maximize shareholder value, particularly given the difficulty in raising returns on equity to levels acceptable to shareholders.

In certain cases, management's attention was diverted from running the institution to staving off proxy fights and hostile takeover attempts, and implementing "poison pills" such as shareholder rights plans.[38] Moreover, profitability declined among both converted and peer banks over the sample period, reflecting the widespread problems resulting from the softening of New England real-estate markets, as well as a regional recession in the later quarters, and increased competition for deposits to fund the high rates of asset growth. Had the regional economy continued to expand, greater asset growth might have been possible. Moreover, if net interest margins and overall profitability had remained high, less asset growth would have been necessary to increase or at least maintain ROEs.

Conclusion

The experience of the converted New England savings banks has useful lessons for bankers and bank regulators. High capitalization rates alone do not provide protection against failure. In fact, this study finds that the high capitalization rates achieved upon conversion to stock form led managements to engage in rapid asset growth. When this occurs, additional risk is borne through rapid loan growth and credit quality may suffer. This was the case for the group of 54 converted New England savings banks; their net loan and lease charge-offs increased from a median annual rate of 0.007 percent of assets one quarter prior to conversion to 0.110 percent of assets 12 quarters after conversion.[39] Finally, if strategic growth plans are not well-thought-out, the bank increasingly may become reliant upon volatile, high-cost liabilities.

Conversion to stock form results in a fundamental change in the nature of an institution. Bank managements need to have well-defined strategic plans, particularly when planning to expand operations. If growth plans are ill-timed or not supportable given market opportunities, severe difficulties may be encountered. This study has shown that the sample of New England converted savings banks faced these problems and suffered as a result.

[36] ROEs of publicly traded commercial banks during the mid-1980s tended to be in the range of 13 to 15 percent. *See* Keefe, Bruyette & Woods, Inc., *Peer Bank Averages*.

[37] Some improvement in ROA after conversion may occur with the reduction in total interest expense associated with increased capitalization.

[38] There were five proxy fights involving New England savings banks between 1988 and 1990. Source: D.F. King & Co., Inc.

[39] Statistical tests of the difference between converted and mutual-form peer savings banks' net loan and lease charge-off rates showed that the converted banks' rates were significantly higher than those of the peer banks eight quarters after conversion (at the 95 percent confidence level). Moreover, converted banks' net loan and lease charge-off rates remained significantly higher than those of peer banks during the entire third year after conversion.

APPENDIX A

Statistical Significance Tests

This appendix looks at the statistical significance of the differences between converted savings banks' and peer banks' financial performance. Specifically, peer banks' financial ratios were subtracted from those of converted savings banks on a quarterly basis. The mean differences in the two groups' financial ratios were obtained. Next, the Student's "t" statistics were computed to test the hypothesis that the mean differences in the financial ratios were not significantly different from zero. Tables 4, 5, and 6 present both the mean differences in financial ratios and the associated Student's t statistics. The same mutual-form peer bank group used in the figures is used in Tables 4, 5, and 6. A Student's t statistic of 1.96 or greater means that the mean differences in the financial ratios are statistically different from zero at the 95 percent confidence level. Mean differences in financial ratios greater than zero result when the converted banks' mean ratios are greater than those of peer banks, and *vice versa* when mean differences are negative.

Table 4 shows that the converted savings banks' capitalization rates increased from pre-conversion rates significantly lower than those of peer banks to post-conversion rates significantly higher than those of peer banks. Converted savings banks' post-conversion asset and loan growth rates were significantly higher than those of peer banks for a brief period after conversion. Converted savings banks' concentrations of construction and land development loans were significantly greater than those of peer banks in the post-conversion period. As stated before, these results generally held for different peer groups.

Tables 5 and 6 present information on converted and peer banks' earnings. Table 5 shows that converted savings banks' ROAs were significantly less than those of peers prior to conversion but, in general, were not significantly different than peers' ROAs after conversion. Converted banks' ROEs generally remained significantly less than those of peers for two years subsequent to conversions.

Table 4
Comparison of the 54 Converted and Peer Banks' Balance-Sheet Activity
Mean Ratio Differences (t Statistics), Quarterly Growth Rates

Number of Quarters from Conversion	Capital/ Assets	Asset Growth	Loan Growth	Construction Loans/ Assets
-4	-1.54 (-4.44)	0.60 (1.38)	-0.08 (-0.12)	1.06 (2.11)
-3	-1.41 (-4.48)	1.63 (0.79)	1.02 (0.61)	0.60 (1.06)
-2	-1.47 (-4.45)	-0.23 (-0.49)	0.94 (1.25)	0.94 (1.73)
-1	-1.81 (-5.46)	1.50 (1.77)	-0.38 (-0.44)	1.21 (2.09)
0	**7.47 (10.43)**	**9.82 (8.13)**	**2.88 (3.35)**	**0.78 (1.30)**
1	6.95 (10.18)	0.84 (1.24)	5.50 (6.92)	1.50 (2.41)
2	6.40 (9.50)	2.27 (2.84)	3.16 (2.78)	1.67 (2.63)
3	5.72 (8.52)	2.42 (2.98)	2.59 (3.33)	1.58 (2.59)
4	5.75 (9.96)	0.67 (0.69)	0.89 (0.99)	1.08 (1.55)
5	4.87 (8.88)	1.70 (2.67)	1.96 (2.87)	2.30 (2.89)
6	4.18 (7.25)	3.08 (2.30)	2.38 (1.73)	2.70 (4.06)
7	3.98 (6.80)	0.39 (0.59)	-0.56 (-0.80)	3.05 (3.95)
8	3.49 (5.80)	1.80 (1.28)	1.38 (0.79)	2.77 (3.49)
9	3.25 (5.47)	1.28 (0.91)	2.56 (0.88)	1.95 (2.36)
10	3.03 (5.27)	0.51 (0.47)	0.93 (0.85)	2.12 (2.86)
11	2.19 (3.77)	-2.00 (-3.80)	-1.09 (-1.56)	2.44 (3.50)
12	1.80 (3.29)	-0.59 (-0.98)	-1.59 (-2.66)	1.47 (1.88)

Table 6 shows that converted banks were able to earn very favorable net interest margins (NIMs) after conversion to stock form. This was due to declines in interest expense, as well as increases in interest income. Interest expense declined primarily because of the increase in equity capitalization, *i.e.*, a reduction in the proportion of assets financed with deposits and debt capital. This reduction in total debt was enough to offset converted banks' increased reliance upon high-cost funding (see Figure 12) in the post-conversion period. The increase in interest income was attributable to the large increases in loans after conversion. Prior to year-end 1987, banks were able to treat all fees and points associated with loans as part of current interest and fee

Table 5

Comparison of the Converted and Peer Banks' Profitability

Mean Ratio Differences (t Statistics), Annualized Profit Rates

Number of Quarters from Conversion	Return on Assets	Return on Equity
-4	-0.29 (-2.38)	-0.02 (-0.01)
-3	-0.02 (-0.13)	3.55 (1.86)
-2	-0.32 (-2.09)	-1.94 (-0.92)
-1	-0.42 (-2.45)	-4.06 (-1.43)
0	**-0.03** **(-0.33)**	**-6.18** **(-6.21)**
1	0.13 (1.51)	-5.05 (-5.44)
2	0.005 (0.03)	-5.26 (-4.54)
3	-0.09 (-0.52)	-5.41 (-3.97)
4	-0.08 (-0.44)	-5.95 (-2.68)
5	0.07 (0.59)	-2.47 (-2.21)
6	-0.11 (-0.44)	-3.01 (-1.68)
7	-0.28 (-1.43)	-6.41 (-2.48)
8	-0.29 (-1.34)	-4.82 (-2.43)
9	-0.55 (-1.49)	-9.10 (-1.84)
10	-0.46 (-2.36)	-7.84 (-2.95)
11	-2.06 (-1.84)	-1426.06* (-1.01)
12	-0.70 (-2.28)	-8.78 (-1.69)

* This large value resulted from one converted bank's ROE.

Table 6

Comparison of the Converted and Peer Banks' Income and Expenses

Mean Annualized Differences in Rates as a Percent of Assets (t Statistics)

Number of Quarters from Conversion	Net Interest Margins	Loss Provisions	Net Noninterest Income
-4	0.02 (0.11)	0.12 (1.77)	0.06 (0.55)
-3	-0.12 (-0.84)	0.05 (1.39)	0.11 (0.81)
-2	-0.04 (-0.33)	0.05 (2.59)	0.07 (0.65)
-1	0.05 (0.34)	0.05 (1.86)	0.17 (1.99)
0	**0.09** **(0.51)**	**0.02** **(0.75)**	**-0.04** **(-0.25)**
1	0.55 (4.95)	0.03 (1.20)	0.21 (2.11)
2	0.33 (2.52)	0.04 (1.73)	0.06 (0.59)
3	0.22 (1.40)	0.21 (1.38)	0.01 (0.10)
4	0.34 (2.32)	0.30 (1.60)	-0.003 (-0.03)
5	0.29 (2.87)	0.07 (0.89)	0.01 (0.14)
6	0.24 (2.45)	0.10 (0.94)	-0.01 (-0.06)
7	0.33 (3.71)	0.36 (2.33)	0.17 (1.81)
8	0.22 (1.97)	0.44 (2.11)	0.11 (1.10)
9	0.34 (2.71)	0.80 (2.31)	0.25 (1.51)
10	0.09 (1.04)	0.47 (3.25)	0.21 (1.50)
11	-0.005 (-0.04)	1.83 (1.87)	0.35 (1.60)
12	0.08 (0.79)	0.60 (2.11)	0.22 (1.52)

income (interest income).[40] Because the majority of conversions in the sample occurred in 1986, the large increases in real-estate loans subsequent to conversions generated high fee income for mortgage lenders.

[40] The treatment of fee income on loans changed with Financial Accounting Standards Board Statement 91 (FASB-91), Accounting for Nonrefundable Fees and Costs Associated with Originating or Acquiring Loans and Indirect Costs of Leases. FASB-91 required banks to amortize most of the fee income associated with mortgage lending.

APPENDIX B

Required Returns to Common Stockholders

Expected Earnings Growth Estimates

The previous sections looked at the strategies used by the converted savings banks to improve profitability (ROEs). We were able to determine, *ex post*, that strategic plans focused upon leveraged asset growth. It also would be interesting to know what shareholders' *ex ante* expectations were regarding strategic plans and the effect of those plans upon bank earnings. This section used market data on converted banks' common stock prices along with their financial data (income statements and balance sheets) to address these questions. First, share prices and financial statements were used to obtain estimates of expected earnings growth rates, *i.e.*, expected growth rates in net income to common stockholders. Second, these expected earnings growth rates were related to banks' profitability and asset levels in order to make inferences about expected asset growth rates. The methodology used to obtain expected earnings growth rates is that presented by Ben-Horim and Callen (1989). The results of that analysis are presented next, followed by a description of the Ben-Horim and Callen methodology.

Expected Earnings Growth Rates

Shareholders' expectations of future earnings are generally reflected in common share prices and returns. As shown in Figure 13, converted banks' common stock returns fell soon after conversion. Figure 13 presents the trend in the median return on common shares of a sample of 24 converted New England savings banks. The 24 savings banks were selected from the 54 banks used in the financial trend analysis.[41] Initially, the performance of converted savings banks appeared attractive. However, returns dropped quickly after conversion and remained poor for most of the post-conversion period shown in Figure 13.[42]

The poor earnings expectations were reflected in estimates of expected earnings growth rates. Figure 14 shows the trends in expected earnings growth rates for a small group of converted savings banks. This group is a subset of the 24 converted banks whose share returns are shown in Figure 13. Earnings data were not available for all 24 banks in every quarter, but were available for seven of the

Figure 13
Median Common Stock Returns (Annualized)
Converted New England Savings Banks

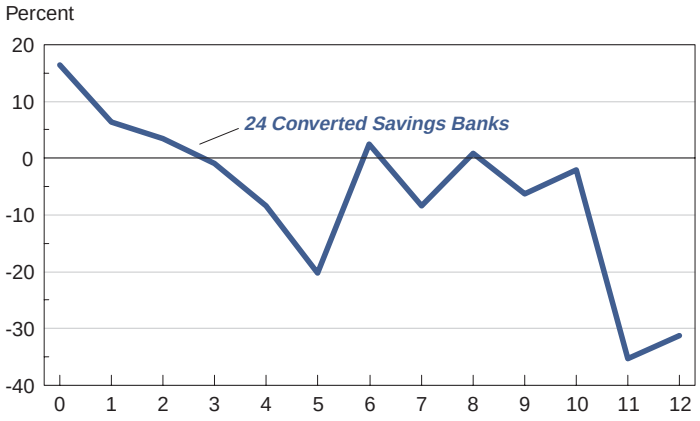
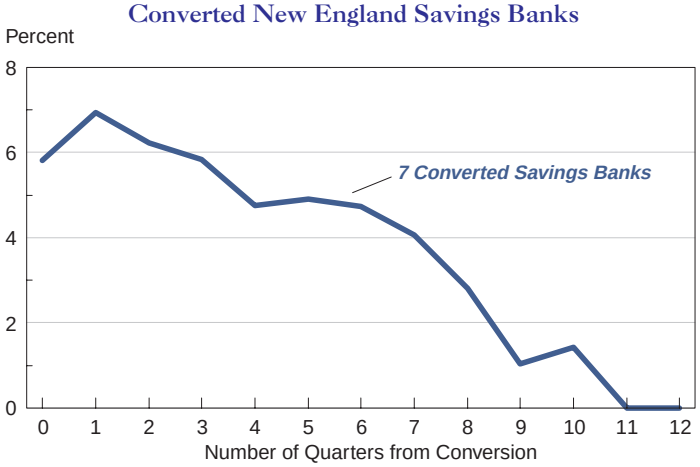


Figure 14
Median Expected Earnings Growth Rates (Annualized)
Converted New England Savings Banks



[41] Daily stock returns over a three-year period subsequent to conversions were available for 24 of the institutions in the original group of 54 converted savings banks. Daily returns were compounded to obtain actual quarterly returns. The median quarterly returns were then compounded to obtain annualized values.

[42] It should be noted that a portion of the poor post-conversion return performance may be due to the general stock market "crash" of October 1987. Although the October 1987 market crash would explain poor returns for year-end 1987, poor performance in other periods should be determined primarily by bank performance.

original 24 banks. As Figure 14 shows, the expected earnings growth rates for this group declined over the post-conversion period.

Expected Asset Growth Rates

In order to relate the expected earnings growth rates to expectations about converted banks' asset growth strategies, one can look at the relationships between overall profitability, asset growth, and resulting earnings growth. While there is no formal model for relating earnings expectations to banks' strategic plans, inferences were made based upon bank performance. The expected total earnings as of the end of the period can be expressed as the product of the expected return on end-of-period assets (ROA), and the end-of-period asset level.[43]

$$E_1 = (ROA_1) * (Assets_1)$$

If the overall profit rate on bank assets (ROA) is expected to remain constant over time, then the expected earnings growth rate will be the same as that for total assets. If, however, the ROA is expected to decline, then the expected earnings growth rate will be less than that for assets.[44] This latter situation can explain the declining expected earnings growth rates observed in Figure 14.

The declining expected earnings growth rates shown in Figure 14 are in agreement with the relatively high asset growth rates in Figure 6. To see this more clearly, consider the following example. Suppose a bank's ROA declines from 0.8 percent to 0.7 percent. Suppose also that the bank's assets increase from $100 million to $120 million over the period. This would result in an asset growth rate of 20 percent, yet the earnings growth rate is only five percent. If, however, assets had increased to only $110 million (ten percent), the earnings growth rate would be -3.8 percent. Therefore, the trends in expected earnings growth rates shown in Figure 14 are consistent with the hypothesis that shareholders anticipated moderate leveraged asset growth to offset a portion of the adverse impact that weakening ROAs had upon earnings growth rates.

Overall profitability among both converted and peer savings banks did decline in the late 1980s and early 1990s (see Figure 6). We do not have estimates of expected ROAs, nor expected asset growth. However, it seems reasonable to expect that shareholders of the converted savings banks were aware of the need for leveraged asset growth to bolster profit rates on equity capital (ROEs). In addition, shareholders also should have been aware of the adverse impact of the regional recession, as well as the weakening real-estate market upon savings banks' overall profitability. Therefore, if ROAs were expected to decline, the expected growth rates in earnings for a given quarter would be less than the expected growth rates in total assets.

Estimating Expected Earnings Growth

Standard economic theory states that market value of any financial claim is equal to the present discounted value of the stream of earnings the claim is expected to generate. The discount rate used to value expected earnings can alternatively be thought of as investors' required rate of return or the firm's funding cost. Because actual earnings may differ from expectations, the required rate of return is also an expected rate of return. Given an expected earnings stream, investors in debt or equity instruments adjust market prices so that the instrument will yield the required rate of return. The cost of common equity capital is, therefore, the discount rate that investors use to value expected dividends. Equation 1 gives the standard expression for the present value of a firm's stock. To simplify the presentation a firm index is not used in equation 1, leaving implicit the knowledge that all terms vary across firms.

In this equation, V_0 is the current market share price of a firm's common stock, d_t is the expected value, at time 1, of dividends to be received at time t, and k_t is the expected rate of return on the firm's stock over period t-1 to t.

$$1)\ V_0 = \sum_{t=1}^{\infty} \frac{d_t}{(1+k_t)^t}$$

Equation 1 permits a firm's required returns to vary over time. While this may be theoretically appealing, the analysis is greatly simplified if one assumes a constant discount rate over time. This constant rate would be an average of the time-dependent rates. Even with this simplification, it is not possible to obtain estimates of the required rate of return from equation 1 without knowledge of the expected dividend stream. If one assumes, for simplicity, that dividends (earnings) grow at a constant expected rate, g, equation 1 is further simplified as equations 2 and 3.

$$2)\ V_0 = \sum_{t=1}^{\infty} \frac{d_0 (1+g)^t}{(1+k)^t}$$

or

$$3)\ V_0 = \frac{d_1}{(k-g)}$$

From equation 3, one obtains the common expression (equation 4) for the required return on common equity capital as the sum of the expected dividend yield plus expected growth rate in earnings.

$$4)\ k = \frac{d_1}{V_0} + g$$

Estimation of equation 4 is made difficult by the need to project not only next period's earnings and divi-

[43] The return on assets can be defined as the ratio of net income to either average assets for the period or end-of-period assets. Average assets are the preferred denominator, because an average asset value is more reflective of the asset level which existed over the period to generate earnings. Period-end assets are used in this paper in order to simplify the discussion. Moreover, because quarterly data are used, the difference between period-end and average asset levels should not be large.

[44] For infinitesimally small changes in ROA and assets, the percentage change in earnings will equal the sum of the percentage changes in ROA and assets.

dends, but also the future growth rate in earnings. Ben-Horim and Callen (1989) show that it is possible to avoid the need to estimate g by introducing stock market data on firm value into equation 4. Specifically, Ben-Horim and Callen introduce Tobin's q, the ratio of the market value of a firm to the replacement cost of its assets (equation 5).

$$5)\quad q = \frac{V_0 + D_0}{RC}$$

In equation 5, the market value of the firm is defined as the sum of the present value of common stock plus the present value of all other claims on the firm's earnings and assets (preferred stock and debt, denoted D_0). The replacement cost of assets is denoted as RC. If factor markets are competitive, replacement costs will equal the present value of the expected earnings generated by assets. In order to simplify the analysis further, Ben-Horim and Callen assume that any invested capital will earn a constant expected rate of return, r. Under these assumptions, factor markets value firm assets in the same way one would a perpetuity. Thus, the replacement cost of assets is equal to the ratio of expected total earnings in the next period, E_1, to r. Under these assumptions Tobin's q for the levered firm can be rewritten as:

$$6)\quad q = \frac{V_0 + D_0}{\frac{E_1}{r} + D_0}$$

Ben-Horim and Callen next introduce the firm's dividend and internal investment decisions into the analysis by assuming that the firm reinvests a constant proportion of earnings, b, each period. It is easy to show that with this reinvestment policy, the expected growth rate in earnings, g, equals the product of the retention rate times the expected rate of return on invested capital, *i.e.*, br. Under these assumptions, the required rate of return on equity capital can be expressed as a function of the firm's expected earnings, reinvestment rate, and the rate of return on invested capital.

$$7)\quad k = \frac{(1-b)\,E_1}{V_0} + br$$

Rewriting r in terms of Tobin's q, equation 7 becomes:

$$8)\quad k = \frac{(1-b)E_1}{V_0} + (b)\,\frac{E_1 q}{V_0 + D_0(1-q)}$$

or

$$9)\quad k = [\,1 - b + \frac{bqV_0}{V_0 + D_0(1-q)}\,]\,\frac{E_1}{V_0}$$

Ben-Horim and Callen state that estimation of required returns using equation 9 is made easier by the fact that one can avoid estimation of growth in earnings by using information on current market values, replacement costs, and earnings. This is clearly seen in the expression for the growth rate implied by equation 9.

$$10)\quad g = (E_1)\,\frac{bq}{V_0 + D_0\,(1-q)}$$

Because the expected value of earnings in the next period equals this period's earnings times one plus the growth rate, equation 10 simplifies to:

$$11)\quad \frac{g}{(1+g)} = (E_0)\,\frac{bq}{V_0 + D_0\,(1-q)}$$

One may, therefore, solve for the growth rate in earnings implied by equation 10 using current market information.

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