This PDF is a selection from an out-of-print volume from the National Bureau of Economic Research

Volume Title: Financial Markets and Financial Crises

Volume Author/Editor: R. Glenn Hubbard, editor

Volume Publisher: University of Chicago Press

Volume ISBN: 0-226-35588-8

Volume URL: http://www.nber.org/books/glen91-1

Conference Date: March 22-24,1990

Publication Date: January 1991

Chapter Title: The Failure and Survival of Thrifts: Evidence from the Southeast

Chapter Author: George J. Benston, Mike Carhill, Brian Olasov

Chapter URL: http://www.nber.org/chapters/c11490

Chapter pages in book: (p. 305 - 384)

10 The Failure and Survival of Thrifts: Evidence from the Southeast

George J. Benston, Mike Carhill, and Brian Olasov

10.1 Conditions Leading to the Debacle

The cost of the failures of thrifts (savings and loan associations and savings banks previously insured by the Federal Savings and Loan Insurance Corporation [FSLIC]) in the 1980s and 1990s, and probably beyond, is enormous. Present-value estimates range from $150 billion to $300 billion. Some of this cost will be borne directly by owners of thrifts and banks in the form of higher deposit insurance premiums to the Federal Deposit Insurance Corporation (FDIC).[1] Some will be borne by the customers of these insured depositories, depending on their elasticities of demand for deposits and bank loans. The bulk of the cost probably will be paid by U.S. taxpayers.

The initial cause of the debacle should be well known. Prior to 1982, most thrifts invested primarily in long-term fixed-interest mortgages that were funded by deposits and other liabilities with much shorter durations. Consequently, thrifts faced considerable interest rate risk. When interest rates increased sharply in 1979–81 to a peak of about 15 percent on long-term U.S. Treasury obligations and over 18 percent for thirty-year mortgages, the present value of their assets declined much more than the present value of their short-term liabilities, and a large number of thrifts became economically insolvent. The number of insolvent thrifts and the extent of their insolvency is not known with much precision because thrifts and most other enterprises do not record unrealized capital gains and losses. Carron (1982, 19) estimates that the savings and loan industry had an aggregate economic (market value)

George J. Benston is the John H. Harland Professor of Finance, Accounting, and Economics at Emory University. Mike Carhill is an economist at the Federal Home Loan Bank of Atlanta. Brian Olasov is the Financial Institutions Specialist at Long Aldridge & Norman in Atlanta, Georgia.

The views expressed here do not necessarily reflect the views of either the Federal Home Loan Bank or Long Aldridge & Norman.

negative net worth of $17.5 billion at year-end 1980 and negative $44.1 billion on 30 June 1981. Kane (1985, table 4.6) estimates that, by year-end 1982, some two-thirds of the nation's thrifts were economically insolvent, with aggregate negative net worth of perhaps $109 billion.[2] Some 85 percent of all institutions were unprofitable in accounting terms in 1982.

Relatively few economically insolvent thrifts were liquidated or merged by the Federal Home Loan Bank Board (FHLBB) through 1984. From 1981 through 1984, 180 thrifts were officially announced as having failed. An additional 295 are identified by FHLBB economists as having been forced to merge by the FHLBB to avoid failure (a total of 475). But, as many as 71 other thrifts had negative net worth according to regulatory accounting principles (RAP). With net worth measured according to generally accepted accounting principles (GAAP), as many as 434 operating thrifts had negative net worth.[3] Annual numbers are given in table 10.1, as measured by economists at the FHLBB and at the General Accounting Office (GAO). Although none of these metrics measure economic insolvency, the numbers indicate that the FHLBB permitted many probably insolvent thrifts to continue operations.

Furthermore, the FHLBB reduced the legal net worth (RAP) requirement over the period. RAP was adopted to increase the measure of net worth. In 1979 the FHLBB permitted thrifts to take up to 250 basis points of fees on loans into income (and, hence, into net worth), even though GAAP requires taking fees into income over the life of the institution's ownership of the loans, with the exception of fees that reimburse currently charged expenses. In 1981 the FHLBB permitted thrifts to defer losses on the sale of assets with below-market yields over the lives of the loans sold rather than reduce net worth immediately. Also in 1981 the FHLBB permitted capital-deficient thrifts to issue qualifying mutual capital certificates and income capital certificates that were purchased by the FSLIC and included in the thrifts' net worth. In 1980

Table 10.1 **Failures and Accounting Insolvencies of Savings and Loans, 1981–1984**

Year	Official Failures per B	FHLBB Failures per BR	RAP Insolvent per BR	GAAP Insolvent per BR	GAAP Insolvent per GAO
1981	28	81	41	65	53
1982	72	251	80	201	222
1983	53	101	54	287	281
1984	27	42	71	434	434
Totals	180	475			

Sources: Official failures: Benston (1985, table 1). FHLBB failures per BR: Barth and Regalia (1988, table 6). RAP (regulatory accounting principles) insolvent per BR: Barth and Regalia (1988, table 6). GAAP (generally accepted accounting principles) Insolvent per BR: Barth and Regalia (1988, table 6). GAAP (generally accepted accounting principles) Insolvent per GAO (General Accounting Office): Garcia (1988, table 2).

the FHLBB reduced the net worth requirement from 5 to 4 percent of liabilities and, in January 1982, the net worth requirement was reduced to 3 percent. In July 1982, liability accounts, such as loans in process, unearned discounts, and deferred fees and credits, were reclassified as contra-assets, which reduced liabilities and increased the ratio of RAP net worth to liabilities. In that same month the FHLBB approved an accounting change that allowed goodwill from an acquisition (including goodwill resulting from an exchange of stock rather than only from a purchase) to be expensed over forty years, while gains from the write-up to market of assets acquired would be taken into income (and, hence, into net worth) over a five- to ten-year period. In November 1982, in an effort to prevent sale and lease backs of thrifts' fixed assets, the FHLBB permitted the use of appraised equity capital to increase regulatory net worth.[4] The net effect of these and other differences increased RAP over GAAP by 17, 16, and 20 percent on average in 1982, 1983, and 1984.[5] The results of these regulatory changes and accounting gimmicks are reflected in the considerably greater number of GAAP-insolvent compared to RAP-insolvent thrifts presented in table 10.1.

Congress sought to alleviate the deposit outflow with the Depository Institutions Deregulation and Monetary Control Act (DIDMCA), enacted on 31 March 1980. To permit chartered depository institutions to compete with unregulated alternative investments, particularly money market mutual funds (MMMFs) and brokers' cash management accounts, Regulation Q ceilings on time and savings deposits were phased out over a six-year period and deposit insurance coverage was raised from $40,000 to $100,000 per account. These changes had the effect of shifting risk, as well as risk-monitoring, away from thrift depositors and to the FHLBB and FSLIC.

DIDMCA also permitted federally chartered thrifts to diversify their assets somewhat by allowing them to invest up to 20 percent of their assets in a combination of nonresidential real estate, commercial and consumer loans, commercial paper, and corporate debt securities. They also were permitted to invest up to 3 percent of assets in service corporations, as long as one-half of the investment over 1 percent of assets was devoted to community or inner-city developments. Ceilings on the amounts that could be loaned on mortgages and geographical restrictions on loans were removed. Nationwide lending was permitted by the FHLBB in 1983.

Further liberalization was permitted by the Garn–St Germain Depository Institutions Act, enacted on 15 October 1982. The deregulation of deposit interest rates was hastened by permitting institutions to offer interest-bearing checking (NOW) accounts and money market deposit accounts that were competitive with MMMFs. The act authorized thrifts to make commercial real estate loans up to 40 percent of assets, make consumer loans up to 30 percent of assets, make commercial and agricultural loans up to 10 percent of assets, invest in personal property for rent or sale up to 10 percent of assets, and invest in commercial paper and corporate debt securities up to 100 percent of

assets. Until Garn–St Germain, federal charters could be obtained only for mutual associations; the act permitted federal stock charters and allowed the conversion of mutuals to stockholder ownership.

Several states permitted the thrifts they chartered more extensive asset powers. The permissible limits varied considerably. Equity securities could not be held by thrifts in thirty states. Fourteen of these also prohibited thrifts from having an equity interest in non-business-premise real estate.[6] The states experiencing substantial numbers of failures are of special interest. In 1980, Florida was first to allow its thrifts to invest 20 percent of their assets in service corporations and 10 percent in real estate. In 1982, Texas permitted thrifts to invest up to 10 percent of assets in service corporations and amounts up to their equity in real estate. California eliminated all real estate asset restrictions in 1983 (subject to specific supervision by state authorities). Arizona allowed its thrifts to invest 10 percent of assets in real estate and equity securities and 6 percent in service corporations. Among states with relatively few failures, Nebraska and Wisconsin imposed no dollar limitations on direct investments in real estate.

As the 1980s progressed, it became increasingly clear that the number and cost of thrift failures was far greater than the officially recognized figures, and that the decline in interest rates by 1984 to levels somewhat above the pre-1978 level but much below the prior peak would not "bail out" the sickest institutions. The number of official and internally recognized failures was 70 in 1985. The chairman of the FHLBB, Edwin Gray, strongly (and almost single-mindedly) urged thrifts to make adjustable-rate mortgages, which were federally authorized in April 1981, as the primary means of reducing their exposure to interest rate risk. He concentrated on three sources of what he believed was excessive risk-taking by thrifts: brokered deposits, direct investments, and growth. In January 1984 the FHLBB and the FDIC jointly announced a proposed regulation that, if enacted, would have virtually denied deposit insurance to depositors who used the services of brokers to place their funds. The regulation was not enforced because it was found to be illegal by the Federal District Court (District of Columbia) in June 1984, a decision upheld by the United States Court of Appeals for the District of Columbia in January 1985. In March 1985 the FHLBB limited direct investments by state-chartered FSLIC-insured thrifts to the lower of 10 percent of assets or twice RAP-measured equity without the prior approval of the FHLBB. In June 1987, direct investments were further limited, and land loans and nonresidential construction were subjected to limitations.[7] In March 1985, the growth of savings and loan associations was limited by a regulation imposing higher capital requirements on institutions that increased their total liabilities by more than 15 percent a year, measured quarterly. In addition, growth at an annual rate of 25 percent of liabilities was prohibited without prior approval by the FHLBB.

10.2 Hypotheses on the Causes of the Debacle

Several, somewhat overlapping, hypotheses have been suggested and asserted to explain the factors responsible for the thrift debacle. Each is discussed briefly.[8] Because none of the explanations appears sufficient to explain the collapse of the industry, we later model them operationally and subject them to empirical test.

1. Unbalanced Durations of Assets and Liabilities—Interest-Rate Risk

Thrifts generally have made and held long-term fixed-interest mortgages funded with liabilities that are repriced at much shorter intervals, and thus are subject to interest-rate risk. Before the Great Depression, savings and loan associations (S&Ls) financed their mortgage holdings with share capital that, allegedly, could not be readily withdrawn. As Barth and Regalia (1988, 117) point out, "it was not until the advent of federal deposit insurance for savings and loan associations in the 1930s that the taking of deposits as such became widespread." Furthermore, because the average maturity of their mortgage holdings was about eleven years, the durations of the two sides of their balance sheets were probably not as greatly mismatched, nor were they subjected to the amount of interest-rate volatility recently experienced (Benston and Kaufman 1990).

In the subsequent years, the duration of mortgages increased, following the lead of FHA-insured mortgages. FSLIC insurance guaranteed the par value of the shares (initially up to $5,000 per shareholder), effectively transforming S&L shares into deposits with short durations. This mismatch strategy works well as long as the yield curve is positively sloped. The duration "bomb" did not go off before 1979–81 because previous interest rate increases were insufficient to use up the economic capital S&Ls had amassed as a result of favorable tax treatment and restraints on entry into their markets.

As we stated earlier, the sharp increase in rates in 1979–81 caused economic insolvencies amounting to perhaps $100 billion. The actual amount is not well established. The published estimates may be overstated because thrift managers and owners and the FHLBB expected interest rates to decline. If this were the situation, the expected cash flows from mortgages and other fixed-interest obligations should be discounted by the interest rates expected rather than by the rates recorded for mortgages made in 1981, 1982, and so forth. These "actual" rates include the value of the mortgagors' option to refinance when interest rates decline.

2. Excessive Risk-Taking by Economically Insolvent and Weak Thrifts

Economic theory (or even simple common sense) suggests that the owners and managers of economically, though not regulatorily, insolvent institutions have very great incentives to take very high risks promising large returns

(which they retain) and large losses (which the FSLIC and other uninsured creditors, if any, absorb). The effect of the FHLBB's permitting insolvent institutions to continue operations has not been well established. As discussed below, most of the research uses data from thrifts with stock traded on exchanges. While such data are preferable to accounting numbers, the observations exclude most thrifts and may include biases endemic to these thrifts. Other research uses traditional accounting data, from which RAP, GAAP, and TAP (tangible accounting principles)[9] net worth is derived. None of these measures reports the economic market value of a thrift. Consequently, we devoted a large part of our effort to measuring the market value of thrifts' assets and liabilities to determine the market value of their net worths. We use these market-value data to test the hypothesis that losses in post interest-rate-increase periods were a function of the economic value of thrifts rather than deregulation and other factors.

3. Overspecialization in Mortgage Loans—Insufficient Diversification and Declines in Economic Conditions

Tradition, government subsidies, and regulatory constraints have caused thrifts to concentrate on home mortgages and other real estate lending and investing. Prior to the Great Depression, most S&Ls (at that time called building and loans) were societal organizations established to help their members buy homes. They tended to be small: the average S&L had only $750,000 in assets. Their rate of failure during the Great Depression reflected their specialization and size. Of the 11,777 S&Ls operating in 1930, 526 failed (4.5 percent). These failed associations held $410.6 million of the industries' $8,828.6 million total assets (4.7 percent) and had an average asset size of $781,000 (Benston and Kaufman 1990). This failure rate exceeded that of the now similar mutual savings banks (MSBs). Only eight (1.3 percent) MSBs failed during the Great Depression, in large part because they held much more diversified portfolios: 55 percent of their assets were mortgages, 14 percent government obligations, and 22 percent in other securities (Welfling 1968, 73–74). However, S&Ls did much better than commercial banks, which experienced a 38.5 percent drop in numbers, from 24,970 in 1929 to 15,348 in 1934. The S&Ls' better experience appears due to the close relationship of shareholders (there were no depositors) and mortgagors, which provided strong incentives and opportunities for monitoring loans.[10]

Legislation enacted during and following the Great Depression, particularly deposit insurance and favorable tax treatment tied to home mortgage investments, allowed and encouraged specialization by S&Ls in mortgages and real-estate-related consumer loans. Until 1983, S&Ls could write mortgages only within 100 miles of their offices or within their state. Although the Garn–St Germain Act of 1982 authorized S&Ls to invest up to 10 percent of its assets in commercial loans and 100 percent in state or local government

securities, it permitted them to branch only if they met the Internal Revenue Code's qualified thrift lender (QTL) test. To be a QTL, a thrift had to hold 60 percent of its assets in home mortgages, mortgage-backed securities, cash, student and passbook loans, or certain government securities. The QTL threshold was changed to a more restrictive 70 percent in 1989 by the Financial Institutions Reform, Recovery, and Enforcement Act (FIRREA).[11]

As a result of specialization in real estate loans concentrated geographically, thrifts tended to be vulnerable to local economic depressions. This concentration may account for the large number and cost of failures in such states as Texas, Louisiana, Oklahoma, and Colorado, which were particularly hard hit by the collapse of petroleum prices in the 1980s.[12] Local overbuilding and overoptimistic pricing followed by a collapse of real estate prices in such states as Arizona and perhaps Massachusetts similarly may account for thrift failures. However, it should be noted that not all thrifts failed in these areas, and many thrifts failed in states that did not experience severe reductions in real estate values.[13]

An additional factor contributing to thrift losses is the 1986 change in the income tax statute which disallowed fast write-offs of commercial real estate. This reduced the expected net cash flows from new and purchased commercial real estate investments and projects, rendering negative the present values of many of these ventures. The owners then had incentives to default on their mortgage obligations.

4. Deposit Insurance and the Removal of Interest-Rate Ceilings on Savings Deposits

Federal deposit insurance, instituted in 1934 with the establishment of the FSLIC, relieved most depositors in thrifts from concern about the risks taken by those institutions. The increase in 1980 from $40,000 to $100,000 per account, together with lower computing costs that permitted investors to divide large sums efficiently into many thrift and bank accounts and the "too-large-to-fail doctrine," is thought to have resulted in de facto 100 percent deposit insurance for savings placed with insured depositories. Consequently, when ceilings on savings deposits (including certificates of deposit, or CDs) were removed beginning in April 1980 and accelerated in December 1982, thrifts could attract funds from outside their market areas through the services of brokers or directly from their own efforts.

Kane (1985, 1989), among others, emphasizes the moral hazard costs of deposit insurance as the primary cause of the thrift (and bank) losses. He points out that severely unbalanced duration portfolios would not be feasible if depositors (and, consequently, depository institutions) had to bear the cost of interest-rate risk.[14] The federal deposit insurance agencies do not charge a direct risk-related premium, which gives thrift owners and managers incentives to take on high-risk projects promising high returns but negative ex-

pected present values. However, the insurance agencies can impose indirect risk-related costs on thrifts in the form of intrusive examinations and strict supervision.[15] If it is measured in terms of economic market values, capital also can serve as a means of imposing deductible or coinsurance. The effectiveness of these means of reducing moral hazard is examined below.

5. Deregulation of Asset Investments and Brokered Deposits

Deregulation of asset investments exacerbated by growth made possible by brokered deposits appears to be the most often charged cause of the thrift disaster, at least among legislators, regulators, the thrifts' principal trade association (the United States League of Savings Institutions), and the press. The former chairman of the FHLBB, Edwin Gray, was particularly concerned about direct investments and brokered deposits. His concern resulted in regulations enacted in 1985 and extended in 1987, limiting the amount of such investments by insured thrifts.[16] As noted above, he unsuccessfully tried to eliminate brokered deposits, but he was able to put on growth restrictions in 1985. Mr. Gray's belief was echoed by the United States League of Savings Institutions (Strunk and Case 1988). It also is reflected in the provisions of FIRREA. Thrifts' investments in commercial real estate loans now are restricted to four times capital rather than the Garn–St Germain limit of 40 percent of assets. The powers of state-chartered savings and loan associations are restricted generally to those permitted federally chartered associations, and investments in real estate equity and non-investment-grade (junk) bonds by all thrifts must generally be phased out by mid 1994. The legislation also restricts troubled institutions from accepting brokered deposits. As mentioned above, the act further emphasizes residential mortgages by increasing the QTL test to 70 percent from 60 percent of assets. In large measure then, FIRREA has re-regulated the thrift industry to its position before the Garn–St Germain Act of 1982 with respect to asset powers.[17]

Evidence in support of the FIRREA asset and brokered deposits restrictions has not been published, to our knowledge. As summarized later, some studies report findings that are inconsistent with the assumptions underlying re-regulation. Additional evidence on the relationship between the assets restricted by FIRREA and the insolvency of thrifts is presented below.

6. Risk Aversion and Risk Preference of Mutual Compared to Stock Thrifts

Prior to enactment of the Garn–St Germain Depository Institutions Act of 1982, only state-chartered S&Ls could issue equity claims. Encouraged by the Reagan administration, the act permitted federally chartered S&Ls and mutual savings banks to convert to stock ownership. Both the ownership status and the conversion itself may have affected the propensity of thrifts to take risks that, on average, led to considerable losses.

Economic theory provides reason to expect managers of mutual institutions to be more risk-averse than owners and managers of stockholder-owned insti-

tutions. Managers of mutuals in effect are the owners of those institutions, subject to the constraint that they can be removed by the supervisory authorities and are subject to control by a board of directors whom they essentially appoint but may not control completely. Importantly, mutual managers cannot directly garner large gains from successful operations, because they do not own stock that can be sold to realize those gains. Instead, their rewards come in the form of higher salaries and perquisites, the magnitudes of which are restricted by the supervisory authorities. Furthermore, they cannot transfer the wealth embodied in the positions to their heirs or others, except indirectly by providing jobs for favored persons and arranging for their positions to be "inherited" by their sons or daughters. All of these constraints and limitations should lead them to be risk-averse, as their income and wealth is concentrated in their job positions and can continue only so long as their associations are, at a minimum, allowed to stay open.

The managers who are not owners of stock thrifts are in a similar situation. Should their decisions turn out badly, they are likely to lose their jobs. Should these decisions turn out well, they will reap rewards, but these are not likely to be symmetrical with their expected costs. Hence, they should tend to be risk-averse, unless they are controlled effectively by the owners of their firms, *cet. par.*

In the absence of punitive supervision, owners of thrifts should tend to prefer risk, which increases inversely with the firm's capital cushion, given the presence of deposit insurance that is not priced to reflect completely the cost of risk, *cet. par.* Their preference for risk, though, may be restrained by the diversification they can achieve in their personal portfolios. As is the situation for the managers of mutuals, a very large portion of some owners' wealth may be firm-specific. Given decreasing marginal utility of wealth, these owners may not perceive benefits from greater risk-taking.

7. Fraud, Self-Dealing, Incompetence, and Inadequate Supervision

Allegations of fraud and self-dealing by managers and owners of failed thrifts abound. Several books and newspaper exposes have been published describing how the "bad guys" looted specific thrifts.[18] There seems to be little doubt that such illegal behavior occurred. Although FIRREA provided funds to enhance the Department of Justice's prosecution of miscreants, the extent to which wrongdoers will be successfully prosecuted and the stolen or misapplied resources recovered is in doubt. The extent to which the losses incurred are due to the illegal behavior also is not known and may never be known.

Incompetence of thrift managers also is alleged as an important cause of losses. This hypothesis is related to the issues of specialization and deregulation. Before high and variable interest rates characterized the market, thrift management did not require sophisticated financial knowledge. But unsettled conditions and the new asset and activity powers granted to thrifts in the early 1980s required considerable financial expertise. As a result, thrift managers

may have invested poorly because of inexperience rather than dishonesty. (This hypothesis leads to predictions about losses that are contrary to the prediction expected from the risk-aversion hypotheses previously discussed.)

Another explanation of why poor performance occurred in the 1980s to a greater extent than in earlier periods (assuming that such is the case) is a breakdown of effective examination and/or supervision. The possibility of fraud and self-dealing always is present in depository institutions. Indeed, earlier investigations found fraud and mismanagement to be the principal cause of bank and thrift failures.[19] A major purpose of field examinations is (or should be) to uncover and discourage such problems, and a major function of supervision is to use examiners' reports and other sources of information to stop and mitigate these problems. Institutions with negative or low economic capital should be closely monitored and supervised, as their managers and owners have considerable incentives to "steal or bet the bank." Evidence on the effectiveness of the FHLBB in these regards, and the effect of managerial incentives and deregulation on examination and supervision is considered below.

10.3 Previous Evidence on Failures and FSLIC Losses

10.3.1 Causes of Failures and Insolvencies

Benston (1985) and Barth, Brumbaugh, Sauerhaft, and Wang (1985)

Benston matched each of the 202 thrifts that officially failed between 1 January 1980 and 31 August 1985 with four nonfailures, two just larger and two just smaller, in each of five regions. Various balance sheet ratios of these thrifts were compared for each year. Barth, Brumbaugh, Sauerhaft, and Wang (hereafter BBSW) similarly analyzed 318 official and unofficial (unannounced FSLIC-assisted mergers) failures in 1982 and 1983. Benston also analyzed separately failed and nonfailed thrifts in California, Texas, Florida, Ohio, and Louisiana; the findings are similar to those reported for the total sample. Both studies used accounting rather than market values.

Benston found that negative (book value) net worth in the year prior to failure was not a necessary condition for failure. However, compared to their nonfailed peers, the failed thrifts' net worth to total asset ratios are significantly lower in each year prior to failure. The failed thrifts' return on total assets also are significantly lower than their peers' by an average of 2.2 percentage points, due primarily to lower net interest margins. (BBSW report similar results.) The lower margins are the result of higher cost of funds, apparently arising from significantly greater reliance on jumbo CDs, Federal Home Loan Bank advances, and brokered deposits. Yields on earning assets are not significantly different, which is inconsistent with the hypothesis that the failed thrifts took greater risks than their nonfailed peers, assuming that

the accounting numbers reflect correctly the economic values of the thrifts' assets, liabilities, and expected loan losses.

Foreclosed mortgages to total loans in the Benston study is significantly greater for the failed thrifts in both studies. Nonresidential mortgages to total loans also is significantly greater, although this variable exhibits considerable variance among institutions (BBSW do not use this variable). Both studies find that nontraditional assets (nonmortgage commercial and consumer loans, and direct investments) are unrelated to failures. Perhaps surprisingly, growth in assets at the failed and nonfailed thrifts is not much different for Benston's data (BBSW do not report this variable).

The relationship of the financial ratios and other variables to failure also was analyzed by Benston and BBSW with a multinomial logit model. Benston and BBSW find significant inverse relationships between failure and net worth to total assets and return on total assets. With net worth to total assets excluded, significant inverse relationships to failure were found for the yield on earnings assets and for state rather than federal charter, and significant positive relationships for the change in the cost of funds and change in total assets (BBSW did not use these variables). Among the variables not related to failure, even at the 0.10 level, are large liabilities (CDs over $1 million plus Federal Home Loan Bank advances and other debt) to earnings assets, deposits to earnings assets, and direct investments to total assets. BBSW report a similar finding for direct investments.

Benston additionally analyzed the financial statements of the twenty-one failures that held direct investment of more than 5 percent of total assets. The reasons for their failures appeared to be quite diverse. High growth was found at only 52 percent of the thrifts, 43 percent experienced high interest expenses relative to revenue, 24 percent recorded large non-operating expenses, and 43 percent incurred large loan losses. Direct investments do not appear related to failure of any of the thrifts.

Benston's monograph also includes chapters devoted to an analysis of returns and risk from direct investments over the three years ending 30 June 1984. He finds that direct investments yielded considerably higher returns than other assets and appeared to reduce portfolio risk slightly. Another chapter analyzes growth, return, and risk over the years 1981 through 1984 for thrifts disaggregated into small (less than $100 million in assets) and large. About half of the growth at fast-growing (over 15 percent a year) thrifts was funded from jumbo CDs and brokered deposits, with the remaining funding coming from ordinary deposits. Faster growing thrifts tended to increase regulatory net worth in about the same proportion as slower growing thrifts. The funds generated by smaller, faster-growing thrifts were invested more in nonresidential mortgages, while the large, faster-growing thrifts invested more in acquisition, development, and construction loans, and somewhat more in direct investments. Regressions of the change in regulatory net worth over the three years ending 30 June 1984 found growth significantly positively related

to higher net worth. Thus, growth, as such, does not appear to be due to financial weakness, which is inconsistent with the deposit-insurance hypothesis.

Benston (1989)

Benston analyzed the change in tangible net worth (ΔTNW) over the two-and-a-half years between 31 December 1983 and 30 June 1986 of all California thrifts operating since 31 December 1981, as functions of the amounts of various types of assets on 31 December 1983 and on their change through 30 June 1986. Separate regressions also were computed for weak and stronger thrifts (tangible net worth to total assets less or greater than 0.01 on 31 December 1983). ΔTNW is significantly positively related to the change in multifamily mortgages and beginning TNW, and to asset growth when residential mortgage loans are omitted. Among the weak thrifts, only the change in multifamily mortgages is significantly (positively) associated with ΔTNW when residential mortgage loans are omitted. Among the stronger thrifts, ΔTNW is significantly positively associated with residential mortgage loans and asset growth, and inversely with change in other real estate loans and change in consumer loans, whether or not residential mortgage loans are excluded.

ΔTNW also was regressed on various income-statement flows over the two-and-a-half-year period, with TNW on 31 December 1983 included and excluded. The only statistically significant positive relationships found are between ΔTNW and direct investments net income and net interest margin for all samples, and also for income from foreclosed real estate operations, sale of other assets, and adjustments to prior periods for the stronger thrifts and the total sample. Thus, there is but weak support for the asset-deregulation hypothesis,

Benston also analyzed 73 of the 82 thrifts that failed in 1986 (data on the others could not be obtained) with respect to their TNW, direct investments (DI), and nonresidential real estate loans (NREL), relative to total assets on 31 December 1985. Fifteen (21%) of the failed thrifts had DI in excess of 10 percent of their assets, while 66 (90%) had NREL in excess of 10 percent of assets. Negative TNW was reported by 58 (79%) of the failed thrifts at the year-end before failure; while this is not surprising, 48 of the 58 (83%) were not closed until at least three months after their year-end balance sheet showed negative TNW. Furthermore, 42 of the 73 failures in 1986 (58%) had negative TNW on 31 December 1984.

Barth and Bradley (1989)

Barth and Bradley (hereafter BB) compare the performance of thrifts that were solvent or insolvent (as defined by GAAP) at year-end, over the years 1979 though 1988 (second quarter). Through year-end 1984, the annual after-tax net income of both groups moved similarly, with the insolvents' net income lower. After 1984 the insolvent thrifts' losses as a percentage of assets increase dramatically: −1.2 in 1985, −5.2 in 1986, −7.7 in 1987, and

– 12.0 in 1988, due primarily to net non-operating losses. A detailed analysis of June 1988 balance sheets reveals that insolvent thrifts held considerably more commercial mortgages, somewhat more equity-risk investments and brokered deposits, and slightly more commercial loans than solvent thrifts.[20] BB also show that more than two years before June 1988, 71 percent of the GAAP-insolvent thrifts reported negative tangible capital, 61 percent reported negative GAAP capital, and 53 percent reported negative RAP capital.

Carhill and Mauldin (1989) and Rudolf and Topping (1988)

These studies find that, from 1984 through 1988, thrifts with relatively high percentages of assets in residential mortgages or mortgage-backed securities were the most successful with respect to reported GAAP net profits, while those that responded to deregulation by diversifying their portfolios and adopting unconventional strategies were unsuccessful. The authors could not determine whether unprofitable operations caused thrifts to adopt unconventional strategies, unconventional strategies caused thrifts to become unprofitable, or the causation runs both ways.

The effect of competition and local market conditions on thrifts' profitability and investment strategy was examined in Florida. This state's economy has been stable through the 1980s (Fritz 1989), while competitive pressure increased substantially and the financial health of financial intermediaries declined dramatically (Hasan 1989). At the same time, Florida thrifts which followed more nontraditional strategies did about as well as other thrifts. Hence, both the poor financial condition of Florida thrifts and their adoption of nontraditional strategies appear due primarily to the effects of increased competition (Hasan 1989; Carhill 1989).

Risk as Indicated by Stock Market Data

Benston and Koehn (1990) used weekly rates of return of forty publicly traded California thrifts from July 1978 through April 1985 to examine the systematic risk of twenty-nine institutions that operated successfully throughout the period compared to eleven that failed during the period. The failed group tended to have higher institution-specific risk, which was shifted to FSLIC. Risk-shifting did not appear to have been affected by the increase in deposit ceilings, deregulation of interest rates, and expansion of asset powers. Positive associations with overall risk were found only for low thrift net worth, brokered deposits and direct investments at low-capital thrifts, and for state-chartered rather than federally chartered thrifts.

10.3.2 FSLIC Losses

Barth, Brumbaugh, Sauerhaft, and Wang (1985) and Brumbaugh (1986)

BBSW examine the FSLIC's losses for 31 thrifts that failed during 1982–83. They find a statistically significant relationship only for foreclosed real estate (positive); direct investments (positive); and log of total assets (nega-

tive). (All variables except log total assets are divided by total assets.) Unfortunately, each of these variables was included without the other two in the same regression. Hence, any one can stand for the other one or two.

Brumbaugh essentially replicates BBSW with an expanded sample of 88 thrifts that failed from 1982 through 1984. Various combinations of different forms of the net worth variable together with two forms of the direct investments variable were tried in twelve regressions. Seven variables had significant coefficients, as noted: net worth (negative for the tangible and market-value forms, positive for the regulatory and GAAP forms); commercial loans (often negative); slow loans and scheduled items (positive); foreclosed real estate (often negative); direct investments (sometimes positive and sometimes negative); jumbo CDs (positive); and brokered deposits (positive).

Barth, Brumbaugh, and Sauerhaft (1986)

This study analyzed 324 thrift failures from December 1981 through October 1985. It is notable because it includes a variable measuring the number of months between insolvency and closure. The following variables are significantly positively related to FSLIC losses: tangible net worth, cost of FHLBB advances, delinquent loans, acquisition and development loans, direct investments, and months between insolvency and closure ("growth" is not included as a variable). Total assets and the constant have negative significant coefficients. (All dollar variables are divided by total assets.)

Benston (1985, 1989)

The 1985 study regressed the FSLIC's losses at the 95 failed thrifts during the period 1 January 1980 through 31 August 1985 for which the loss amounts were made publicly available. Statistically significant positive coefficients were found only for total assets, yield on total assets, brokered deposits to earning assets, and change in nonresidential real estate loans to total loans. Negative significant coefficients were found for change in total assets and change in brokered deposits to earning assets (somewhat surprising results). Direct investments to total assets were significantly and positively related to FSLIC losses only for small thrifts, and this only when the change in direct investments to total assets was excluded.

The 1990 study used all publicly available FSLIC loss data (28 thrifts) for failures between 1 September 1985 through 31 December 1986. Significant negative coefficients were found for adjustable-rate mortgages, residential mortgages, and foreclosed real estate. The strongest relationship found was for nonresidential mortgage loans, which are significantly positively related to FSLIC losses.

10.3.3 Summary and Limitations[21]

The studies reviewed reveal several reasonably consistent findings. For thrifts failing before 1986, the major variable distinguishing failed from op-

erating thrifts is negative book-value (GAAP) net worth prior to failure. This is hardly surprising, as this variable defines failure in an accounting sense. However, negative net worth often precedes failure by several years. The failed thrifts compared to nonfailed peers experienced lower return on total assets, determined primarily by lower net interest margins resulting from a higher cost of funds and larger proportions of interest-bearing liabilities to earning assets. Among the asset holdings, foreclosed mortgages are higher at failed thrifts. Nonresidential mortgages also are higher, although the relative amounts vary considerably. Nonmortgage loans, direct investments, rapid growth, brokered deposits, and large CDs are not significantly related to failure. The 1986 failures are characterized by negative tangible net worth and relatively high proportions of nonresidential mortgages. Direct investments appear to have played a minor role.

Failure, however, is not the same as insolvency, as many book-value insolvent institutions were permitted to continue operations. A comparison of GAAP-solvent and −insolvent institutions shows that after 1984 the insolvent institutions had considerable increases in non-operating losses. The 1988 GAAP-insolvent institutions held relatively more commercial mortgages, equity-risk investments, and brokered deposits than solvent institutions. A high proportion of these insolvent thrifts reported negative tangible capital at least two years before 1988.

Studies of changes in tangible net worth at California thrifts over the two-and-a-half years ending 30 June 1986 find a positive association with direct investments, multifamily mortgages, residential mortgages, and higher growth rates. A negative association is found for other real estate loans.

Evidence of risk-shifting to the FSLIC by California publicly traded thrifts is reported. Higher risks appear to have been taken by thrifts with low capital and those with state rather than federal charters, and are associated with direct investments and brokered deposits only at low-capital institutions.

Losses reported by the FSLIC are associated with higher levels of commercial real estate loans, foreclosed real estate, acquisition and development loans, time between insolvency and closure, change in total assets and brokered deposits, and possibly with direct investments, jumbo CDs, and brokered deposits.

A major shortcoming of most of these studies is that they are based on accounting book values. Neither GAAP nor regulatory accounting permits thrifts to record losses or gains on assets unless these assets are sold. (Regulatory accounting even permits institutions to defer recording losses on mortgage sales.) Hence, the effect of changes in interest rates is not recorded when they occur, but rather over time in the form of lower- or higher-than-market interest earnings. Furthermore, there is reason to believe that many thrifts did not record credit losses until after they clearly were insolvent. For these reasons, it is essential that the net worth of thrifts be restated at market values before an analysis of their performance is undertaken.

An additional shortcoming is the use of cross-sections rather than time-series of thrifts. Changes in thrifts' performance need not have taken place within a year or two. Consequently, we sought to examine a sample of thrifts over time.

10.4 Market-value Estimates

Accounting values reflect the market value of assets and liabilities at the time they are acquired. In accordance with generally accepted accounting principles (GAAP), subsequent changes in market conditions and price levels are ignored, except for physical assets and marketable securities that suffer "permanent" price declines. In particular, changes in interest rates are ignored, even when the consequence is a substantial reduction in the present value of a financial asset or liability. Under GAAP, changes in the probability that cash flows on financial assets, such as loans, will be less than previously expected normally should be accounted for by reductions in asset amounts through increases in a contra-asset account, "allowance for loan losses." However, these valuations often are not reliable, and reporting has been at the discretion of the thrift managers. GAAP-determined numbers, therefore, do not provide valid measures of economic market values, particularly during periods of changing interest rates and credit risk, such as the 1980s. If one is to describe the incentives facing thrift owners, one should improve on accounting values as measurements of the economic value of the owners' investments in their enterprises.

The Federal Home Loan Bank of Atlanta Market-Value Model (MVM) is designed to provide this improvement. (For a complete documentation, see Benston, Carhill, and Olasov 1991.) The data base comes from the *Thrift Financial Report* (*TFR*), in which each thrift reports quarterly detailed financial information. Contract maturities and rates of interest for each thrift's financial assets and liabilities have been reported in the *TFR* Section H, beginning with the first quarter of 1984. This section of the *TFR* was unchanged through 1988; it was revised substantially in June 1989. We supplemented these data with our model's prepayment projections, the FHLBB's estimated decay rates for passbook liabilities, and thrift-specific credit experience. The result is a detailed cash-flow projection for each thrift, which lends itself to discounted-cash-flow analysis.

Concurrent market interest rates and standard present-value equations are used to discount the expected cash flows. On the liability side, we discount the thrifts' payout cash flows by the concurrent certificate of deposit (CD) rates, which we assume are the marginal cost of attracting funds. Because passbook deposits carry rates below current CD rates, the discounting results in a lower-than-book-value number; the reduction often is considered an asset, the "core deposit intangible." On the asset side, we use secondary market rates. For example, the Federal Home Loan Mortgage Corporation's commit-

ment rate (which includes a factor for credit risk) is used to discount cash flows from mortgage loans. Commercial loan rates from Federal Reserve survey information are used to discount cash flows from commercial loans. Agency rates are used to discount cash flows from securities portfolios. The available interest rates generally do not include all maturities. We constructed a full term structure for each interest rate from the U.S. Treasury bill and note series.

Mortgage-servicing rights are estimated by multiplying "mortgages serviced for others less mortgages serviced by others" by 1.75 percent, which a review of the literature and interviews with market participants revealed to be reasonably accurate in the absence of more detailed information. Recorded intangible assets, such as goodwill and various deferrals, are assumed to have zero values. All remaining assets and noninterest-bearing liabilities are valued at GAAP book values.

While some commentators have expressed the reservation that present-value mathematics and the choice of discount rates is too complicated to provide valid value estimates, our experience does not confirm this objection. We found the selection and justification of discount rates and the mathematics, although quite tedious, to be workable and noncontroversial. However, there are three aspects of the MVM which create considerable difficulties or are potentially controversial: the lack of thrift-specific information, which necessitates generic assumptions; the use of standard present-valuation methodology, which implicitly assumes a random walk of the term structure of interest rates in place of a "normal-rate" assumption; and the treatment of credit quality.

We use generic assumptions because thrift-specific assumptions would be feasible only in a small-sample study. For example, the *TFR* does not provide information on the composition of thrifts' security portfolios, so the MVM discounts all security portfolios at the interest rate on federal agency debt. This procedure can result in a material misstatement of high-gross-yield, high-risk assets, such as "junk" bonds and some commercial and nonresidential real estate loans.[22] These and other generic assumptions are the primary disadvantage of using the MVM in place of RAP, GAAP, or GAAP-tangible book values, which give the balances of more specific assets and liabilities. We emphasize that this disadvantage does not apply to market-value accounting, per se, which could use all the information provided by current accounting methodologies plus those data gathered from on-site inspections, but only to large-scale estimation of market values from generic financial reports.

While standard present-value methodology and the efficient-market hypothesis are generally accepted, their assumption that current market and term structure of interest rates provide the best estimate of future rates of interest may not reflect the perceptions of market participants. For example, a current version of the "conventional wisdom" alleges that rates of interest on mortgage loans will fluctuate around a 10 percent long-run normal. This is Keynes's

"normal-rate hypothesis" à la Wall Street. If the normal-rate hypothesis were correct, our method would understate market values when rates are above their norm, and overstate market values when rates are below their norm.

Commercial, construction, and development mortgage loans present a special problem. Much like zero-coupon bonds, these loans often do not require interim payments, and thus do not become delinquent for many years. Yet, they are usually high risk, and so carry high rates of interest. Thus, our delinquency-based approach to market valuation of risky loans might overstate the market values of thrifts with a high proportion of such risky loans. To check for this problem, we examined a number of thrifts. Surprisingly, this inspection revealed that, for thrifts with risky but stable portfolio strategies, delinquencies generally had time to "catch up" to the high yields, resulting in little overestimation of market values. However, for those few thrifts that radically and suddenly shift their portfolios, our delinquency-based approach appears to yield overstated net worth. In addition, because we discount all mortgage loans by the same (Federal Home Loan Mortgage Corporation commitment) rate, we tend to overstate the present value of loans with lagged delinquencies. This measurement problem appears important for explaining the failure of apparently initially solvent thrifts (see later discussion of tables 10.8 and 10.9).

The ultimate test of the MVM is its ability to predict, relative to the alternative measures provided by RAP, GAAP, and tangible book values. As detailed in Benston, Carhill, and Olasov (1991), despite its generic nature, the MVM outperforms these alternative estimates, particularly in predicting thrift failures. However, we were not able to reject the hypothesis that the market follows the normal-rate hypothesis; values from the MVM perform well in predicting the direction of stock-price movements, but appear to overstate volatility.

10.5 Empirical Analysis of Southeastern Thrifts

The Southeast refers to the area supervised and served by the Federal Home Loan Bank of Atlanta (district 4). It includes Alabama, the District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, and Virginia. The area is quite diverse in that it encompasses rural and urban communities and states with stable, growing, and declining economies. As such, it represents a good cross-section of the United States, with the notable exception of the boom and bust southwestern states of Texas, Louisiana, Colorado, and Arizona, where a very large part of the losses imposed on the FSLIC (and later on its successors, the FDIC and taxpayers) occurred. Hence, although the findings reported likely are not representative of the southwestern states, they probably provide a good picture of the rest of the nation. In this study, we analyze data from the 517 FSLIC-insured thrifts in operation at year-end

1984. These are 16.5 percent of the 3,136 U.S. total. In terms of total assets at book value, the southeastern thrifts represent 15.6 percent of the U.S. total.

Thrifts "fail" when the FHLBB (now the Office of Thrift Supervision, or OTS) decides to close them, place them in conservatorship, or force their merger with another institution, often with resources provided by the FSLIC (now the FDIC). Clearly, this is an insufficient definition of failure or measure of the cost of the S&L debacle to solvent thrifts and banks and to the taxpayers. Consequently, we measure the cost in terms of economic market value of equity—assets less liabilities that were not insured, de facto or de jure, by the FSLIC. A thrift's losses, then, are measured by the decline in its market-value equity adjusted for dividends and equity issues or distributions.

10.5.1 Losses Through Year-End 1984 at Thrifts Then Operating

It would have been interesting to have measured the effect of interest rate changes on the present values of thrifts' assets and liabilities year by year from, say, 1977, when the rise in interest rates began. Interest rates on 10-year U.S. Treasury notes, the duration of which is roughly comparable to mortgages with 30-year contracted maturities (the average for thrift mortgages is about 25 years), were relatively stable in the years before 1977. This rate then rose from 7.8 percent at year-end 1977 to a peak of 15.8 percent in September 1981, declined to 10.5 percent at year-end 1982, and was 11.6 percent at year-end 1984. Unfortunately, the data which we require to estimate present values were not reported by thrifts until 1984. However, if one assumes that the administration and/or the Congress did not act to close economically insolvent thrifts because they expected interest rates to decline, it is reasonable to expect that the benefits from lower interest rates should have been fully accomplished by 1984. The FHLBB, as well as the managers and owners of operating thrifts, should have had little reason to expect further benefits from still lower interest rates, particularly considering that interest rates had increased again (by about 90 basis points) between 1982 and 1984.

We should measure the losses incurred from interest rate changes as the present value of affected assets and liabilities at year-end 1984 less the present value of those mortgages at year-end 1977, both in amounts and as percentages of the asset and liability values and net worth at year-end 1977. For these measures to be meaningful, we must adjust the beginning balances for payments made over the period and new mortgages put on the books during the period. Fortunately, this apparently formidable task can be accomplished rather easily for financial assets.

Because of the relative stability of interest rates before 1977, we can assume that the book values of mortgages still outstanding at year-end 1984 provide valid measures of their present values at year-end 1977. Mortgages booked over the period 1977 through 1984 should have been recorded at their market values when the mortgages were made. Reductions in mortgages as a result of payments, payoffs, and write-offs are reflected in the year-end 1984

book values. Hence, these year-end figures accurately reflect the original market values of mortgages made before year-end 1984 and still outstanding at that time. Similarly, the book values of other assets and liabilities measure their present values at the beginning and during the years prior to year-end 1984. Hence, we measure the change in present value for financial asset i from 1977 through 1984 as

$$(1) \qquad CAV_{i\Delta t} = AM_{it} - AB_{it},$$

where $CAV_{i\Delta t}$ is the change in asset i's value over time $t-1$ through $t(\Delta t)$, and AM_{it} and AB_{it} are the asset's market and book values at time t.

These changes in value also are presented as percentages of total assets at book value, the book values of the individual assets at year-end 1984 (time t), and as percentages of the book value of net worth at year-end 1984 to show the relative change in values. These later ratios are measured as

$$(2) \qquad CAV_{i\Delta t} / AB_{t} = CAVA_{i\Delta t}$$

where $CAV_{i\Delta t}$ is the change in asset value to the book value of the asset.[23]

We calculate a similar measure for liabilities. The difference between the book and market values of the liabilities on 31 December 1984, however, does not measure fully the impact of interest rate changes between 1977 and 1984. In 1977, thrifts undoubtedly had a "core deposit intangible" asset (the difference between the market and book value of deposits) because Regulation Q constrained the amounts that could be paid directly to depositors and thrifts had unrecorded goodwill. Hence, the book value of deposit and other liabilities on 31 December 1984 does not measure their market values at year-end 1977 or in the intervening years. We should note, though, that the lower level of market interest rates in 1977 (the January three-month Treasury bill rate is 4.62 percent) gave rise to smaller core deposit intangible amounts.

The amount of the loss, as calculated with equation (1), provides a measure of the amount lost primarily as a result of the 1979–82 increase in interest rates and their subsequent decline through year-end 1984. The 517 southeastern thrifts operating on 31 December 1984 had aggregate RAP net worth of $5,814 million. The net worth of these thrifts at market values totaled −$2,264 million (−1.5 percent of their total assets at book value). Thus, they suffered an aggregate loss of $8,078 million (5.3 percent of their total assets). It should be recalled that our measure of present values includes the effect of expected credit losses as well as interest rate losses and gains. Hence, the asset losses measured tend to overstate the losses due to interest rate changes. In 1984 the overstatement decreases market values by about 12 percent, on average.

Table 10.2 presents the numbers derived from equations (1) and (2) for net worth, assets, and liabilities at the 517 FSLIC-insured thrifts operating in the

Table 10.2 **Interest-Rate-Induced Changes in Asset and Liability Values at 517 Thrifts Operating at Year-end 1984**

	Mean	Std. Error of Mean	Percentiles 5	25	50	75	95
(A) Market less Book Values as Percentages of Total Assets (at Book Value)							
Net worth	−3.6	3.2	−9.0	−5.2	−3.5	−1.6	1.1
Total mortgages	−3.7	0.2	−7.3	−5.2	−3.8	−2.4	0.5
Fixed rate	−3.6	0.2	−6.7	−4.8	−3.7	−2.4	0.0
Adjustable rate	0.2	0.6	−0.2	0.0	0.2	0.5	1.0
Other	−0.4	0.5	−1.4	−0.6	−0.3	0.0	0.3
Second	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Commercial loans	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Securities	0.1	0.3	−0.3	0.0	0.1	0.2	0.4
Mortgage servicing, net	0.1	0.0	0.0	0.0	0.0	0.2	0.7
Total assets	−4.6	0.1	−9.5	−6.2	−4.6	−2.8	0.8
Passbook deposits[a]	−1.9	1.5	−4.9	−2.5	−1.7	−1.1	−0.2
Other deposits and liabilities[a]	0.8	0.5	0.4	0.7	0.9	1.1	1.7
Total liabilities	−1.1	0.1	4.3	−1.8	−0.9	−0.1	1.0
(B) Market less Book Values as Percentages of Book Values							
Net worth	−71.5	33.1	−1,035.4	−173.2	−84.3	−36.9	6.7
Total mortgages	−4.7	3.1	−9.5	−6.7	−5.0	−3.1	1.3
Fixed rate	−7.2	3.3	−11.9	−9.3	−7.5	−5.5	−0.9
Adjustable rate	1.6	2.5	−1.9	0.8	1.8	2.7	4.6
Other	−5.1	5.3	−14.2	−8.8	−5.1	−1.5	3.2
Second	−0.5	3.7	−7.7	−1.9	0.3	1.4	4.1
Commercial loans	−0.9	5.3	−9.5	−1.2	0.2	1.0	4.0
Securities	0.4	2.6	−2.6	0.2	0.7	1.3	2.5
Passbook deposits[a]	−25.1	4.0	−25.7	−25.6	−25.6	−25.1	−24.8
Other deposits and liabilities[a]	1.1	0.5	0.5	0.8	1.0	1.3	1.9

[a]Difference as of 1984 only; 1977 amount not deducted (see text for details).

Southeast as of year-end 1984. Panel A shows the change in value (market less book) as percentages of total assets at book value at each thrift. The mean reduction in net worth is 3.6 percent (the median reduction is 3.5). At least three-quarters of the 517 thrifts suffered reductions in net worth that were not recorded according to RAP. Mortgages in total are responsible for reducing assets by a mean of 3.7 percent. Almost all of this reduction is due to 1–4 family fixed-interest mortgages; adjustable-rate mortgages, other mortgages, second mortgages, and securities contributed but slightly to the change in net worth, on average, and at the extremes.[24] Revaluations of commercial loans

(of which there were hardly any at southeastern thrifts) and securities were of small importance.[25] We valued the intangible asset for mortgaging servicing as 1.75 percent of mortgages serviced for others,[26] and removed the asset "purchased mortgage servicing"; as a result, total assets increased on average by 0.1 percent. The removal of other book-value intangibles, primarily goodwill and deferred losses on mortgage sales, resulted in an additional decrease in net worth of about 0.8 percentage points, on average. In total, the revaluation of financial assets to market decreased book net worth as a percentage of total assets by 4.6 percent, at the average (mean) thrift. Passbook accounts have considerably lower market than book values, giving rise to the core-deposit intangible asset (recorded in table 10.2 as a decrease in the liability). At the average thrift, this intangible increased the book value of net worth by 1.9 percent of total assets. As noted above, an unknown proportion of the core-deposit intangible asset existed in earlier years, although the differential between market and passbook rates was considerably smaller in 1977 than in subsequent years. Increases in the market value over book of other liabilities decreased net worth by 0.8 percentage points.

Panel B of table 10.2 shows the percentage change in value of net worth, assets, and liabilities to their book values at year-end 1984. Net worth decreased by 71.5 percent on average. The range of this change is considerable because some thrifts had low RAP net worth.[27] Total mortgages at market value are lower by an average of 4.7 percent of their book values. The greatest decrease (relative to the balances outstanding) is in fixed-rate 1–4 family mortgages (7.2 percent) and other mortgages (5.1 percent). The market values of adjustable-rate mortgages are higher than their book values, by an average of 1.6 percent. As shown in panel A, fixed-rate 1–4 family mortgages dominate the mortgages held by the southeastern thrifts. Passbook deposits' market value is 25.1 percent lower than book value, on average. The effect of this large reduction in the value of this liability on net worth is mitigated considerably because passbook deposits are a relatively small percentage of most thrifts' liabilities. The market and book values of other deposits and liabilities were similar because these liabilities tend to be more exposed to competitive pricing pressures.

Several factors may be responsible for one or another thrift absorbing larger or smaller market-value losses or (in a few cases) gains. As discussed above in section 10.2 with respect to hypotheses 3 and 6, these factors include the thrifts' initial net worth position, economic conditions in an area, opportunities for diversification, and type of thrift ownership. To test these hypotheses, as well as to gain a greater understanding of the phenomenon, we examined the following relationship:

$$(3) \quad CNW_{\Delta 84} = b_0 + b_1 TA_{84} + b_2 TA_{84}^2 + b_3 M * TA_{84} + b_j S_j * TA_{84},$$

where

$CNW_{\Delta 84}$ = change in net worth (market less book value) through year-end 1984;

TA_{84} = total assets at book value at time t = year-end 1984 (book value is used as the "size" variable because this measures the amount originally invested by each thrift);

M = 1 if a mutual thrift, 0 if a stock, multiplied by TA_{84} to account for the expectation that the effect of ownership form is proportional to the size of an institution; and

S_j = state dummy, equals 1 for each state j with the exception of North Carolina or Florida (the states with the most thrifts), one of which is omitted to avoid overidentification, multiplied by TA to account for the expectation that the effect of state location is proportional to the size of an institution.

The square to total assets is included to test the hypothesis that the change in net worth is not related linearly to size. To reduce the effect of collinearity, the variables are divided by TA and equation (3′) was calculated:

$$(3') \qquad CNW_{\Delta 84} / TA_{84} = 1 / TA_{84} + 1 + b_2 TA_{84} + b_3 M + b_j S_j.$$

The coefficients estimated are presented in table 10.3, with the dummy variables for Florida and North Carolina included or omitted. The intercept (which measures the effect of TA) is significantly negative, indicating that larger thrifts experienced greater amounts of net worth losses than smaller thrifts (which is not surprising, as the larger thrifts had more to lose). The coefficient of TA (which measures TA^2) also is significantly negative, indicating that the loss at larger thrifts is proportionately greater than at smaller thrifts. Mutuals also had greater net worth losses than stocks, *cet. par.* The only statistically significant state dummy variable is for Virginia, which appears to have experienced greater reductions in equity, *cet. par.*

We examined further the reasons for the thrifts' change in net worth and the level of market-value net worth at year-end 1984 by regressing these variables on the thrifts' June 1982 amounts of book-value net worth, passbook deposit accounts, and 1–4 family mortgages, and the growth in their assets from June 1982 through December 1984. We used June 1982 as the beginning date because this preceded passage of the Garn–St Germain Act of 1982 which "deregulated" thrift assets and was coincident with the gradual removal of Regulation Q ceilings on deposit interest rates, and preceded the introduction (in December 1982) of money market deposit accounts that allowed thrifts to compete with money market mutual funds. The available data are deficient in two important regards. First, the number of observations are smaller because 485 of the 517 thrifts operating at year-end 1984 were operating in June 1982 (the balance were chartered in the interim). Nevertheless, the mean net worth change for this subset of −3.82 percent is similar to the mean change for the full data set of −3.56 percent. Second, we are unable to identify and separate

Table 10.3 **Change in Market-Value Net Worth through Year-end 1984 Related to Size, Ownership Form, and State Location (equation [3']), Coefficients and [Probability Coefficient > 0]**

Mean of Dependent Variable (in percentage):
Market less Book Value of Net Worth ÷ Total Assets = −3.56%

Independent Variables	Coefficients [prob > 0] Excluding: Florida	North Carolina
1/Total assets ($ thousands)	379	379
[intercept]	[<.01]	[<.01]
Intercept	−4.30	−4.04
[total assets]	[<.01]	[<.01]
Total assets	−1.2 E−6	−1.2 E−6
[total assets squared]	[<.01]	[<.01]
Mutual = 1	−1.80	−1.82
Stock = 0	[<.01]	[<.01]
North Carolina = 1	0.30	
	[.46]	
Florida = 1		−0.30
		[.46]
District of Columbia = 1	−1.51	−1.82
	[.19]	[.12]
Alabama = 1	−0.30	−0.63
	[.57]	[.25]
Georgia = 1	0.00	−0.30
	[.95]	[.45]
South Carolina = 1	−0.52	−0.80
	[.38]	[.13]
Virginia = 1	−1.01	−1.33
	[.03]	[.06]
Maryland = 1	0.53	0.24
	[.26]	[.60]
Adjusted R^2	0.22	0.22
Number of observations[a]	509	509

[a]Eight observations omitted because states were not known.

asset growth due to mergers from growth from deposits and borrowings. (As shown in table 10.6, growth through mergers skews the mean rate).

We ran the following regressions:

$$(4a)CNW_{\Delta 84} / TA_{84} = 1 / TA_{84} + 1 + c_2 TA_{84} + c_3 M + c_4 NWB_{82} / TA_{84} + c_5 PD_{82} / TA_{84} + c_6 1\text{–}4M_{82} / TA_{84} + c_7 \Delta TA / TA_{84},$$

where

NWB_{82} = book-value net worth on 30 June 1982;
PD_{82} = passbook deposits on 30 June 1982;

$1\text{–}4M_{82}$ = 1 to 4 family mortgages (including second mortgages and construction loans on 1–4 family dwellings);[28] and

ΔTA = change in total assets from 30 June 1982 through 31 December 1984;

and the other variables are as described for equation (3).

$$(4b)\ NWM_{84} / TA_{84} = 1 / TA_{84} + 1 + c_2 TA_{84} + c_3 M + c_4 NWB_{82} / TA_{84} + c_5 PD_{82} / TA_{84} + c_6\ 1\text{–}4M_{82} / TA_{84} + c_7 \Delta TA / TA_{84},$$

where

NWM_{84} = net worth at market value at year-end 1984.

The state dummy variables were not included in the regressions because they are generally insignificant and their inclusion would reduce the sample by eight observations (see table 10.3).

The coefficients, presented in table 10.4, show (as in table 10.3) that total asset size (measured by the intercept in equations [4a] and [4b]) is significantly inversely related to the change in net worth and to the year-end 1984 amount of market-value net worth; both total assets and total assets squared

Table 10.4 **Change in Market-Value Net Worth through Year-end 1984 Related to Size, Ownership Form, and Mid-year 1982 Values (equation [4]), Coefficients and [Probability Coefficient > 0]**

	Mean of Dependent Variables (in percentages)			
	Market less Book Value of Net Worth ÷ Total Assets = −3.82%		Market Value of Net Worth at Year-end 1984 ÷ Total Assets = 0.47%	
Independent Variables	Coefficients	[prob > 0]	Coefficients	[prob >0]
1/Total assets ($ thousands) [intercept]	240	[<.01]	161	[<.01]
Intercept [total assets]	−7.31	[<.01]	−8.22	[<.01]
Total assets ($ thousands) [total assets squared]	−1.13 E−6	[<.01]	−8.18 E−7	[.01]
Mutual = 1, Stock = 0	−1.05	[<.01]	−1.37	[<.01]
Book value net worth 6/82 ÷ total assets, in percentages	0.40	[<.01]	1.65	[<.01]
Passbook deposits 6/82 ÷ total assets, in percentages	0.18	[<.01]	0.18	[<.01]
1–4 Family mortgages 6/82 ÷ total assets, in percentages	−0.03	[.14]	−0.04	[.15]
Asset growth, 6/82–12/84 ÷ total assets, in percentages	0.06	[<.01]	0.10	[<.01]
Adjusted R^2	0.34		0.54	
Number of observations	485		485	

Note: Total assets as of year-end 1984.

have negative significant coefficients. Mutual thrifts experienced a greater reduction in net worth by one percentage point, on average. The June 1982 amounts of book-value net worth and passbook deposits are significantly positively related and mortgages on 1–4 family dwellings are inversely related (at the 0.15 level) to the change in net worth and amount of market-value net worth. Asset growth is significantly positively related to the dependent variables, a finding that is inconsistent with the belief that growth, as such, was detrimental to thrifts, at least through year-end 1984.

Assuming that the June 1982 book values reflect the thrifts' pre-1979 market values, these results indicate that the thrifts that experienced reductions in net worth (many of which became economically insolvent, as shown in table 10.6) were those with low initial percentages to total assets of net worth and of passbook deposits (see tables 10.4 and 10.6). Low relative amounts of passbook deposits are consistent with thrifts having obtained deposits from outside their local market areas, perhaps because they faced strong local competition. These results, together with the inverse relationship between asset size and the change and level of year-end 1984 market-value net worth, are consistent with the hypothesis that the thrifts that became insolvent when interest rates increased in 1979–81 were those that had expanded beyond their passbook-deposit base without proportionately having increased their net worth. The negative sign of the coefficient of the 1–4 family mortgages variable indicates that these mortgages (which, in 1982, were largely fixed-rate, longer-term obligations) also are responsible for reductions in and lower amounts of market-value net worth.

10.5.2 The Behavior of Continuing and Failed Thrifts Classified by Market-Value Solvency

It is likely that financial institutions take actions with consequences that occur over a period longer than a year. Consequently, we first examine the investments and changes in net worth of thrifts classified according to their economic (market-value) net worth at the end of 1984 over the years through 1988. The observations are divided into two groups: thrifts that operated throughout the period and those that ceased operations as a result of failure. Those that ceased being independent institutions because of voluntary mergers are not included in this group and are not analyzed at this point. This separation was made so that the changes over time would not be subjected to sample-composition bias, at least for those thrifts that continued operating.

Continuously Operating Thrifts

The continuously operating thrifts also are classified according to whether their net worth to total assets in market values at year-end 1984 is $< -3\%$, $-3\% < 0\%$, $0\% < 3\%$, $3\% < 6\%$, and 6% and over. The assets, net worths, and liabilities as percentages of total assets (at book values) of these thrifts then are given for each year.[29] Table 10.5 presents the data for the 455 thrifts

Table 10.5 **455 Thrifts in Continuous Operation from 1984 through 1988 (asset and liability amounts as percentage of book-value total assets except where noted; grouped by market-value net worth to total assets as of 31 December 1984)**

	Market Value of Net Worth/Total Assets (in percentages)									
	< −3%		−3% < 0%		0% < 3%		3% < 6%		> 6%	
	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean
Total assets ($ millions)										
1984	**579**	78	**355**	55	**292**	66	**126**	21	**59**	11
1985	**633**	91	**378**	60	**305**	66	**150**	25	**80**	15
1986	**664**	103	**410**	63	**334**	71	**171**	30	**107**	26
1987	**700**	122	**439**	68	**371**	77	**190**	34	**122**	28
1988	**779**	148	**500**	81	**423**	91	**205**	36	**133**	29
Market value of net worth to total assets at market value										
1984	**−6.0**	0.3	**−1.3**	0.7	**1.3**	0.1	**4.2**	0.1	**12.5**	1.1
1985	**−1.0**	0.6	**3.1**	0.2	**4.9**	0.4	**7.0**	0.3	**10.5**	0.4
1986	**0.3**	0.7	**4.4**	0.3	**6.3**	0.5	**7.7**	0.4	**9.8**	0.5
1987	**−1.2**	0.7	**3.8**	0.4	**5.8**	0.7	**7.4**	0.5	**8.7**	0.6
1988	**−0.1**	1.5	**3.4**	0.5	**5.5**	0.9	**7.0**	0.7	**7.8**	0.7
Book-value net worth										
1984	**1.9**	0.2	**3.2**	0.1	**4.5**	0.1	**5.7**	0.2	**12.3**	1.1
1985	**2.9**	0.5	**3.9**	0.1	**4.9**	0.3	**6.0**	0.2	**8.4**	0.3
1986	**3.3**	0.6	**4.7**	0.2	**5.5**	0.4	**6.4**	0.3	**7.9**	0.3
1987	**2.8**	0.7	**5.2**	0.3	**6.1**	0.6	**7.0**	0.4	**8.2**	0.4
1988	**3.6**	1.5	**5.3**	0.4	**5.9**	0.9	**6.8**	0.6	**8.1**	0.4
Annual growth in total assets										
1985	**6.6**	1.6	**5.7**	0.8	**8.3**	0.9	**11.7**	1.3	**25.6**	2.8
1986	**3.8**	1.3	**6.7**	0.8	**7.6**	0.6	**10.5**	1.0	**18.9**	1.6
1987	**2.4**	1.4	**4.8**	0.7	**5.9**	0.8	**6.4**	1.0	**11.0**	1.4
1988	**6.2**	1.7	**7.0**	1.0	**7.4**	0.8	**6.9**	1.2	**8.4**	1.2
Passbook deposits to total assets										
1984	**6.9**	0.4	**7.0**	0.3	**7.8**	0.3	**9.5**	0.7	**12.3**	1.3
1985	**6.1**	0.4	**6.6**	0.3	**7.1**	0.3	**8.6**	0.7	**11.3**	1.2
1986	**4.0**	0.5	**7.2**	0.3	**7.7**	0.3	**9.5**	0.8	**11.3**	1.1
1987	**7.6**	0.5	**7.5**	0.3	**8.1**	0.3	**10.5**	0.8	**11.0**	1.0
1988	**8.1**	1.1	**6.9**	0.3	**7.6**	0.3	**9.8**	0.8	**10.5**	1.0
Traditional (1–4 family first) mortgages										
1984	**64.9**	1.3	**70.2**	1.1	**68.3**	1.2	**68.0**	1.6	**64.4**	2.5
1985	**60.0**	1.4	**66.6**	1.2	**63.7**	1.3	**65.3**	1.5	**64.1**	2.2
1986	**57.4**	1.3	**64.4**	1.2	**61.4**	1.3	**62.1**	1.4	**63.1**	2.0
1987	**59.3**	1.4	**66.2**	1.1	**64.3**	1.3	**64.8**	1.5	**65.5**	2.1
1988	**61.2**	1.5	**66.4**	1.2	**64.9**	1.2	**66.3**	1.4	**65.7**	2.1
Fixed-interest rate (1–4 family first) mortgages										
1984	**46.0**	1.7	**52.6**	1.4	**50.6**	1.4	**47.7**	2.0	**41.4**	3.3
1985	**38.4**	1.5	**44.0**	1.5	**42.1**	1.5	**40.2**	2.0	**37.2**	3.2
1986	**34.5**	1.4	**39.7**	1.4	**36.8**	1.4	**36.0**	1.9	**37.4**	2.9
1987	**33.2**	1.4	**37.4**	1.6	**35.7**	1.6	**35.4**	2.0	**38.1**	3.0
1988	**29.4**	1.4	**33.6**	1.5	**32.4**	1.6	**32.4**	2.0	**36.8**	3.0

(continued)

Table 10.5 (continued)

	Market Value of Net Worth/Total Assets (in percentages)									
	< −3%		−3% < 0%		0% < 3%		3% < 6%		> 6%	
	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean
Adjustable-interest-rate mortgages										
1984	**17.8**	1.1	**17.1**	1.0	**17.9**	1.2	**20.1**	1.4	**18.1**	2.4
1985	**24.7**	1.3	**24.3**	1.2	**26.0**	1.4	**28.2**	1.9	**28.9**	3.0
1986	**27.5**	1.4	**28.6**	1.3	**29.9**	1.5	**30.0**	1.8	**29.3**	2.9
1987	**31.5**	1.6	**33.2**	1.5	**34.9**	1.7	**34.6**	2.0	**31.0**	2.9
1988	**36.4**	1.7	**37.3**	1.5	**39.1**	1.8	**39.4**	2.1	**33.3**	2.8
Multifamily and nonresidential mortgages										
1984	**13.4**	1	**11.8**	0.7	**12.2**	1.0	**11.7**	1.2	**12.8**	1.4
1985	**14.1**	1	**13.1**	0.7	**14.3**	1.1	**12.0**	1.2	**15.7**	1.9
1986	**15.5**	1.1	**13.1**	0.7	**14.4**	1.1	**11.9**	1.1	**15.1**	1.8
1987	**12.3**	0.9	**9.8**	0.6	**11.5**	0.9	**9.5**	0.9	**11.3**	1.3
1988	**11.9**	0.9	**9.5**	0.6	**11.0**	0.8	**9.4**	0.8	**10.9**	1.2
Second mortgages										
1984	**0.8**	0.2	**0.7**	0.2	**0.6**	0.1	**0.5**	0.1	**1.3**	0.4
1985	**1.0**	0.3	**0.8**	0.1	**0.6**	0.1	**0.5**	0.7	**1.3**	0.3
1986	**1.4**	0.4	**0.6**	0.1	**0.6**	0.1	**0.4**	0.1	**0.9**	0.2
1987	**1.6**	0.4	**0.6**	0.7	**0.5**	0.1	**0.4**	0.1	**0.9**	0.2
1988	**1.7**	0.4	**0.7**	0.1	**0.5**	0.1	**0.5**	0.1	**0.8**	0.2
Consumer loans										
1984	**4.7**	0.5	**3.8**	0.4	**3.3**	0.3	**3.9**	0.4	**2.7**	0.4
1985	**5.5**	0.6	**4.7**	0.4	**4.0**	0.4	**4.7**	0.6	**3.6**	0.5
1986	**5.5**	0.6	**4.8**	0.4	**4.3**	0.4	**4.6**	0.6	**3.1**	0.5
1987	**5.6**	0.6	**5.1**	0.5	**4.7**	0.4	**4.6**	0.5	**3.1**	0.6
1988	**6.1**	0.6	**5.5**	0.4	**5.2**	0.4	**5.0**	0.6	**3.4**	0.6
Commercial loans										
1984	**0.8**	0.2	**0.4**	0.1	**0.5**	0.1	**0.6**	0.2	**1.7**	0.6
1985	**1.3**	0.2	**0.7**	0.1	**0.8**	0.2	**0.9**	0.2	**1.6**	0.4
1986	**1.6**	0.3	**0.9**	0.2	**1.1**	0.2	**1.2**	0.3	**1.8**	0.4
1987	**1.7**	0.3	**1.1**	0.2	**1.1**	0.2	**1.3**	0.3	**1.5**	0.3
1988	**1.7**	0.3	**1.2**	0.2	**1.2**	0.2	**1.4**	0.3	**1.5**	0.3
Investment securities										
1984	**10.5**	0.9	**10.1**	0.7	**12.7**	0.8	**14.1**	1.3	**20.0**	2.2
1985	**11.1**	1.0	**9.9**	0.7	**13.8**	0.9	**13.3**	1.1	**14.9**	1.3
1986	**12.0**	0.9	**11.8**	0.7	**14.8**	0.9	**15.3**	1.1	**15.3**	1.1
1987	**10.4**	0.9	**10.1**	0.7	**11.7**	0.7	**12.6**	1.2	**14.0**	1.3
1988	**9.6**	0.9	**9.9**	0.8	**10.5**	0.7	**11.2**	1.2	**12.4**	1.1
Delinquency on (all) mortgages, percentages of total mortgages										
1984	**2.8**	0.4	**1.7**	0.1	**1.7**	0.1	**1.5**	0.1	**1.3**	0.1
1985	**2.8**	0.4	**2.4**	0.4	**2.5**	0.3	**2.0**	0.2	**2.0**	0.2
1986	**3.2**	0.4	**2.5**	0.3	**3.1**	0.4	**3.1**	0.8	**2.2**	0.3
1987	**3.4**	0.4	**2.5**	0.3	**3.0**	0.4	**2.5**	0.4	**3.4**	0.7
1988	**3.2**	0.4	**2.2**	0.2	**2.4**	0.3	**2.2**	0.3	**3.1**	0.5

Table 10.5 (continued)

	Market Value of Net Worth/Total Assets (in percentages)									
	< −3%		−3% < 0%		0% < 3%		3% < 6%		> 6%	
	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean
Delinquency on nonmortgages, percentages of nonmortgages										
1984	**1.9**	0.3	**1.7**	0.4	**9.8**	0.3	**0.9**	0.2	**0.9**	0.5
1985	**2.7**	0.5	**2.8**	0.7	**1.7**	0.6	**1.2**	0.3	**0.9**	0.3
1986	**3.6**	0.7	**2.8**	0.6	**2.2**	0.5	**2.2**	0.7	**1.8**	0.6
1987	**3.1**	0.5	**2.4**	0.4	**2.5**	0.7	**1.5**	0.4	**1.7**	0.3
1988	**4.0**	0.7	**2.6**	0.4	**2.4**	0.6	**1.8**	0.4	**1.7**	0.4
Number of observations	77		106		112		82		78	
Percentage of total	17%		23%		25%		18%		17%	

that operated continuously through year-end 1988.[30] Data on the 31 thrifts that were terminated during this period are presented in table 10.7. (The remaining 31 thrifts that ceased independent operations for other reasons are not included in this portion of the analysis.)

Considering first the 455 continuously operating thrifts, as of year-end 1984, 77 (17% of the sample) had market-value equity to asset ratios of less than −3 percent, 106 (23%) had ratios between −3 and 0 percent, 112 (25%) between 0 and 3 percent, 82 (18%) between 3 and 6 percent, and 78 (17%) 6 percent and over. Table 10.5 shows an inverse relationship between market-value solvency and total asset size, which also is revealed by the statistically significant negative coefficient of total assets estimated for equations 3′ and 4b (see tables 10.3 and 10.4). This relationship continues throughout the five-year period and probably back at least to mid 1982. Table 10.6 presents data on the book-value net worth to total assets and passbook deposits to total assets as of 30 June 1982 and the percentage growth in total assets through 31 December 1984 of the 485 thrifts operating on 30 June 1982. While this group is not directly comparable to the 455 continuously operating thrifts because of merger and new charters before year-end 1984 and cessation of operations after year-end 1984, it provides a valuable (and the only available) benchmark.

One reason for the solvency of southeastern thrifts at year-end 1984 appears to be a higher relative ratio of passbook deposits to total assets. Solvency and the percentage of passbook deposits are directly related, and smaller thrifts tend to have relatively more of these deposits, both at mid-year 1982 and year-end 1984. While the percentage of passbook deposits over the period declined by 54 to 61 percent (which is not surprising, considering the large increase in market interest rates and much smaller rise in the Regulation Q ceiling), the

solvent thrifts still held larger percentages at year-end 1984 than the insolvent thrifts. As noted above, higher proportions of passbook deposits also may proxy for the competitiveness of the thrifts' marketplace. (Had we the data, we would have related the solvency of thrifts to their Herfindahl index or other measure of competition.) Thus, the solvent thrifts appear to have benefited from a slower run-off of their below-market-rate liabilities and possibly from less competition in their markets. This conclusion is supported by the regression reported in table 10.3, which shows a significant positive relationship between market-value net worth and passbook deposits.

Another hypothesis for the inverse relationship between size and solvency is that thrifts rendered insolvent by the 1979–81 sharp increase in interest rates may have grown relatively more rapidly before 1984, in an attempt to "grow" out of their old balance sheets, than those that were still solvent in 1982. The data presented in tables 10.4 and 10.6, though, are inconsistent with this hypothesis. The regression coefficients given in table 10.4 show a significant positive relationship between asset growth and market-value net worth. The magnitude of the relationship, though, is small: a $100 million increase in assets is associated with a $100,000 increase in market-value net worth. The univariate relationship shown in table 10.6 indicates that most of the measured multivariate positive relationship is due to the group with market-value net worth above 6 percent. This group has a relatively large number of newly chartered thrifts, as indicated by the small assets size and the greater number at year-end 1984 than at mid-year 1982 (at least 78 compared to 61).[31] Hence, it is not surprising that the group experienced higher mean growth rates. (Newly chartered thrifts also are less likely to have suffered from interest-rate-increase induced losses, as they have more currently priced fixed-rate mortgages.) Table 10.6 gives mean growth rates over the entire period and over the eighteen months ending 31 December 1983. Over both periods the rate of growth of the solvent thrifts exceed that of the insolvent thrifts. The table also shows the median, quartile, and five and ninety-five percentile growth rates. These data reveal that the mean growth rates are considerably affected by some large values, probably the result of mergers. We consider the median rates, therefore, more meaningful indicators of growth due to the acquisition of deposits and debt. These rates for the entire period and the period through year-end 1983 show only slightly higher growth for the more solvent thrifts. This finding is inconsistent with the hypothesis that insolvent and weak thrifts took advantage of deposit insurance to grow excessively. This contention also is inconsistent with the positive relationship found between growth and solvency for the June 1982 through December 1984 period, as shown in table 10.4.

A third hypothesis is that thrifts' year-end 1984 insolvency is due to their prior net worth position. This hypothesis is supported by the "market value of net worth at year-end 1984" regression given in table 10.4 and the book-value net worth reported in table 10.6. The coefficient of "book-value net worth

Table 10.6 **485 Thrifts' Characteristics from June 1982 (grouped by market-value net worth to total assets as of 31 December 1984)**

	Market Value of Net Worth/Total Assets (in percentages)									
	< − 3%		−3% < 0%		0% < 3%		3% < 6%		≥ 6%	
	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean
Book-value net worth to total assets, in percentages										
	2.7	0.2	**3.7**	0.1	**5.5**	0.4	**5.9**	0.3	**6.5**	0.8
Passbook deposits to total assets, in percentages										
	12.5	0.5	**12.6**	0.4	**13.5**	0.5	**15.5**	0.7	**22.8**	1.5
Growth in total assets from 6/82 to 12/84, in percentages										
	62.6	17.1	**64.0**	14.5	**97.7**	28.9	**63.2**	12.8	**102.0**	31.1
Percentile										
95%		220.5		244.3		555.7		297.4		495.8
75%		47.4		51.5		45.7		44.8		54.5
50%		24.1		24.5		25.3		27.6		24.3
25%		10.0		14.5		15.7		17.0		16.8
5%		0.3		4.1		2.4		3.2		3.7
Growth in total assets from 6/83 to 12/84, in percentages										
	24.3	4.6	**27.4**	3.6	**40.9**	9.2	**43.0**	13.5	**38.2**	6.0
Percentile										
95%		64.8		105.0		146.0		177.3		175.7
75%		25.7		31.1		31.1		29.1		42.4
50%		15.6		15.8		17.4		18.0		19.5
25%		8.4		8.8		11.3		10.4		11.1
5%		−2.2		−0.5		1.9		0.4		4.5
Number of observations	93		123		125		83		61	
Percentage of total	19%		25%		26%		17%		13%	

6/82" of 1.65 in table 10.4 indicates a greater than proportional relationship between book value on 30 June 1982 and market-value net worth on 31 December 1984. Table 10.6 shows that the very insolvent thrifts (< 3% market-value net worth to total assets) had mean book-value net worth of 2.7 percent and the −3% < 0% thrifts had mean book-value net worth of 3.7 percent of total assets at mid-year 1982. In comparison, the solvent thrifts had mean book-value net worth of at least 5.5 percent of total assets (the differences are statistically significant).

Returning now to table 10.5, the second group of figures, market-value net worth to total assets at market value, indicates that the average relative solvency position of the continuously operating thrifts improved dramatically in 1985 when interest rates declined, for all except the strongest group (≥ 6%), but did not change much thereafter. The continuous decline in the strongest

groups' average market-value net worth appears to be due to rapid expansion by strong, small, often newly chartered thrifts, as shown by the increase in the average amounts of total assets. After 1985 the average market-value ratios remain fairly constant. These data are not consistent with the hypothesis that insolvent and weak thrifts engaged in excessive risk-taking resulting in net losses, on average. (Note that these data do not include thrifts that failed during the period.) However, the regulatory book-value net worth ratios for the insolvent groups tend to increase more than for the solvent thrifts. This may reflect their strong incentive to use RAP modifications to bolster reported capital, thereby preventing takeover by the authorities. As is shown later, the increase in RAP net worth of insolvent thrifts is not simply a function of their having taken and benefited from additional interest-rate risk.

Surprisingly, perhaps, growth in assets does not appear to be a function of the market-value solvency of the thrifts in the post-1984 years, nor (as we report above) in the mid 1982 through year-end 1984 period. Indeed, the 1984 insolvent thrifts grew at a slower rate than the solvent thrifts, particularly the strongest thrifts. This finding is inconsistent with the "deposit-insurance" hypothesis.

All groups tended to decrease their investment in fixed-interest-rate 1–4 family first mortgages and increase their holdings of adjustable-rate mortgages (relative to total assets). Investment in traditional (1–4 family first) mortgages relative to total assets is not very different among the solvent groups, with the exception of the $< -3\%$ net worth group, where the percentage is significantly lower by about five percentage points. The percentages of fixed- and adjustable-interest-rate mortgages to total assets is insignificantly different among the groups. Multifamily and nonresidential mortgages relative to total assets decreased significantly over the period and are about the same for all groups. Second mortgages are a significantly higher percentage of total assets at the most insolvent thrifts after 1985, although the average percentage only reaches 1.7 (in 1988). This may, however, signal a willingness among these thrifts to accept higher loan-to-value loans—the most important indicator of credit losses on mortgages. On the whole, though, the data are inconsistent with the hypothesis that insolvency encouraged thrifts to take advantage of expanded mortgage loan powers.

Commercial loans are also small proportions of total assets for all groups, but are similar among the groups. Consumer loans, though, are a relatively greater percentage of total assets, on average, at the most insolvent thrifts; however, the difference is greatest for the most insolvent group, which has significantly higher percentages than the most solvent group (e.g., in 1986, 5.5 vs. 3.1 percent). Investment securities are higher percentages of total assets at the most solvent thrifts. Given that consumer loans are not considered to be inherently risky and were permitted prior to the Garn–St Germain Act of 1982, this evidence either is inconsistent with the "insolvency-driven, excessive risk-taking" and "asset-deregulation" hypotheses, indicates that asset

type is an inadequate measure of risk (which is contrary to the basic consumption of the "asset-deregulation" hypothesis), or supports the view that the fourth district supervisors were effective in restraining excessive risk-taking.

The delinquency percentages (to mortgages outstanding) are available only for portfolios of mortgages and nonmortgages. All groups experienced significant increases in delinquencies (which our model assumes are total losses). The delinquency rates are not significantly different among the groups with respect to solvency, which is inconsistent with the "insolvency-driven, excessive risk-taking" hypothesis. However, the delinquency rate on nonmortgages is significantly higher and escalates quickly for the very insolvent thrifts after 1985, particularly as compared to the strongest thrifts. These data are consistent with the hypothesis and perhaps with the "asset-deregulation" hypothesis, although with commercial mortgages included in the mortgage delinquency rate, the hypothesis cannot really be tested with these data. Furthermore, as noted above, nonmortgage (commercial and consumer) loans are relatively small percentages of total assets at most thrifts, although relatively high delinquencies on small amounts of loans could be sufficient to drive weakly capitalized thrifts into insolvency.

On the whole, the data appear inconsistent with the hypothesis that insolvency and low capital ratios, measured in market-value terms, encouraged surviving thrifts to take excessively high risks, nor did their operations tend to result in large losses. Alternatively, the supervisory authorities may have constrained excessive risk-taking. However, the sample is biased in that the institutions that were closed (failed) are not included. We turn to those now.

Failed Thrifts

Table 10.7 shows the assets and liabilities of the 35 thrifts that were operating at year-end 1984 and closed by year-end 1988. The table presents financial ratios for these thrifts in the year-ends preceding failure. The failed thrifts are smaller, on average, than the most insolvent operating thrifts (although the large standard errors of the means among the 1986 and 1987 failures indicates a wide variance) and about the same size as the weak operating thrifts.[32] The market-value net-worth-to-total-assets-at-market percentages indicate they were insolvent, on average, in the years before they were closed. Examination of the individual data indicates that most of these thrifts were insolvent in those years. However, on average and individually, they rarely were book-value insolvent except in the year just preceding their being closed.

High rates of growth did not precede failure, on average and (with a few exceptions) individually, which again is inconsistent with the "deposit-insurance" hypothesis. The small average amounts of brokered deposits as a percentage of total liabilities also is inconsistent with this hypothesis. (Indeed, only two thrifts in each failure year had more than trivial amounts of brokered deposits.) Deposits over $100,000 as a percentage of total liabilities are relatively larger at the failed thrifts (compare with tables 10.8 and 10.9),[33]

Table 10.7 **35 Thrifts That Were Closed in 1985 through 1988 (balance sheet amounts and ratios in the years before closure)**

			Total Assets (TA) (book value in $ millions)		Market-Value Net Worth as % of TA		RAP Net Worth as % of TA		Annual Growth in TA in percentages		Nontraditional Assets[a] as % of TA	
	Year-End	Number of Thrifts	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean
Closed in 1985	1984	3	232	94	−27.0	4.6	−11.4	7.4	not calculated		7.0	3.3
Closed in 1986	1984	8	460	225	−4.3	2.0	1.9	1.2	not calculated		35.3	11.6
	1985	8	490	247	−7.2	2.7	−2.0	1.7	0.5	7.4	35.8	7.5
Closed in 1987	1984	11	489	216	−3.4	2.2	1.3	1.1	not calculated		37.3	6.2
	1985	11	510	231	−4.1	3.9	−0.3	1.7	0.6	6.0	38.5	7.5
	1986	11	460	198	−15.5	7.2	−7.2	3.8	−12.8	4.8	36.5	5.0
Closed in 1988	1984	13	353	85	−1.2	1.5	2.8	0.7	not calculated		22.5	4.8
	1985	13	355	81	0.0	1.1	2.8	0.4	3.0	3.9	31.0	6.8
	1986	13	354	87	−3.8	1.4	1.3	0.8	−1.5	5.1	31.1	6.0
	1987	13	344	92	−13.0	2.7	−5.7	2.3	−8.6	4.7	26.9	5.3

[a]Mortgages other than first mortgage 1–4 family loans, commercial and consumer loans, and real estate held for investment.

	Year-End	Number of Thrifts	Traditional Mortgages[b] as % of TA		Fixed-Interest Mortgages as % of TA		Adjustable-Rate Mortgages as % of TA		Delinquency Rate on Mortgages		Delinquency Rate — on Nonmortgages	
			Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean
Closed in 1985	1984	3	73.8	6.3	66.8	8.1	6.2	3.1	2.0	1.0	1.0	1.0
Closed in 1986	1984	8	47.2	9.3	29.1	7.6	31.2	9.0	5.5	1.9	4.3	2.3
	1985	8	48.4	8.6	22.8	5.8	43.9	6.7	12.2	4.9	14.2	7.7
Closed in 1987	1984	11	42.8	6.6	34.4	6.3	19.2	3.9	4.1	1.2	1.2	0.5
	1985	11	45.8	5.1	28.5	5.5	35.1	6.5	8.6	2.5	3.7	2.0
	1986	11	42.5	4.7	25.9	4.7	32.1	5.6	18.1	5.0	7.2	4.5
Closed in 1988	1984	13	66.6	4.6	36.3	6.1	26.2	6.9	2.1	0.4	0.8	0.5
	1985	13	53.6	4.0	28.9	4.2	35.6	7.1	4.0	2.6	1.4	0.7
	1986	13	49.7	4.6	26.6	5.8	34.5	6.3	7.7	1.6	4.9	2.7
	1987	13	52.4	4.2	30.4	4.7	33.1	6.3	12.4	3.4	1.5	0.6

[b]1–4 family first mortgages.

(continued)

Table 10.7 (continued)

	Year-End	Number of Thrifts	Passbook Deposits as % of Total Liabilities (TL)		Deposits Under $100,000 as % of TL		Deposits Over $100,000 as % of TL		Brokered Deposits as % of TL	
			Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean
Closed in 1985	1984	3	4.7	0.4	76.3	10.6	8.1	4.9	0.0	0.0
Closed in 1986	1984	8	2.9	0.8	80.7	2.1	10.8	2.4	5.9	3.8
	1985	8	2.8	0.9	87.3	2.9	6.9	2.6	3.5	2.4
Closed in 1987	1984	11	7.5	3.8	70.0	5.8	15.5	4.1	1.1	0.6
	1985	11	7.6	4.0	73.4	4.9	14.7	4.3	2.7	1.5
	1986	11	8.4	3.9	77.8	4.5	8.7	2.0	2.1	1.5
Closed in 1988	1984	13	4.2	0.9	73.4	4.1	10.8	1.8	2.5	1.3
	1985	13	4.0	0.9	72.3	3.7	11.7	2.5	3.6	2.6
	1986	13	5.7	1.1	77.7	3.4	9.6	1.9	2.6	2.0
	1987	13	5.5	1.0	78.5	4.2	7.3	2.0	3.9	2.0

which indicates that they had local funding problems but were able to obtain partially insured funds. This conclusion is supported by the failed thrifts' relatively lower amount of deposits under $100,000 as compared to the stronger operating thrifts. However, in the year before their failure, the percentage of deposits over $100,000 decreased substantially (indicating that holders of these deposits correctly predicted failure) and the percentage of fully insured deposits increased, but not sufficiently to offset the decrease in partially insured funds. The shortfall was made up with advances from the Federal Home Loan Bank.

Nontraditional assets (first mortgages other than 1–4 family loans, commercial and consumer loans, and real estate held for investment) are considerably higher at the failed thrifts, although there is little evidence of increase over the time before they were closed. Traditional mortgages as a percentage of total assets are about two-thirds of the percentages at operating thrifts, particularly for thrifts that failed before 1988. The percentages of fixed- and adjustable-interest-rate mortgages to total assets are not significantly different from the operating groups, with the exception of the three thrifts that failed in 1985. These thrifts concentrated on traditional mortgages and held almost no adjustable-interest-rate mortgages, which appears to account for their early failure.

After 1985, delinquencies play a large role in the failure of southeastern thrifts. The delinquency rates (to mortgages and to nonmortgage loans outstanding) are significantly higher among the failed thrifts compared to all except the most insolvent operating thrifts. However, unlike these institutions, the failed thrifts' delinquency rates tend to be higher for mortgage than for nonmortgage loans. This may be due to their capitalizing unpaid interest on restructured commercial loans. In all cases, delinquencies rapidly escalated from year to year as weak credits emerged or supervisors forced recognition.

10.5.3 The Behavior of Thrifts that Were Market-Value Insolvent or Solvent at Year-End 1984 and That Subsequently Were Closed or Open through 31 March 1990

The analysis of operating and failed thrifts just presented does not speak directly to the question of why some thrifts failed while others survived. To answer this question, we put the data together and constructed table 10.8, which presents data on the 517 thrifts operating at year-end 1984 for the subsequent four years. These thrifts are classified into four major groups (solvency is as of year-end 1984, according to our measure of market values; closure is through 31 March 1990, the latest data available at the time this table was constructed): insolvent and subsequently closed (50 thrifts, 10% of the 517 in operation at year-end 1984); insolvent and subsequently open (still operating) (170 thrifts, or 33%); solvent and subsequently closed (22 thrifts, or 4%); and solvent and subsequently open (275 thrifts, or 53%). To test further the hypothesis that economically insolvent thrifts with RAP net worth

Table 10.8 **The Condition of the 517 Thrifts That Were Insolvent or Solvent at Year-end 1984 And That Subsequently Were Closed or Open through 31 March 1990**

		Number of Observations		Total Assets (TA) (book value in $ millions)		Annual Growth in TA (percentages)		Market-Value Net Worth as % of TA		RAP Net Worth as % of TA	
	Year-end	Number	% in Year	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean
Insolvent and Closed	1984	50	10	579	102	not calculated		−7.3	1.0	0.9	0.9
	1985	47	9	632	124	−0.9	2.2	−4.2	1.1	0.8	0.6
	1986	40	8	665	164	−3.4	2.2	−5.2	1.5	−0.6	1.2
	1987	34	7	718	238	−2.5	2.4	−8.6	1.2	−2.6	1.3
	1988	29	6	883	343	−1.8	2.0	−9.3	1.5	−4.1	1.8
Insolvent/RAP NW > 3% and Closed	1984	12	24	1,061	307	not calculated		−4.1	1.1	3.8	0.2
	1985	12	26	1,195	372	6.3	3.9	−3.1	1.9	3.0	0.4
	1986	10	25	1,261	568	2.9	2.7	−3.7	1.6	2.3	1.1
	1987	7	21	1,826	1,061	3.4	4.3	−8.0	2.0	−0.2	1.8
	1988	7	24	2,080	1,355	−1.4	3.9	−10.7	2.3	−2.8	2.4
Insolvent and Open	1984	170	33	407	45	not calculated		−3.0	0.2	2.8	0.1
	1985	164	32	656	51	6.6	0.7	2.0	2.9	3.8	1.9
	1986	161	32	475	54	6.9	0.7	3.6	0.3	5.2	0.2
	1987	158	33	484	55	4.2	0.8	3.2	0.3	13.5	0.5
	1988	153	34	557	66	8.1	1.0	4.1	0.7	14.3	0.6

Insolvent/RAP NW											
> 3% and Open	1984	69	41	504	88	not calculated		−2.2	0.3	4.1	0.1
	1985	68	41	564	100	7.8	1.1	3.2	0.5	5.0	0.4
	1986	66	41	599	104	7.2	0.9	5.1	0.6	6.2	0.5
	1987	65	41	584	103	4.0	0.9	4.7	0.5	6.5	0.3
	1988	62	41	667	126	8.2	1.3	4.8	0.5	6.6	0.3
Solvent and Closed	1984	22	4	160	40	not calculated		4.2	1.3	4.7	1.3
	1985	22	4	191	46	14.0	4.5	1.6	1.9	1.8	1.5
	1986	21	4	212	56	3.8	4.3	−6.8	4.0	−1.6	2.5
	1987	16	3	261	93	5.1	3.5	−11.6	4.9	−4.0	4.2
	1988	12	3	285	138	−2.2	4.4	−14.8	6.9	−10.2	7.5
Solvent and Open	1984	275	53	189	30	not calculated		5.4	0.4	7.1	0.4
	1985	275	54	207	30	13.7	1.0	7.3	0.2	2.4	0.1
	1986	274	55	231	33	11.4	0.6	7.9	0.2	6.8	0.2
	1987	265	56	251	37	7.4	0.6	7.8	0.2	7.5	0.2
	1988	260	57	279	43	8.0	0.6	7.6	0.3	7.5	0.2

Note: Except for market-value worth and total assets, all numbers are based on book values.

(continued)

Table 10.8 (continued)

	Year-end	Nontraditional Assets[a] as % of TA		Traditional Mortgages as % of TA		Fixed-Interest Mortgages as % of TA		Adjustable-Rate Mortgages as % of TA		Delinquency Rate on All Mortgages, in percentages	
		Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean
Insolvent and Closed	1984	24.5	2.5	60.4	2.1	43.0	2.2	20.0	2.2	3.7	0.6
	1985	25.2	1.7	55.4	1.9	34.3	1.8	27.2	2.2	5.2	1.1
	1986	25.7	1.5	52.4	2.0	33.8	2.1	25.8	1.9	6.0	0.9
	1987	23.2	1.6	56.2	1.8	34.7	2.1	26.7	2.2	5.6	0.9
	1988	21.8	1.6	59.5	2.1	32.8	2.3	31.9	2.4	4.7	0.8
Insolvent/RAP NW >3% and Closed	1984	27.1	7.8	57.0	5.7	37.0	5.3	28.5	5.3	3.5	1.0
	1985	22.0	3.7	56.4	4.4	32.2	4.1	29.6	5.1	6.3	0.3
	1986	24.4	3.5	50.6	4.4	32.7	2.5	24.6	3.9	6.0	0.1
	1987	24.4	4.0	53.4	3.9	36.2	4.0	23.8	4.1	6.7	0.3
	1988	23.9	3.6	53.0	5.6	32.9	4.5	30.0	4.8	7.2	0.3
Insolvent and Open	1984	16.3	0.6	68.9	0.9	51.1	1.1	17.1	0.8	1.7	0.1
	1985	18.7	0.8	64.9	1.0	42.9	1.2	24.5	0.9	1.8	0.1
	1986	19.3	0.9	62.7	1.0	38.2	1.2	28.2	1.0	2.0	0.1
	1987	20.0	0.9	64.6	1.0	35.9	1.2	33.3	1.2	2.2	0.2
	1988	20.2	0.9	65.2	1.0	31.8	1.2	37.8	1.3	2.2	0.2

Insolvent/RAP NW											
>3% and Open	1984	14.4	0.9	70.3	1.3	53.3	1.8	16.5	1.2	1.6	0.2
	1985	17.0	1.1	66.4	1.5	43.9	1.9	24.7	1.6	1.8	0.2
	1986	17.7	1.2	64.7	1.7	39.6	1.9	27.8	1.7	1.7	0.2
	1987	18.2	1.3	66.4	1.6	37.5	1.9	33.3	1.9	1.8	0.2
	1988	18.3	1.4	66.0	1.7	33.6	2.0	36.4	2.0	1.6	0.2
Solvent and Closed	1984	32.1	4.4	48.4	5.6	20.2	4.0	30.1	4.4	2.6	0.5
	1985	47.5	4.9	45.3	4.1	16.7	1.6	51.2	5.1	6.7	1.6
	1986	45.5	4.2	42.9	3.1	15.9	2.9	47.4	5.0	13.7	3.0
	1987	39.5	4.8	48.7	3.5	16.1	2.7	49.0	5.4	14.9	2.9
	1988	34.2	4.6	52.2	3.2	16.9	3.9	49.1	6.4	11.1	1.6
Solvent and Closed	1984	16.1	0.7	67.6	0.9	47.8	1.2	18.2	9.1	1.5	0.1
	1985	18.2	0.8	64.4	0.9	40.9	1.1	26.2	1.1	1.9	0.1
	1986	18.3	0.8	62.2	0.9	37.3	1.1	28.7	1.1	2.0	0.1
	1987	18.9	0.9	65.1	0.9	36.9	1.2	33.0	1.2	2.2	0.2
	1988	18.8	0.8	66.2	0.9	34.4	1.3	37.1	1.3	2.2	0.2

[a]Mortgages other than first 1–4 family loans, commercial and consumer loans, and real estate held for investment.

(continued)

Table 10.8 (continued)

		Delinquency Rate on Nonmortgages, in percentages		Passbook Deposits as % of Total Liabilities (TL)		Deposits Under $100,000 as % of TL		Deposits Over $100,000 as % of TL		Brokered Deposits as % of TL	
	Year-end	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean
Insolvent and Closed	1984	3.3	0.2	5.6	0.4	74.2	1.8	11.3	1.3	2.2	0.8
	1985	4.2	0.4	5.2	0.4	75.4	1.7	10.2	1.1	1.8	0.6
	1986	5.0	0.3	6.2	0.5	73.7	2.0	9.7	1.3	1.5	0.5
	1987	5.3	0.2	6.2	0.5	75.0	2.5	6.8	1.1	2.1	0.8
	1988	6.2	0.2	5.7	0.5	73.5	2.7	6.4	1.3	2.7	1.2
Insolvent/RAP NW >3% and Closed	1984	1.2	0.5	5.4	0.7	77.5	3.5	10.8	2.5	1.5	1.3
	1985	6.6	0.5	4.9	0.7	73.2	3.8	12.4	2.8	3.1	1.6
	1986	2.1	0.8	6.4	1.0	70.6	4.2	12.1	3.9	3.2	1.5
	1987	6.9	0.3	6.2	1.0	73.2	7.7	8.3	3.6	4.9	3.3
	1988	6.5	0.2	5.7	0.9	71.7	7.7	8.9	4.5	5.3	4.4

Insolvent and Open	1984	1.4	0.2	7.3	0.3	81.9	1.0	8.5	0.7	0.5	0.2
	1985	2.3	0.2	6.8	0.2	83.0	0.8	7.9	0.4	0.3	0.1
	1986	2.6	0.3	7.4	0.3	81.1	0.9	8.7	0.5	0.2	0.1
	1987	2.1	0.3	7.9	0.3	79.6	0.9	8.1	0.4	0.5	0.1
	1988	2.6	0.2	7.7	0.6	83.5	5.5	10.0	2.2	0.6	0.1
Insolvent/RAP NW											
> 3% and Open	1984	1.7	0.5	7.8	0.4	84.8	1.2	7.3	0.7	0.4	0.2
	1985	1.6	0.4	7.3	0.4	84.7	1.1	6.9	0.5	0.3	0.2
	1986	2.5	0.9	7.7	0.4	82.9	1.2	7.4	0.5	0.2	0.2
	1987	1.6	0.4	8.4	0.5	80.7	1.4	7.4	0.5	0.5	0.2
	1988	2.4	0.7	7.5	0.5	77.8	1.6	7.5	0.5	0.6	0.3
Solvent and Closed	1984	1.8	0.4	5.3	2.1	71.2	3.4	19.1	2.9	4.3	0.1
	1985	6.2	1.1	5.3	2.2	75.6	3.5	16.1	3.0	4.2	0.2
	1986	10.0	1.1	6.8	2.3	79.6	3.1	11.9	2.3	3.1	0.2
	1987	5.8	0.7	5.4	1.5	80.8	3.5	7.7	0.1	3.3	0.2
	1988	12.0	0.8	5.9	1.7	81.8	3.5	6.2	0.4	4.8	0.2
Solvent and Open	1984	0.9	0.2	9.6	4.4	85.6	7.8	9.4	0.6	0.7	0.1
	1985	0.9	0.2	8.8	0.4	85.4	7.1	9.2	0.5	0.6	0.1
	1986	1.5	0.3	9.2	3.9	84.4	7.0	9.9	0.4	0.6	0.1
	1987	1.8	0.3	9.7	4.2	83.8	6.8	8.8	0.4	0.6	0.1
	1988	1.6	0.2	10.0	4.1	83.5	6.7	8.8	0.4	0.8	0.2

that met the FHLBB's informal definition of adequate solvency had a stronger incentive to take excessive risks, we subclassified the insolvent thrifts into those with RAP net worth of over 3 percent (RAP NW > 3%). The twelve insolvent/RAP>3% thrifts that subsequently closed constitute 24 percent of the total insolvent and closed group. The 69 open insolvent/RAP>3% thrifts are 41 percent of the insolvent and open group.[34]

Table 10.8 shows that the insolvent thrifts are significantly larger than the solvent thrifts, consistent with table 10.5. However, a striking finding revealed by table 10.8 is that the closed insolvent/RAP>3% group is over twice as large, on average, than the other insolvent thrifts. The 1987 and 1988 standard errors of the means are quite large because the data include one small thrift (total assets of about $35 million) and one very large thrift (with total assets of $4 billion in 1984 and $10 billion in 1988; the next largest thrift had $1.6 billion in assets). While this group had few members, they imposed large cost on the FSLIC.

The costs to the FSLIC (and, largely, to the taxpayers) are indicated by the negative market-value-to-total-asset percentages. All of the 50 insolvent and closed thrifts had negative market-value net worth in each year they were operating. However, about half of these thrifts had positive book-value net worth ratios in 1984, 1985, and 1986. These positive RAP net worth values appear to explain why the insolvent thrifts were allowed to continue operating. Most of the 22 solvent thrifts that were closed started their downward slide in 1986. Five of the 21 institutions still operating in 1986 were closed in 1987, and 4 were closed in 1988.[35] Most (over 75 percent) of the year-end 1984 insolvents that remained open (including those with RAP NW > 3%) became market-value solvent after 1984, and almost all had positive book-value net worth.

On average, the insolvent thrifts that closed had negative growth rates in all five years. Although the closed insolvent/RAP>3% groups grew, on average, in 1985, 1986, and 1987, the maximum annual rate at any of these thrifts did not exceed 24 percent. Thus, high growth does not appear to have been a strategy followed by or permitted to insolvent thrifts that were closed. Year-end 1984 insolvent thrifts that remained open grew, on average, in each year studied, as did the year-end 1984 solvent thrifts, with one exception. Average negative growth rates were experienced by the solvent and closed thrifts in 1988. Although this group of thrifts grew at an average rate of 14.0 percent in 1985, this rate is not significantly different from the 13.7 percent rate experienced by the solvent thrifts that were not closed. Thus, growth, as such, does not appear to be related to initial solvency or closure.

Investment in nontraditional assets (other than first mortgages secured by 1–4 family residential property, commercial and consumer loans, and real estate held for investment) is significantly higher at thrifts that closed than at thrifts that survived. The closed thrifts also experienced significantly higher delinquency rates, possibly in association with their high level of nontraditional investment. However, the insolvents did not noticeably increase their

nontraditional investments between 1984 and closure, in contrast to the 22 solvents that closed. These institutions not only began with high levels of nontraditional assets, but dramatically increased these investments through 1986. The overwhelming type of nontraditional asset held by the 1984 solvent-and-closed group is commercial mortgages, which constitute from one-half to almost all of the nontraditional assets. Mortgages on multifamily residential property is the next most popular nontraditional asset. Commercial loans of between 10 and 15 percent of total assets were held by only five thrifts; the percentage is less than 4 percent at the rest. Consumer loans are less than 10 percent of assets at all except four thrifts (one of which had a quarter of its assets in consumer loans). Few of these thrifts had real estate held for investment; as a percentage of total assets, only two had as much as 9 percent, one had 7 percent, three had between 1 and 3 percent, and fifteen had none. The delinquency rates on both mortgage and nonmortgage loans experienced by the 1984 solvent-and-closed thrifts are higher than those experienced by the other thrifts, substantially so for 1986, 1987, and 1988. Thus, reasons for the failure or survival of 1984 solvent southeastern thrifts appears to be poor loan underwriting and possibly regional downturns, and may be related to deregulation that allowed higher investment in commercial mortgages.

Two other factors also appear important. First, 14 of the 22 thrifts (64 percent) were chartered after 1979; six of these (27 percent) were chartered after 1982. Two of these post-1982 thrifts were heavily (over 70 percent) invested in nontraditional assets. Second, the mean market-value net worth to assets ratios in 1984 and 1985 for the solvents that closed are 4.2 and 1.3 percent, compared to the ratios for open solvents of 5.4 and 7.3 percent in those years. One of the solvent and closed thrifts has a 30.0 percent ratio in 1984, which declined to 12.6 percent in 1985 and 5.4 percent in 1987, as it grew. With this newly chartered thrift omitted, the mean ratio for the group at year-end 1984 is 3.0 percent and 1.1 percent at year-end 1985. Thus, although it seems clear that rapid movement into nontraditional assets was the proximate cause of the solvent thrifts' failure, these thrifts' newness and net worth weakness may have been the proximate cause of their undertaking this strategy. It also should be noted that this group of thrifts are only 4 percent of the total number in the Southeast operating at year-end 1984.

All of the groups tended to decrease their holdings of fixed-interest-rate 1–4 family mortgages as percentages of total assets over the period, while increasing their holdings of adjustable-interest-rate mortgages (ARMs). The largest holdings of ARMs relative to total assets is by the solvent and closed group. These thrifts may have experienced relatively large delinquency rates and operating losses because they underwrote large amounts of ARMs with below-market "teaser" rates without qualifying mortgagors at the higher post-teaser rates. Unfortunately, the data required to test this hypothesis are not available.

Passbook deposits, which give rise to the core deposit intangible asset, are somewhat higher percentages of total liabilities at open than at the closed thrifts, on average. However, these average only from 5 to 10 percent of total liabilities. Deposits under $100,000, which average above 70 percent of total liabilities, are significantly greater at the open compared to the closed thrifts. These fully insured deposits did not increase as a percentage of total liabilities at the insolvent thrifts, and decreased at the insolvent/RAP>3% thrifts, which is inconsistent with the insolvency-incentive, deposit-insurance hypothesis. Indeed, fully insured deposits on average are highest at the solvent and open thrifts. Deposits over $100,000 tended to decrease as a percentage of total liabilities at the closed thrifts (both insolvent and solvent). They were replaced largely with advances from the Federal Home Loan banks. Finally, brokered deposits were under 5 percent, on average, for all groups in all years. However, they were highest among the insolvent/RAP>3%, and solvent and closed thrifts.

10.5.4 The Behavior of Thrifts that Were Market-Value Insolvent or Solvent at Year-End 1986 and That Subsequently Were Closed or Open through 31 March 1990

Many of the thrifts recovered substantially by year-end 1986, as interest rates declined. Consequently, we calculated the percentages of net worth, assets, and liabilities (presented in table 10.9) for the 496 thrifts still operating as of year-end 1986. In contrast with the earlier period, 81 percent of the thrifts were solvent and open (compared to 53 percent at year-end 1984), while the insolvent and open group decreased from 33 percent to 6 percent. About the same percentages of thrifts were insolvent and closed (8 compared to 10 percent in 1984) and solvent and closed (4 percent in both years).

The distribution of total assets among the groups is similar to that found for the 1984 insolvents: the solvent thrifts are smaller and the largest thrifts are those that are insolvent/RAP>3%. The total asset growth rates are negative, on average, for the insolvent and closed thrifts, but are significantly positive and roughly similar for the other groups. All of the closed insolvent thrifts remained insolvent until they were closed, while the open insolvents improved their solvency over the years: half are solvent by year-end 1988. A similar pattern is found for the open and closed insolvent/RAP>3% groups. On the other hand, three-quarters of the solvents that were closed became insolvent in 1987 and all but two are insolvent in 1988. However, most of these thrifts show positive RAP net worth through year-end 1988.

The average percentages of nontraditional assets to total assets are similar for the 1986 and the 1984 insolvents. The mortgage and nonmortgage delinquency rates similarly are significantly higher for the closed than for the open thrifts. But these rates are not higher for the insolvent/RAP>3% groups or for the insolvent and open groups compared to the solvent and open groups. Thus, while credit losses appear to have been a cause of thrifts' losses and

Table 10.9 **The Condition of the 496 Thrifts That Were Insolvent or Solvent at Year-end 1986 And That Subsequently Were Closed or Open through 31 March 1990**

		Number of Thrifts		Total Assets (TA) (book value in $ millions)		Annual Growth in TA (percentages)		Market-Value Net Worth as % of TA		RAP Net Worth as % of TA	
	Year-end	Number	% in Year	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean
Insolvent and Closed	1986	42	8	573	157	−5.7	2.2	−10.0	2.1	−2.9	1.5
	1987	34	7	635	239	−4.6	2.4	−11.8	2.1	−5.5	2.2
	1988	26	6	839	384	−5.6	2.8	−14.4	3.3	−9.6	3.8
Insolvent/RAP NW > 3% and Closed	1986	10	24	994	579	3.2	4.1	−6.3	1.8	3.7	0.2
	1987	8	24	1,334	959	7.9	3.4	−7.7	1.7	1.0	1.8
	1988	5	19	2,434	1,918	7.1	4.3	−4.6	1.8	3.2	0.8
Insolvent and Open	1986	31	6	564	128	6.9	2.4	−2.4	0.4	2.9	0.5
	1987	30	6	510	116	2.5	1.6	−2.1	0.6	3.2	0.4
	1988	27	6	583	135	9.1	3.2	−1.3	0.7	3.7	0.4
Insolvent/RAP NW > 3% and Open	1986	21	68	559	162	8.0	2.9	−2.1	1.0	3.9	0.2
	1987	20	67	458	128	1.5	1.7	−2.0	0.8	4.1	0.4
	1988	17	63	537	155	9.1	4.4	−1.3	1.0	4.1	0.4
Solvent and Closed	1986	19	4	367	90	9.7	3.5	3.4	0.7	3.4	0.7
	1987	16	3	437	124	9.5	2.3	−5.0	2.8	2.2	0.9
	1988	15	3	481	139	4.4	2.7	−4.9	1.7	0.5	0.7
Solvent and Open	1986	404	81	303	30	10.0	0.5	6.9	0.2	6.3	0.1
	1987	393	83	325	32	6.5	0.5	6.6	0.2	6.9	0.1
	1988	386	85	368	39	7.9	0.5	6.8	0.3	7.0	0.2

(continued)

Table 10.9 (continued)

		Nontraditional Assets[a] as % of TA		Traditional Mortgages as % of TA		Fixed-Interest Mortgages as % of TA		Adjustable-Rate Mortgages as % of TA		Delinquency Rate on All Mortgages, in percentages	
	Year-end	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean
Insolvent and Closed	1986	29.2	2.1	50.9	2.2	30.1	2.5	31.2	2.9	10.1	1.8
	1987	23.9	1.7	55.8	2.0	32.1	2.5	30.3	3.2	7.8	1.2
	1988	21.5	1.6	60.0	2.3	32.1	2.9	33.9	3.8	5.5	1.0
Insolvent/RAP NW > 3% and Closed	1986	22.7	4.1	50.1	5.1	30.4	6.0	25.6	6.8	6.8	2.1
	1987	17.7	2.9	56.7	4.3	38.2	6.4	25.3	7.7	5.5	2.2
	1988	16.4	3.7	57.4	3.4	34.9	5.9	26.3	7.8	1.0	0.4
Insolvent and Open	1986	22.8	1.8	53.8	2.0	26.8	2.3	31.1	2.4	2.9	0.4
	1987	22.9	1.5	59.4	2.1	28.7	2.6	35.3	2.8	3.0	0.6
	1988	24.7	1.6	56.2	2.2	24.3	2.2	38.1	3.0	2.8	0.4
Insolvent/RAP NW > 3% and Open	1986	21.4	2.3	53.0	2.6	25.9	2.9	30.6	2.9	2.8	0.5
	1987	21.2	2.0	57.9	2.7	25.7	2.7	36.2	3.5	3.3	0.9
	1988	22.8	2.2	55.0	3.2	22.9	3.0	38.2	4.3	3.0	0.5
Solvent and Closed	1986	39.9	4.5	45.4	2.9	22.1	3.1	38.0	4.7	5.5	1.0
	1987	38.0	4.9	49.9	3.2	21.6	3.0	41.2	4.5	9.9	2.8
	1988	32.9	4.1	52.6	2.6	22.1	2.9	42.0	3.6	8.1	1.5
Solvent and Open	1986	18.4	0.6	63.1	0.7	38.5	0.9	28.3	0.8	1.9	0.1
	1987	19.1	0.7	65.3	0.7	37.2	0.9	33.0	0.9	2.2	0.1
	1988	19.0	0.6	66.5	0.7	34.1	1.0	37.3	1.0	2.1	0.1

	Year-	Delinquency Rate on Nonmortgages, in percentages		Passbook Deposits as % of Total Liabilities (TL)		Deposits Under $100,000 as % of TL		Deposits Over $100,000 as % of TL		Brokered Deposits as % of TL	
		Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean	Mean	Std. Error of Mean
Insolvent and Closed	1986	7.5	1.2	6.0	0.5	75.2	2.1	10.0	1.5	2.2	0.8
	1987	6.2	1.1	6.4	0.6	76.5	2.7	6.7	1.1	3.1	1.0
	1988	8.4	1.7	6.4	0.6	74.0	3.1	6.0	1.4	3.2	1.4
Insolvent/RAP NW > 3% and Closed	1986	3.6	2.3	5.8	1.5	69.7	2.8	9.2	1.5	8.6	2.7
	1987	2.2	1.0	5.6	1.8	65.6	5.1	8.9	3.0	7.8	3.8
	1988	2.4	1.0	5.0	2.2	55.5	6.3	10.5	6.2	7.0	6.0
Insolvent and Open	1986	2.7	0.8	6.6	0.6	78.2	2.0	8.4	1.2	0.6	0.6
	1987	2.7	1.2	6.9	0.7	78.6	1.9	7.0	0.7	1.1	0.5
	1988	2.0	0.4	6.1	0.6	76.3	2.1	6.9	0.8	1.2	0.6
Insolvent/RAP NW > 3% and Open	1986	1.8	0.5	7.6	0.7	76.8	2.5	8.9	1.6	0.7	0.4
	1987	1.7	0.4	8.0	0.9	77.6	2.3	7.4	1.0	1.0	0.6
	1988	1.9	0.5	7.2	0.8	76.0	2.4	7.4	1.0	1.1	0.8
Solvent and Closed	1986	3.5	1.5	7.2	2.4	76.9	3.0	11.7	2.0	1.6	1.3
	1987	3.8	1.1	4.9	1.3	77.7	3.3	8.1	2.0	1.1	0.4
	1988	6.9	1.7	4.8	1.3	79.3	2.9	6.9	1.4	3.7	1.5
Solvent and Open	1986	1.9	0.3	8.6	0.3	83.6	0.6	9.5	0.4	0.4	0.1
	1987	1.8	0.2	9.2	0.3	82.5	0.6	8.7	0.3	0.5	0.1
	1988	2.0	0.2	8.8	0.4	84.0	2.2	9.4	0.9	0.7	0.1

Note: Except for market-value net worth and total assets, all numbers are based on book values.
[a]Mortgages other than first 1–4 family loans, commercial and consumer loans, and real estate held for investment.

failure, these data do not provide support for the insolvency-incentive hypothesis. However, of the 19 thrifts that were solvent at year-end 1986 but subsequently were closed, 7 (37 percent) were insolvent at year-end 1984, and the mean market-value net worth to assets of the group at year-end 1986 is 3.4 percent, compared to 6.9 percent for the solvent and open thrifts. Thus, net worth weakness may have played a role in the investment strategy of the 1986 solvent thrifts that closed.

Over the years 1986 through 1988, the percentage of fixed-interest-rate 1–4 family mortgages to total assets remained fairly stable, on average, with the exception of a significant decrease in the solvent and open group (which still has about the highest percentages). ARMs percentages are similar to those found for the 1984 insolvencies: lowest for the insolvent/RAP>3% and closed group, but the differences among the groups are not statistically significant.

Among the liabilities, passbook deposits as a percentage of total liabilities is significantly higher at the solvent and open groups and insolvent/RAP>3% and open groups, and somewhat higher at the insolvent and open group, which may explain, in part, why they were able to survive. As with the year-end 1984 insolvents, deposits under $100,000 as a percentage of total liabilities is significantly higher at the solvent and open group, which is inconsistent with the deposit-insurance hypothesis. Deposits over $100,000 as a percentage of total liabilities are somewhat higher, on average, at the thrifts that were closed. However, as table 10.7 shows, these partially insured deposits decreased considerably as the thrifts neared closure. Finally, brokered deposits are a very small percentage of total liabilities (most thrifts had none). The average percentages are highest for the insolvent/RAP>3% that closed, but this mean is due to three of the ten in 1986, two in 1987, and one in 1988 (which funded 31 percent of its liabilities with brokered deposits).

10.5.5 Excessive Risk-Taking, Solvency, Type of Ownership, and Change in Ownership

Risk-taking may take the form of holding a duration-unbalanced portfolio of financial assets and liabilities, investing in assets with highly variable net cash flows not offset by cash flows from other assets, or taking excessive credit risk (as discussed below). These behaviors are hypothesized to be a function of the market-value solvency of a thrift, an insolvent thrift appearing to be solvent as measured by its RAP net worth being at least 3 percent of its assets, whether the thrift is a mutual or stockholder owned, and whether ownership or management changed in the recent past.

Interest-Rate Risk

The year-end Freddie Mac commitment rate on thirty-year fixed-interest first mortgages is 13.4 percent in 1983, 13.1 percent in 1984, 10.8 percent in 1985, 9.3 percent in 1986, 10.6 percent in 1987, and 10.8 percent in 1988. Thus, the improvement in the solvency of the least-solvent thrifts from 1984

to 1985 shown in table 10.5 may have been the result of these thrifts taking interest-rate risk from which they benefited when interest rates declined. Although we would have preferred using the duration of the thrifts' portfolios, these data are not available. Instead, we used the one-year-repricing gap between assets and liabilities to measure thrifts' propensity toward interest-rate-risk taking, and assume that this gap is representative of the entire portfolio. The gap and the independent variables are measured as of the end of a year to measure ex ante propensity toward taking interest-rate risk. The following relationship is examined (all variables are taken from year-end financial reports: consequently, the year subscript is omitted):

$$(5) \quad GAP1 = b_1 TA + b_2 NTA + b_3 NWM + b_4 IN\text{-}RAP3\%*TA + b_5 CC*TA + b_6 M*TA,$$

where

$GAP1$ = gap (difference) between the amount of assets and liabilities that are repriced within one year;

TA = total assets at book value, included as a measure of size;

NTA = nontraditional assets (mortgages other than first 1–4 family loans, commercial and consumer loans, and real estate held for investment), included to account for relevant assets differences, because these assets tend to be interest-rate repriced within a year;

NWM = net worth at market value;

$IN\text{-}RAP3\%$ = (RAP net worth ÷ total assets at book value = NWR) less (net worth ÷ total assets [multiplied by TA to account for scale], both at market value = NWM) if $NWR > 3\%$ and $NWM < 0\%$; 0 otherwise;

CC = 1 if there was a change in control in the current year or in any past year beginning in 1983, the earliest year for which we have data (multiplied by TA to account for scale); 0 otherwise; and

M = 1 if a mutual (multiplied by TA to account for scale); 0 if stockholder owned.

The variables in equation (5) were divided by TA to reduce heteroscedasticity, and the following regression was computed for each of the five years, 1984 through 1988:

$$(5') \quad GAP1 / TA = b_1 + b_2 NTA / TA + b_3 NWM / TA + b_4 IN\text{-}RAP3\% + b_5 CC + b_6 M.$$

The observations include all thrifts operating during the year, including those that failed or merged in the following year.

Table 10.10 presents the mean of the dependent variable and the coefficients estimated, together with the probability that the coefficients are greater than

Table 10.10 **One-Year Interest-Rate Gap: One-Year-Maturity Assets less Liabilities ÷ Total Assets (in percentages), Coefficients [Probability Coefficient > 0]**

Year-end	1984	1985	1986	1987	1988
Dependent variable mean	−36.4	−23.9	−18.1	−24.1	−20.2
Intercept	−43.0	−31.5	−25.1	−36.9	−33.8
[total assets]	[<.01]	[<.01]	[<.01]	[<.01]	[<.01]
Nontraditional ÷ total assets at book values, in percentages	0.29 [<.01]	0.23 [<.01]	0.19 [<.01]	0.42 [<.01]	0.44 [<.01]
Net worth ÷ total assets at market values, in percentage	1.10 [<.01]	0.50 [<.01]	0.43 [<.01]	0.82 [<.01]	0.87 [<.01]
RAP NW if > 3% less MV NW if < 0, percentage of TA; or 0	0.17 [.46]	0.11 [.82]	−0.18 [.58]	0.14 [.68]	0.91 [.04]
Change in control, current and years through 1983	−4.30 [.34]	5.35 [.11]	1.09 [.67]	2.13 [.36]	−0.21 [.92]
Mutual rather than stock	−1.80 [.18]	−2.15 [.16]	−2.70 [.06]	−1.19 [.42]	−1.09 [.47]
Adjusted R^2	0.26 [<.01]	0.09 [<.01]	0.08 [<.01]	0.21 [<.01]	0.22 [<.01]
Number of observations	507	499	487	464	442

Note: All variables measured at year-ends.

zero (in square brackets).[36] As expected, the average one-year gap is negative, indicating that the southeastern thrifts would tend to gain if interest rates declined. The average gap is greatest at year-end 1984—36.4 percent of total assets. It declined by about one-third in 1985 and then by one-quarter in 1986, after which it increased to the 1985 level and then declined again in 1988. The intercept (which is the coefficient of *TA*) indicates that *GAP* is approximately proportionate to the size of the institution, but is not completely due to size alone. The thrifts' holding of nontraditional assets is significantly related to their gap throughout the period, indicating that higher levels of these assets enabled thrifts to reduce their negative gap, and hence their exposure to interest-rate risk.

Market-value net worth is very significantly positively related to *GAP*. The coefficient is largest, by far, in 1984. Thus, it appears that the most insolvent thrifts tended to take the most interest-rate risk, particularly in 1984. This finding is consistent with the solvency improvement reported in table 10.5. However, the insignificant coefficient for *IN-RAP3%* indicates that this subset of the insolvent thrifts did not take advantage of their appearance of solvency, perhaps because the supervisory authorities were not fooled or because the thrifts' managers expected a rise in rates.[37]

Perhaps surprisingly, change in control is not reflected in greater interest-rate-risk taking. The coefficient of mutual-rather-than-stock ("mutual") also is insignificant in the regression. However, as shown in table 10.11, mutual is significantly negatively related to nontraditional assets. Furthermore, the means of *GAP1* are significantly more negative at mutuals than at stocks, for

Table 10.11 **Nontraditional Assets as a percentage of Total Assets, Coefficients [Probability Coefficient > 0][a]**

Year-end	1985	1986	1987	1988
Dependent variable mean	20.3	20.4	20.3	19.9
Intercept	17.8	20.5	20.7	18.7
[total assets]	[.<.01]	[.<.01]	[.<.01]	[.<.01]
Net worth ÷ total assets at market values, in percentages	−0.28	−0.68	−0.65	−0.36
	[.01]	[.<.01]	[.<.01]	[.<.01]
RAP NW if > 3% less MV NW	−0.73	−0.80	−1.11	−0.19
if < 0, percentage of TA; or 0	[.<.01]	[.06]	[.<.01]	[.53]
Change in control, current and	3.3	−1.5	3.8	0.2
years through 1983	[.48]	[.62]	[.13]	[.94]
Mutual rather than stock	−12.8	−11.5	−10.0	−8.2
	[.<.01]	[.<.01]	[.<.01]	[.<.01]
Adjusted R^2	0.16	0.19	0.20	0.14
	[.<.01]	[.<.01]	[.<.01]	[.<.01]
Number of observations	500	488	465	444

[a]Nontraditional assets include mortgages other than first 1–4 family loans, commercial and consumer loans, and real estate held for investment. Nontraditional and total assets at book values. Independent variables measured as of the beginning of the year.

each year 1984 through 1988. The medians (which is a preferable measure, as *GAP1* at some thrifts is positive) also are more negative. These findings are consistent with the coefficient for mutual reported in tables 10.3 and 10.4, which indicated that mutuals had significantly greater market-value losses through 1984 and conforms with conventional wisdom that mutuals tend to be "portfolio" lenders as opposed to selling off their mortgage production. Despite the collinearity between nontraditional and mutual, we included both variables in equation (5) to estimate the relative importance of each variable with respect to *GAP1*. From this equation, it appears that mutuals' taking greater interest-rate risk is related primarily to their holding relatively lesser amounts of nontraditional assets, as is shown next.

Investment in Nontraditional Assets

The Garn–St Germain Act of 1982 permitted federally chartered thrifts to invest in much higher proportions of nontraditional assets—mortgage loans other than first 1–4 family loans, commercial and consumer loans, and real estate held for development—than they previously could hold. We seek to explain the southeastern thrifts' investment in these assets with a regression similar to equation (5′):

$$(6)\quad NTA / TA = c_1 + c_2\, NWM / TA + c_3\, IN\text{-}RAP3\% + c_4\, CC + c_5\, M;$$

where the variables are defined as for equations (5) and (5′).

The observations include all thrifts operating during the year, including those that failed or merged in the following year. The mean of the dependent vari-

able, the coefficients calculated, and the probability that the coefficients are greater than zero for each year, 1985 through 1988, are presented in table 10.11.

The solvency of a thrift (*NWM/TA*) is significantly negative related to its holdings of nontraditional assets, on average. Furthermore, the magnitude of the relationship in 1986 is more than twice that in 1985. However, the magnitudes are small. The coefficients of *NWM/TA* indicate that a $100 decrease in net worth is associated with a $28 increase in nontraditional assets in the beginning of 1985, $68 in 1986, $65 in 1987, and $36 in 1988. The coefficient of *IN-RAP3%* is significantly negative except in 1988, indicating that these institutions tended to invest less in nontraditional assets as the difference between market and RAP net worth widened, *cet. par.*

Change of control does not appear related to investment in nontraditional assets. Mutuals, though, tended to invest significantly less in nontraditional assets than stocks. This finding is consistent with mutuals taking more interest-rate risk through traditional mortgage lending, as we report above.

Excessive Credit Risk

In the absence of federal deposit insurance, the risk-neutral managers and owners of a wealth-maximizing thrift would lend funds such that the present value of the expected net cash flows was positive. For such decision makers, risk taken ex ante is not excessive. However, deposit insurance, unless priced to reflect the insurance agency's risk, gives thrifts an incentive to make loans and investments with greater variances of expected cash flows. The owners of stocks and managers of mutuals have a put option to the FSLIC that increases in value as market-value net worth approaches zero and as the variance of cash flows increases. In particular, thrifts with zero or negative net worth have nothing to lose from taking risks. Consequently, they can gain from investing in high-variance assets that have negative expected present values. Alternatively, thrifts could hold assets on which credit losses are expected, but be compensated in the form of up-front fees and higher interest rates.[38] We consider this possibility in the following section.

We do not have data on the ex ante expected cash flows from loans made by thrifts. We indirectly test the hypothesis that thrifts tended to take excessive risks by regressing the year-end delinquency rate on mortgages (and, separately, on nonmortgages—commercial and consumer loans) on variables measuring their solvency, change in control, stock versus mutual ownership, and variables designed to account for relevant exogenous and endogenous factors, all measured at the beginning of the year:

$$
\begin{aligned}
(7) \qquad DELM_t = {} & d_0 + d_1 MT_{t-1} + d_2 MT_{t-1}^2 + d_3 \, 1\text{–}4FM_{t-1} \\
& + d_4 \, \Delta REP_{st} * MT_{t-1} + d_5 \, NWM_{t-1} + \\
& d_6 \, IN\text{-}RAP3\%_{t-1} * MT_{t-1} + d_7 \, CC_{t-1} * MT_{t-1} \\
& + d_8 \, M_{t-1} * MT_{t-1},
\end{aligned}
$$

where

$DELM_t$ = delinquencies on mortgages in total at time t;
MT_{t-1} = mortgages in total at time $t-1$;
$1\text{–}4FM_{t-1}$ = 1 to 4 family residential mortgages at time $t-1$;
ΔREP_{st} = change in an index of real estate prices in state s during time t, in percentages; and the other variables are defined as for equations (5) and (5′).

Total mortgages (*MT*) is included as a variable to account for the expected positive relationship between loans and the delinquencies on those loans. The square of *MT* is included to test the hypothesis that the relationship is not linear, perhaps because of economies of scale in originating and monitoring mortgages. The *1–4FM* variable is included to test the hypothesis that traditional mortgages are less risky than other types of mortgages. Alternatively, *1–4FM* includes ARMs, on which greater delinquencies may have been experienced if thrifts wrote mortgages with low "teaser" rates that became delinquent when, subsequently, interest rates increased. *ΔREP* is included in the regression to account for exogenous changes in real estate prices, as these could affect delinquencies. We had to use statewide indexes that were assigned to thrifts according to the location of their home office, even though thrifts often hold mortgages on out-of-state property.[39] *ΔREP*, *IN-RAP3%*, *CC*, and *M* are multiplied by *MT* because their effect on delinquencies should be proportional to the amount of mortgages held by a thrift. The independent variables are taken as of the beginning of the period, because they are designed to predict the delinquencies that occur by the end of the period. This procedure does not capture delinquencies on loans made as a result of, say, low market-value net worth in one year that become delinquent in a subsequent year. However, the data presented in tables 10.7, 10.8, and 10.9 indicate that delinquencies tend to increase in the year after a thrift becomes very insolvent. Furthermore, a thrift that is insolvent in one year usually is insolvent or very weak in preceding years; hence, a thrift's solvency in one year is a proxy for its solvency in previous years.

As is done similarly for other relationships, the variables are divided by TM_t to reduce heteroscedasticity. Consequently, equation (7′) was estimated:

$$(7') \quad DELM_t / TM_{t-1} = d_0 / TM_{t-1} + d_1 + d_2 MT_{t-1} + d_3 1\text{–}4FM_{t-1} / TM_{t-1} + d_4 \Delta REP_{st} + d_5 NWM_{t-1} / TM_{t-1} + d_6 IN\text{-}RAP3\%_{t-1} + d_7 CC_{t-1} + d_8 M_{t-1}.$$

The mean of the dependent variable, the coefficients calculated, and the probability that the coefficients are greater than zero for each year, 1985 through 1988, are presented in table 10.12. Before discussing the findings, we should note that delinquencies at year-end are not a complete measure of loan losses,

Table 10.12 **Mortgage Delinquencies as Percentage of Total Mortgages Regressed On Market-Value Net Worth and Other Variables, Coefficients [Probability Coefficient > 0]**[a]

Year-end	1985	1986	1987	1988
Dependent variable (mortgage delinquencies as percentage of total mortgages) mean	2.38	2.84	2.88	2.52
Intercept ($ thousands)	9.60	12.00	13.74	8.78
[total mortgages]	[<.01]	[<.01]	[<.01]	[<.01]
Total mortgages	−2.1 E−7	−5.3 E−7	−7.8 E−7	−5.8 E−7
[total mortgages squared]	[.59]	[.27]	[.07]	[.04]
1–4 Family mortgages as	−0.07	−0.09	−0.10	−0.06
percentage of total mortgages	[<.01]	[<.01]	[<.01]	[<.01]
Real estate price index (statewide),	−0.19	−0.09	−0.19	−0.14
percentage change	[.01]	[<.01]	[<.01]	[<.01]
Market-value net worth as	−0.10	−0.19	−0.16	−0.13
percentage of total mortgages	[<.01]	[<.01]	[<.01]	[<.01]
RAP NW if > 3% less MV NW if	−0.04	−0.05	−0.09	0.00
< 0, percentage of TA; or 0	[.34]	[.58]	[.13]	[.96]
Change in control, current and	−0.30	−0.02	2.18	0.76
years through 1983	[.79]	[.99]	[<.01]	[.11]
Mutual rather than stock	−0.68	−1.06	−0.64	−0.66
	[.06]	[.02]	[.10]	[.03]
1 ÷ Total mortgages	15,331	19.929	16,008	10,935
($ thousands) [intercept]	[<.01]	[<.01]	[.01]	[.01]
Adjusted R^2	0.15	0.22	0.29	0.29
	[<.01]	[<.01]	[<.01]	[<.01]
Number of observations	499	487	464	442

[a]Independent variables measured as of the beginning of the year.

even if delinquencies equal expected loan losses, as we assume. Not included in this measure are loans written off as uncollectible during the year. In addition, as we note above, offsetting income and operating expenses, which are trade-offs for loan losses, are not included in the dependent variable.

As expected, mortgage delinquencies are significantly positively related to mortgages. However, the greater magnitude of the coefficients compared to the mean of the dependent variable indicates that other factors mitigate this relationship. In 1987 and 1988, one mitigating factor is the amount of mortgages; the negative sign on d_2 (the coefficient of total mortgages, *TM*, in equation [7′], which is the square of *TM* in the basic equation [7]) indicates economies of scale with respect to delinquencies, at least for those years. One-to-four family residential mortgages appear to have significantly lower delinquencies, *cet. par.* The change in the index of real estate prices (ΔREP) has significant negative coefficients in all years. Thus, it appears that exogenous factors played a role in a thrift's absorbing credit losses (which we measure with delinquencies).

The coefficients of market-value net worth are significantly negative, indi-

cating that the greater a thrift's solvency, the less likely it was to have credit losses. However, the magnitude of the coefficients are small; a 1 percent decrease in net worth is associated, on the average, with at most a 0.22 percentage point increase in mortgage delinquencies, which is less than 10 percent of the mean amount of delinquencies. The variable designed to measure a particular propensity toward excessive risk-taking, *IN-RAP3%*, has very insignificant coefficients in all years except 1987, when it has an unexpected negative sign.

Prior change in control is not significantly related to mortgage delinquencies, except for 1987, when there is a strong positive significant relationship. Mutuals have significantly lower delinquencies than stockholder-owned thrifts, on average.

We computed a similar set of regressions for delinquencies on nonmortgage (commercial and consumer) loans. The adjusted R squares ranged from zero to two percent. None of the variables was consistently statistically significant, with the exception of the amount of nonmortgage loans, where the coefficients are very close in magnitude to the means of the dependent variable. (The means of nonmortgage delinquencies as a percentage of delinquencies are 1.92 in 1985, 2.48 in 1986, 2.25 in 1987, and 2.48 in 1988.) The only other variable with a statistically significant coefficient is stock versus mutual ownership, where mutuals had significantly lower delinquencies than stocks in 1985 and 1986 (1.00 and 1.90 percentage points lower, on average), and lower delinquencies on consumer than on commercial loans in all years except 1988.

As noted above, delinquencies are not a sufficient measure of excessive risk-taking. Thrifts that experience high delinquency ratios could have been compensated with commensurately higher fees and interest payments. They also could have incurred lesser amounts of operating expenses and accepted greater amounts of delinquencies. In addition, loans written off during the year were not considered. Consequently, we turn now to an analysis of thrifts' net profits, which should summarize the joint effects of credit losses, income, and operating expenses.

10.5.6 The Determinants of Market-Value Net Profits

The ultimate measure of whether investment in deregulated assets, deposits acquired through brokers, change of control, and type of ownership strengthened or weakened thrifts is the net gain or loss in their market-value net worth. We measure this gain or loss by the change in the market value of net worth adjusted for dividends and additional capital investments. This measure is superior to accounting net profits, which do not include gains and losses from changes in market values. However, it suffers (as does GAAP) from being an ex post measure. Unexpected changes in interest rates are reflected in changes in market-value net profit, and thus this variable can have more to do with whether thrifts took interest-rate risk and won or lost the gamble than with whether they were well or badly operated. We deal with this problem by com-

puting market-value net profit over years in which interest rates were relatively stable.

Investment in Deregulated Assets and Other Factors

We consider first the effect on market-value net profit of thrifts' investment in traditional residential mortgages (*TM*, which includes mortgage-backed securities) and nontraditional assets (*NTA*, which includes mortgages other than 1–4 family loans, commercial and consumer loans, and real estate held for investment). Variables representing the source of funds, such as brokered and over $100,000 (jumbo) deposits, are not included in this analysis (they are considered below). To the extent that funding sources are associated with traditional or nontraditional mortgages, the net profit advantage or disadvantage should accrue to that investment. In addition, we consider the effect on net profits of ownership type and change in control, as well as propensity toward risk-taking, as measured by *IN-RAP3%*. Net profits also are affected by exogenous factors, particularly unexpected changes in real estate prices, which we measure as the percentage change of an index of real estate prices by state (ΔREP_s).

We examine the following relationship:

$$(8)\quad MVNP_t = b_0 + b_1\, TM_{t-1} + b_2\, NTA_{t-1}, + b_3\, \Delta REP_{st} * TA_{t-1} + b_4\, IN\text{-}RAP3\% * TA_{t-1} + b_5\, CC_t * TA_{t-1}, b_6\, M_t * TA_{t-1},$$

where

$MVNP_t$ = market-value net profit, the change in the market value of equity adjusted for dividends and additional capital investments through time t;

TM_{t-1} = traditional residential mortgages (including mortgage-backed securities) at market value at the beginning of period t; and the other variables are as defined for equations (5) and (7).

Total assets is not included in the regression because traditional mortgages and nontraditional assets constitute almost all of most thrifts' total assets. Consequently, the coefficients estimated for these variables include the effects on net profits of other, nonspecified assets (as well as liabilities) that are correlated with traditional mortgages and nontraditional assets. To reduce heteroscedasticity, the variables are divided by total assets at book value (*TA*) at the beginning of the period (time $t-1$), and the following regression was run for years 1985 through 1988, individually:

$$(8')\quad MVNP_t / TA_{t-1} = b_0 / TA_{t-1} + b_1\, TM_{t-1} / TA_{t-1} + b_2\, NTA_{t-1} / TA_{t-1} + b_3\, \Delta REP_t / TA_{t-1} + b_4\, IN\text{-}RAP3\% + b_5\, CC_t + b_6\, M_t.$$

The observations include all thrifts operating during a year, including those that failed or merged in the following year, with the exception of eight thrifts not identified by location. Because market-value net profit is measured over a year, we can include only 1985 through 1988. To account for the possibility that a single year's net profit is subject to noise, we also measure market-value net profit averaged over two-year periods, 1985–86 and 1987–88.[40] The means of the dependent variable, the coefficients calculated, and the probability that the coefficients are greater than zero are presented in table 10.13.

The average market-value net profit per dollar of book-value assets, shown by the mean of the dependent variable, exhibits considerable change over the years studied. In 1985 the average profit rate is 3.24 percent. It then declines to 0.17 percent in 1986, −1.16 percent in 1987, and −0.77 percent in 1988. The large profits in 1985 are due to that year's decrease in interest rates.

Table 10.13 **Market-Value Net Profit as a Percentage of Total Assets Regressed On Traditional Mortgages, Nontraditional Assets, and Other Variables, Coefficients [Probability Coefficient >0][a]**

Year-end	1985	1986	1987	1988	1985–86	1987–88
Dependent variable (market-value net profit ÷ total assets): mean	3.24	0.17	−1.16	−0.77	1.74	−0.88
Tradjtlonal mortgages ÷ total assets, ln percentages	0.06 [<.01]	0.02 [<.01]	−0.01 [.15]	−0.01 [.01]	0.04 [<.01]	−0.02 [<.01]
Nontraditional assets ÷ total assets, in percentages	−0.07 [<.01]	−0.05 [<.01]	−0.07 [<.01]	−0.04 [<.01]	−0.06 [<.01]	−0.05 [<.01]
Net worth ÷ total assets in market value, ln percentages	−0.29 [<.01]	0.00 [.89]	0.09 [<.01]	0.09 [<.01]	−0.22 [<.01]	0.09 [<.01]
RAP NW if > 3% less MV NW jf < 0, percentages of TA; or 0	0.16 [.02]	0.12 [.34]	0.20 [.02]	0.22 [<.01]	0.08 [.14]	0.22 [<.01]
Change in control, current and years through 1983	−0.13 [.91]	0.16 [.85]	−2.52 [<.01]	−0.45 [.36]	−0.56 [.57]	−1.05 [.01]
Mutual rather than stock	1.27 [<.01]	1.47 [<.01]	0.64 [.07]	0.66 [.03]	1.31 [<.01]	0.69 [<.01]
Real estate price Index (statewide), percentage change	0.15 [.06]	0.06 [.01]	0.09 [.07]	0.08 [.02]	0.05 [<.01]	0.06 [<.01]
1 ÷ Total assets[b] [intercept]	−12,654 [.07]	−15,501 [.04]	−4,702 [.55]	−10,160 [.14]	−4,888 [.41]	−7,777 [.10]
Adjusted R^2	0.29 [<.01]	0.13 [<.01]	0.26 [<.01]	0.16 [<.01]	0.50 [<.01]	0.34 [<.01]
Number of observations	499	487	464	442	487	442

[a]Market-value net profit = change in market-value net worth plus dlvldends less addltional lnvestments. Tradltional mortgages = 1–4 famlly first mortgages and mortgage-backed securitles, at book value. Nontraditlonal mortgages = other mortgages, commercial, and consumer loans, and real estate held for lnvestment, at book value. Independent variables measured as of the beginning of the year.
[b]In thousands of dollars.

The regressions indicate that traditional mortgages are significantly positively related to market-value net profit in 1985 and 1986, negatively and significantly in 1988, and insignificantly negatively in 1987. This finding is verified by the two-year regressions (1985–86 and 1987–88). It also is consistent with the one-year *GAP*s reported in table 10.10, which show a greater negative gap at year-end 1984 than at the other year-ends, and with the observation that interest rates decreased through the first quarter of 1987. Thus, there is reason to believe that the greater profitability of traditional mortgages in 1985 and, to a lesser extent, in 1986 is due to thrifts with traditional mortgages (that tend to be fixed interest in 1984 and 1985, see tables 10.5, 10.8, and 10.9) winning an interest-rate-change gamble in those years, and losing it in 1987 and 1988.

Nontraditional assets are significantly negatively associated with annual market-value net profit in all years. On average, southeastern thrifts annually lost 4 to 7 percent of their investment in nontraditional assets. Over the two-year periods studied, the loss averages 6 and 5 percent.

A positive relationship between market-value net worth and market-value net profit is expected because the factor cost of capital is not recorded as an expense. The coefficients' market-value net worth is positive and statistically significant for 1987 and 1988, indicating that additional net worth yielded 9 percent, on average. However, the coefficient is negative and statistically significant for 1985. This finding appears due to the weaker thrifts having won their interest-rate-risk gamble in that year. The coefficients of the *IN-RAP3%* variable are positive and significant for all years except 1986. This finding is inconsistent with the hypothesis that these thrifts tended to make negative-value investments.

Change in control has a significant negative coefficient for 1987 and the two-year 1987–88 period; for the other years, the coefficients are very insignificant. Thus, there is only some evidence supporting the hypothesis that a change in control is detrimental to the deposit insurance fund. Mutuals had significantly higher net profits than stocks, particularly in 1985 and 1986. This finding is consistent with their taking greater interest-rate risk (as reported in table 10.10) and holding relatively less nontraditional assets (as reported in table 10.11). The mutuals also may obtain higher market-value net profits because they tend to be located in less competitive markets, as reported by Carhill and Hasan (1990). Finally, the change in real estate prices (ΔREP) is significantly positively related to market-value net profits in all years.

Insured-Deposit Growth and Brokered Deposits and Other Factors

It is alleged that thrifts took advantage of the increase in deposit insurance coverage from $40,000 to $100,000 per account in 1980 and removal of interest-rate ceilings on deposits in the following years to acquire interest-rate-sensitive funds that were invested in risky projects. An alternative to growth with fully insured deposits is growth with deposits over $100,000. These deposits often carry a premium because they are only partially insured

by the FSLIC, and hence should result in lower net profits, *cet. par.* Another altemative considered particularly pemicious by the supervisory authorities is growth by means of brokered deposits.

We related the growth of thrifts' assets between mid-year 1982 and year-end 1984 to their market-value net worths at year-end 1984 (see tables 10.4 and 10.6). The regression coefficients and summary statistics reported are inconsistent with the hypothesis that insolvent thrifts grew more rapidly than solvent thrifts. If anything, the contrary appears to have occurred.

We now examine the relationship between the change in insured, partially insured, and brokered deposits and the thrifts' market-value net profits since 1984. For this purpose, we specified the following relationship:

$$(9) \qquad \begin{aligned} MVNP_t = {} & b_0 + b_1\,\Delta ID_{t-1} + b_2\,\Delta PID_{t-1} \\ & + b_3\,\Delta BD_t + b_4\,NWM_{t-1} * TA_{t-1} \\ & + b_5\,IN\text{-}RAP3\% * TA_{t-1} \\ & + b_6\,M_t * TA_{t-1} + b_7\,CC_t * TA_{t-1}, \end{aligned}$$

where

ΔID = change in insured (under \$100,000) deposits;
ΔPID = change in partially insured (over \$100,000) deposits;
ΔBD = change in brokered deposits; and the other variables are defined as for equation (5).

Total assets (TA) is not included in this relationship because the sum of the deposits almost equals total assets. As is done earlier, all the variables are divided by TA, and we calculated the following regression for each year and for two-year average net profits:

$$(9') \quad \begin{aligned} MVNP_t / TA_{t-1} = {} & b_0\,1 / TA_{t-1} + b_1\,\Delta ID_{t-1} / TA_{t-1} \\ & + b_2\,\Delta PID_{t-1} / TA_{t-1} + b_3\,\Delta BD_t / TA_{t-1} \\ & + b_4\,NWM_{t-1} + b_5\,IN\text{-}RAP3\% + b_6\,M_t + b_7\,CC_t. \end{aligned}$$

Table 10.14 gives the coefficients and other statistics estimated from equation (9'). The coefficients for the change in fully insured deposits (deposits under \$100,000) are significantly positive for 1988 and the two-year period 1987–88, and not significant for the other years. The coefficients estimated also are very small. This finding indicates that thrifts that increased their funding through fully insured deposits experienced trivial market-value net gains. The coefficients for the change in partially insured deposits (over \$100,000) are positive and statistically significant for all years. This source of deposits is associated with market-value net profits. It may be that partially insured depositors sought out better-managed thrifts or that better-managed thrifts were able to attract partially insured deposits.

The coefficients on the change in brokered deposits are negative and significant only for 1988 and for the two-year period 1987–88; in the other years the coefficients are insignificant. On balance, the change in brokered deposits

Table 10.14 **Market-Value Net Profit as a Percentage of Total Assets Regressed On Deposits and Other Variables, Coefficients (Probability Coefficient > 0)[a]**

Year-end	1985	1986	1987	1988	1985–86	1987–88
Dependent variable (net profit as a percentage of total assets): mean	3.24	0.17	−1.16	−0.77	1.74	−0.89
Change in deposits of < $100,000 as a percentage of assets	0.00 [.96]	−0.06 [.13]	0.05 [.12]	0.06 [.01]	0.04 [.46]	0.04 [.03]
Change in deposits of > $100,000 as a percentage of assets	0.16 [.01]	0.17 [<.01]	0.12 [.01]	0.18 [<.01]	0.39 [<.01]	0.15 [<.01]
Change in brokered deposits as a percentage of assets	0.02 [.83]	−0.11 [.24]	−0.12 [.13]	−0.15 [.03]	−0.09 [.34]	−0.25 [<.01]
Net worth ÷ total assets at market value, in percentages	−0.29 [<.01]	0.07 [.02]	0.06 [.02]	0.05 [.01]	−0.20 [<.01]	0.04 [.01]
RAP NW if > 3% less MV NW if < 0, percentage of TA; or 0	0.58 [<.01]	0.18 [.13]	0.13 [.14]	0.17 [.02]	0.33 [<.01]	0.12 [.08]
Change in control, current and years through 1983	−1.10 [.52]	−0.26 [.77]	−2.66 [<.01]	−0.62 [.21]	−0.14 [.33]	−1.23 [.01]
Mutual rather than stock	−0.32 [.49]	1.61 [<.01]	1.87 [<.01]	1.13 [<.01]	0.01 [.97]	1.41 [<.01]
1 ÷ Total assets[b] [intercept]	59,105 [<.01]	−4,006 [.56]	−1,312 [.09]	−17,355 [.01]	4,401 [<.01]	−1,436 [<.01]
Adjusted R^2	0.26 [<.01]	0.11 [<.01]	0.19 [<.01]	0.14 [<.01]	0.30 [<.01]	0.27 [<.01]
Number of observations	499	487	464	444	487	444

[a]Market-value net profit = change in market-value net worth plus dividends less additional investments. Independent variables measured as of the beginning of the period.
[b]In thousands of dollars.

seems to be weakly associated with lower market-value net profits and may reflect a reduced capacity to fund through local deposits.

The coefficients of market-value net worth, *IN-RAP3%*, change in control, and mutual rather than stock variables are similar in this regression as in the regression with asset values rather than deposits (equation [8′]), with one exception. The mutual-rather-than-stock dummy variable has an insignificant coefficient in 1985 when deposits are the other independent variables, but a significantly positive coefficient when assets are the other independent variables.

10.5.7 Deposit Growth and Solvency

We further test the "deposit-insurance" hypothesis by examining the relationship between the change in thrifts' deposits over a year and their market-

value net worth at the beginning of a year. The following relationships are specified:

$$(10a) \qquad \Delta ID_t = b_1 NWM_{t-1} + b_2 IN\text{-}RAP3\% * TA_{t-1} + b_5 CC_t * TA_{t-1} + b_6 M_t * TA_{t-1},$$

and

$$(10b) \qquad \Delta PID_t = b_1 NWM_{t-1} + b_2 IN\text{-}RAP3\% * TA_{t-1} + b_5 CC_t * TA_{t-1} + b_6 M_t * TA_{t-1},$$

where the variables are as defined for equation (9) above.

All variables were divided by TA_{t-1} before calculations were made, and the following regressions were calculated:

$$(10a') \qquad \Delta ID_t / TA_{t-1} = b_1 NWM_{t-1} / TA_{t-1} + b_2 IN\text{-}RAP3\%_{t-1} + b_5 CC_t + b_6 M_t,$$

and

$$(10b') \qquad \Delta PID_t / TA_{t-1} = b_1 NWM_{t-1} + b_2 IN\text{-}RAP3\% * TA_{t-1} + b_5 CC + b_6 M_t.$$

The means of the dependent variables, the coefficients estimated, and the probability that the coefficients are greater than zero are given in table 10.15.

The change in fully insured deposits averages 10.2 percent in 1985, but then drops to 3.0 percent in 1986, and becomes so small as to be insignificant in 1987 and 1988. The coefficient estimated for market-value net worth in 1985 is positive, significant, and large, indicating that growth in insured deposits was greatest at the more solvent thrifts. The coefficients are significant but much smaller and positive in 1986, and negative in 1987 and 1988. With respect to partially insured deposits, the coefficient for 1985 indicates that the more solvent thrifts tended not to grow with deposits over $100,000 in 1985, but did use these deposits in the other years. However, the coefficients are small in magnitude, though statistically significant. The coefficients in *IN-RAP3%* are insignificant for both kinds of deposits, except for 1985 fully insured deposits. The significant positive coefficient and large magnitude gives some evidence that these thrifts took advantage of deposit insurance to grow in that year. Thereafter, their growth may have been restrained by the supervisory authorities.

Change in control is positively associated with deposit growth, but the relationship is statistically significant only in 1988 for fully insured deposits and in 1986 for partially insured deposits. Mutuals had a significantly lesser propensity than stocks to grow with fully insured deposits in all years, and a positive (though lesser) propensity to grow with partially insured deposits than stocks in all years. This finding is consistent with stocks offering more risk to depositors.

Table 10.15 **Change in Deposits as a Percentage of Total Assets Regressed On Market-Value Net Worth and Other Variables, Coefficients [Probability Coefficient > 0][a]**

Year-end	1985	1986	1987	1988
A. Fully Insured Deposits (under $100,000)				
Dependent variable (percentage change in deposits to total assets): mean	10.2	3.0	−0.3	1.1
Net worth ÷ total assets at market value, in percentages	3.55 [<.01]	0.21 [<.01]	−0.46 [<.01]	−0.37 [<.01]
RAP NW if > 3% less MV NW if < 0, percentage of TA; or 0	1.13 [.02]	−0.28 [.45]	−0.12 [.27]	−0.30 [.22]
Change in control, current and years through 1983	6.30 [.55]	−3.80 [.19]	1.00 [.66]	7.70 [<.01]
Mutual rather than stock	−12.6 [<.01]	−8.5 [<.01]	−8.0 [<.01]	6.2 [<.01]
Adjusted R^2	0.46 [<.01]	0.16 [<.01]	0.14 [<.01]	0.14 [<.01]
B. Partially Insured Deposits (over $100,000)				
Dependent variable (percentage change in deposits to total assets): mean	−0.4	0.3	−1.1	−2.2
Net worth ÷ total assets at market value, in percentages	−0.14 [<.01]	0.13 [<.01]	0.06 [.04]	0.03 [.04]
RAP NW if > 3% less MV NW if < 0, percentage of TA; or 0	−0.08 [.41]	−0.07 [.63]	−0.03 [.57]	0.01 [.92]
Change in control, current and years through 1983	1.50 [.45]	3.70 [<.01]	−1.10 [.27]	0.70 [.14]
Mutual rather than stock	1.4 [.01]	1.9 [<.01]	2.6 [<.01]	0.7 [<.01]
Adjusted R^2	0.05 [<.01]	0.07 [<.01]	0.14 [<.01]	0.02 [<.01]
Number of observations	507	496	473	453

[a]Independent variables measured as of the beginning of the period.

10.6 Implications of the Analysis for the Hypotheses

1. Unbalanced Durations of Assets and Liabilities—Interest-Rate Risk

The losses measured for thrifts operating at year-end 1984 indicate that the increase in interest rates in the preceding years was responsible for a large portion of their losses. Over this period, we estimate that the southeastern thrifts lost 5.3 percent of their assets, or $8,078 million. Over three-quarter of the institutions suffered reductions in net worth that were not recorded according to RAP. Not surprisingly, most of the decline was due to mortgages, predominantly on 1–4 family homes. These losses were offset, somewhat, by increases in the value of the thrifts' core-deposit intangible asset related to their passbook-deposit liabilities. (See table 10.2 for details.) We regressed the change in net worth on total assets, total assets squared, state location

of the thrifts, and on their mutual or stock form of ownership (see table 10.3). The net worth change and amount of market-value net worth also was regressed on these variables (except state), on the mid-year 1982 amounts of book-value net worth, passbook deposits, and 1–4 family mortgages, and on growth in assets over the period (see tables 10.4 and 10.6). The larger thrifts suffered the greatest losses. Mutuals had significantly greater losses than stocks. Losses in net worth and lower amounts of market-value net worth are significantly associated with low initial book-value net worth and low passbook deposits. Perhaps surprisingly, asset growth is slightly associated with lesser losses and higher levels of market-value net worth.

As we show in section 10.7, interest-rate-induced losses dominate the losses through 1984 taken by southeastern thrifts. Despite these losses, only 31 of the 517 thrifts operating at year-end 1984 were closed (another 31 voluntarily merged with other institutions).

Additional interest-rate declines in 1985 and 1986 reduced the thrifts' insolvency considerably. On average, the 1984 insolvent thrifts that were operating through year-end 1988 became solvent in 1985 and 1986 (see table 10.5). However, not included in these numbers are 31 thrifts that failed through year-end 1988. All but one of these that failed in 1985 and 1986 were market-value insolvent at year-end 1984, as were slightly over half of those that failed in 1987 and 1988 (see table 10.7).

2. Excessive Risk-Taking By Economically Insolvent and Weak Thrifts

The data support the hypothesis that many thrifts' pre-1984 insolvency and later solvency are related to interest-rate risk-taking, particularly in 1985 (see table 10.10). Indeed, as we discuss above, this appears to be the principal reason that insolvent operating thrifts became solvent, on average, in 1985 and 1986.

However, the data strongly reject the hypothesis that insolvent thrifts grew more than solvent thrifts between mid-year 1982 (just before passage of the Garn–St Germain Act) and year-end 1984. Nor is growth in assets after 1984 a function of the market-value net worth of the thrifts. To the contrary, the most insolvent thrifts, including those that failed, grew at a slower rate than the solvent ones.

Most of the data studied also do not support the hypothesis that insolvent thrifts increased their investment in nontraditional assets (mortgages other than 1–4 family first mortgages, commercial and consumer loans, and real estate held for investment) in an effort to gamble their way to solvency. At year-end 1984, the insolvent thrifts held somewhat higher percentages of multifamily and nonresidential mortgages to total assets than did solvent thrifts. Very low percentages of commercial loans and trivial amounts of real estate held for investment were on the books of any southeastern thrifts. Consumer loans were slightly higher at the most insolvent thrifts. The growth in these nontraditional assets, though, is similar at thrifts grouped according to the

ratios of net worth to assets, measured as market values (see tables 10.5 and 10.8). This conclusion also holds when insolvency is measured at year-end 1986 (see table 10.9). Regressions of nontraditional assets on market-value net worth (and other variables) using data from all thrifts operating in a particular year reveals significant negative coefficients, but the magnitudes are small.

Regressions of the annual change in fully insured deposits on market-value net worth shows a large, significant positive relationship (see table 10.15). No such relationship is found for the change in partially insured deposits (over $100,000). Nor are brokered deposits related to thrifts' market-value net worth or subsequent failure.

Delinquency rates on mortgages are not higher at the 1984 continuously operating insolvent thrifts over the years studied than at the solvent ones; delinquencies on other loans, though, are somewhat higher for the most insolvent group (see table 10.5). The failed thrifts, most of which were insolvent at year-end 1984, had considerably greater delinquencies after 1985, particularly on mortgage loans. Regressions of mortgage delinquencies on market-value net worth using data from all thrifts operating in a particular year also find a significant negative relationship (see table 10.12), which supports the tabular data showing higher delinquencies at the insolvent thrifts that were closed. Thus, although the insolvent thrifts did not hold higher amounts of nontraditional assets, those assets they held appear to have been riskier (as measured by delinquencies) than those held by more solvent thrifts.

The net effect of the actions taken by and the impact of events on thrifts is their net profit or loss. We measured this change in wealth as the change in the market-value of net worth adjusted for dividends and new investments. Regressions of this variable on market-value net worth at the beginning of a year or two-year period show significant though small positive relationships for 1986, 1987, and 1988 (see tables 10.13 and 10.14). Thus, it appears that insolvent thrifts did not, on average, take actions that resulted in net losses. This finding is inconsistent with the hypothesis.

3. Overspecialization in Mortgage Loans—Insufficient Diversification and Declines in Economic Conditions

We were able to test this hypothesis only with a statewide index of real estate prices. Changes in the index are significantly negatively related to delinquencies in 1986, 1987, and 1988 (see table 10.12). The real estate index change is not significantly related to market-value net profit, though. Assuming that this latter result is not due to the crude nature of the variable, the experience of the southeastern thrifts in the period studied does not support this hypothesis.

We were not able to relate directly the 1986 change in the income tax statute to losses incurred by thrifts. Delinquencies on mortgages increased substantially in 1987 and 1988 among the continuously operating thrifts (see table

10.5) and at the thrifts that failed in 1988. However, delinquencies also were high at the failed thrifts in 1986 and 1985, and increased on nonmortgage loans in 1987 and 1988 (see table 10.7). Thus, the data only support the need for further study.

4. Deposit Insurance and the Removal of Interest-Rate Ceilings on Savings Deposits

As we note above, growth in assets both before and since 1984 is not related to the solvency of the thrifts studied. We examined the data more closely by regressing the change in fully and partially insured deposits on market-value net worth and other variables. A large significant positive relationship was found for fully insured deposits in 1985 and a small positive significant relationship in 1986 (see table 10.15). But small negative significant relationships between the change in insured deposits and solvency were found for 1987 and 1988. A small significant negative relationship between partially insured deposits (over $100,000) and solvency was found for 1985, and small significant positive relationships for the other years. The change in partially insured deposits is significantly positively related to market-value net worth, which indicates that the more-solvent thrifts were able to attract such funds and put them to good use.

On the whole, the data do not support the hypothesis, at least for the period studied. By mid-year 1982, at least, the supervisory authorities may have constrained opportunistic behavior by insolvent thrifts or the thrifts' managers may not have attempted such behavior, on average. However, it is clear that without deposit insurance the thrifts rendered insolvent by interest-rate increases would not have been able to remain open and to obtain additional deposits. Indeed, absent deposit insurance, thrifts may not have been structured so as to be exposed to interest-rate risk.

5. Deregulation of Asset Investments and Brokered Deposits

The findings discussed above for the "excessive risk-taking by insolvent thrifts" hypothesis do not indicate an inverse relationship between thrifts' solvency and growth in their investment in deregulated assets, which also is inconsistent with the "deregulation of assets" hypothesis. However, a negative relationship is revealed between holdings of nontraditional assets and market-value net profits annually averaging 5 to 6 percent of nontraditional assets. Thrifts that were solvent at year-end 1984 and that subsequently were closed (4 percent of the sample) had substantially higher investments in nontraditional assets than other thrifts in 1984 that increased considerably in 1985, although those that were insolvent and closed or remained open did not (see tables 10.8 and 10.9). Thus, the evidence is mixed. Delinquencies are importantly related to a thrifts' solvency (particularly among those that were closed), and differences in thrifts' asset choices appear sufficient to explain variations in delinquency rates. It should be noted, though, that thrifts ren-

dered insolvent by interest-rate increases did not grow more since mid-year 1982 than solvent thrifts (see tables 10.4 and 10.6). Thus, on average, insolvent thrifts did not or were not permitted to use the deregulation of interest rates for deposit growth to fund excessively risky assets.

Brokered deposits are a somewhat larger percentage of total liabilities at closed thrifts (see tables 10.8 and 10.9). However, a detailed analysis of these thrifts reveals that this average is due to a few institutions only (see table 10.7). A significant inverse relationship between the change in brokered deposits and market-value net profits was found only for 1988. Thus, it does not appear that brokered deposits played much of a role at southeastem thrifts.

On the whole, we conclude that the southeastem thrifts' failures are primarily due to the damage done by the high interest rates of the early 1980s; most of the failures in the late 1980s were thrifts that became insolvent during the early 1980s. At most, 30 percent of the Southeast's 1985-through-first-quarter-1989 failures (22 of 72) survived the sharp interest-rate increases with their solvency intact, but then lost heavily by investing in deregulated assets. We have reason to suspect that many of these 22 may have actually been insolvent prior to 1984, but gained the appearance of solvency because our market-value model overstates the present value of high interest-rate loans when delinquencies are delayed or underreported. Furthermore, 64 percent of the 22 thrifts were newly chartered, which may have contributed to their failure. Thus, while we can estimate an upper limit on the percentage of the Southeast's failures caused by deregulated-asset investments, we cannot preclude the possibility that almost all failures in fact were caused by the 1979–81 interest-rate run up or the difficulties faced by newly chartered thrifts in the following years.

6. Risk Aversion and Preference of Mutual Compared to Stock Thrifts

Mutual thrifts incurred significantly larger interest-rate-increase-induced losses through 1984 than did stocks (see tables 10.3 and 10.4) and had larger negative one-year maturity gaps at year-end 1984, which subjected them to additional interest risk. When interest rates decreased in 1985 and 1986, mutual thrifts benefited. Mutuals tended to hold lower proportions of nontraditional assets to total assets (see table 10.11) and had lower delinquencies (see table 10.12). They also obtained lower amounts of fully insured deposits and slightly higher amounts of partially insured deposits than did stock thrifts, *cet. par.* (see table 10.15). On balance, in the period studied, this strategy apparently resulted in their having higher market-value net profits in 1986, 1987, and 1988, and possibly in 1985 (see tables 10.13 and 10.14).

The data studied are consistent with the conclusion that mutuals tend to hold traditional assets and are more conservative than stocks, a strategy that benefits them when interest rates do not increase unexpectedly, as they did before 1982, or decrease unexpectedly, as they did in 1985 and 1986.

7. Fraud, Self-Dealing, Incompetence, and Inadequate Supervision

Change in control is alleged as a source of thrift failures, particularly ones that impose considerable costs on the deposit insurance fund. We tested this hypothesis by including in relevant regressions a dummy variable measuring a change in ownership or senior management in 1983 and subsequent years. The coefficient of this variable is insignificant with respect to interest-rate risk as measured by the one-year gap (see table 10.10), holdings of nontraditional assets (see table 10.11), mortgage delinquencies (see table 10.12), market-value net profit (see tables 10.13 and 10.14), and change in deposits (see table 10.15), with a few exceptions. The exceptions are a significant positive relationship with delinquencies in 1987, the change in fully insured deposits in 1988, and the change in partially insured deposits in 1986, and a significant negative relationship to market-value net profit in 1987.

We could not test the inadequate supervision hypothesis directly. However, insolvent thrifts tended to grow less than the solvent thrifts and did not invest excessively in nontraditional assets. These findings are consistent with the conclusion that the supervisory authorities in District 4 were diligent in preventing market-value insolvent thrifts, on average, from taking excessively large risks, thereby imposing higher costs on the FSLIC.

10.7 Failure and Survival

Failure for thrifts may be defined in two ways. One is economic insolvency, the other is closure or involuntary merger by the supervisory authorities. We used both definitions. A comparison of the 455 thrifts that were not closed from year-end 1984 through year-end 1988 with those that were closed during this period (see tables 10.5 and 10.7) reveals that, on average, the closed thrifts were significantly insolvent at the beginning of the period and in every year until closure. The thrifts that were insolvent at year-end 1984 had significantly lower book-value net worths and lower amounts of passbook deposits and somewhat higher amounts of 1–4 family mortgages (all relative to assets) as of mid-year 1982 than did solvent thrifts (see tables 10.4 and 10.6). The 1987 and 1988 closed thrifts also incurred or recognized large losses from delinquencies in the year before they were closed, which no doubt increased the FSLIC's costs. They had higher levels of adjustable-interest-rate mortgages and were larger than the operating thrifts. They held about the same proportions of traditional mortgages. Thus, their principal distinction was initial insolvency and subsequent large credit losses.

We studied the thrifts additionally by examining financial ratios for those that were solvent or insolvent at year-end 1984 and that were closed or open through 31 March 1990, the latest date we could use (see table 10.8). We also studied a subset of the insolvent thrifts—those with RAP net worth above 3

percent—to determine if thrifts that met the FHLBB's informal definition of financial strength behaved differently from other insolvent thrifts. All the thrifts operating at year-end 1984 are included in this analysis, even though some ceased independent operations because of closure or voluntary mergers. The insolvent thrifts with RAP net worth above 3 percent (*IN-RAP3%*) that were closed are substantially larger than the other thrifts. As noted above, they did not appear to engage in opportunistic behavior; they did not grow more or invest more heavily in nontraditional assets, although they did obtain funds through brokers somewhat more than did the other thrifts.

The principal differences between the insolvent thrifts that were closed compared to insolvents that survived is substantially lower rates of growth (the failure thrifts declined in size, on average), higher proportions of nontraditional to total assets, lower initial (1984–85) fixed-interest-rate mortgages to total assets, lower later (1986–88) adjustable-rate mortgages to total assets, higher delinquency rates, slightly lower proportions of passbook deposits and fully insured deposits, and higher (though still small) relative amounts of brokered deposits. A comparison of 1984 solvent thrifts that were closed with those that survived reveals considerably larger proportions of nontraditional assets and adjustable-rate mortgages, much higher delinquency rates, about half the proportion of passbook deposits, substantially more brokered deposits, and much heavier reliance on deposits over $100,000 (at least in the years before they were closed).

Because the thrifts' solvency improved dramatically in 1985 and 1986 (see table 10.5), we examined the 1986, 1987, and 1988 financial ratios of those that still were insolvent at year-end 1986 (see table 10.9). The picture found for the 1984 insolvents is very similar, except that the insolvent thrifts that were not closed were, on average, still insolvent through year-end 1988. These probably represent losses to the deposit insurance fund (now the taxpayers). The relatively few thrifts that were solvent at year-end 1986 but subsequently closed (19, or 4 percent of the total number) had much higher proportions of nontraditional assets and delinquencies than the thrifts that remained open.

Hence, we conclude that the principal determinants of survival or failure among southeastern thrifts are, first, their year-end 1984 insolvency resulting from the increase in interest rates in 1979–81 and initial relatively low levels of net worth and passbook deposits and, second, credit losses. The interest-rate-induced losses were disproportionately borne by larger thrifts that appear to have grown before 1982 by expanding beyond their local market areas, perhaps due to the competitive conditions they faced. We do not know whether this expansion was induced by or resulted in low levels of net worth relative to assets, but these relatively low capital ratios provided them with an insufficient buffer to absorb the interest-rate-induced losses. Following 1984, interest-rate decreases resulted in gains to many insolvent thrifts. But investment in both traditional and nontraditional assets (primarily commercial and

multifamily mortgage loans) on which credit losses were incurred by insolvent and solvent thrifts exacerbated the insolvencies and resulted in additional insolvencies. That credit losses were incurred on both types of assets suggests that generally poor lending, perhaps exacerbated by unexpected regional downtums, rather than deregulation of assets granted by the Gam–St Germain Act of 1982, is responsible for thrift failures. Growth permitted by the deregulation of interest rates or the increase in deposit insurance from $40,000 to $100,000 per account, does not appear to be responsible for the southeastem thrifts' insolvency.

10.8 The Annual Cost of Insolvency

To close the paper, we estimate the annual costs that the FSLIC (and, hence, taxpayers and solvent depositories and their customers) would have incurred had the 517 southeastem thrifts in operation at year-end 1984 been closed when they became market-value insolvent. For this exercise, we assume that our measure of market values provides a sufficient estimate of the costs the FSLIC would have had to assume. We should point out that this measure is deficient in several important respects. First, we measure market values in terms of present values of cash flows for financial assets and liabilities and book values for other assets and liabilities, as reported in the *Thrift Financial Reports*. If these numbers were misreported, intentionally or not, our estimates would be incorrect. The book values of fixed assets (such as buildings and equipment) probably do not equal their market values; however, these amounts are relatively small and are likely to understate market values because they are not adjusted for inflation. Second, our reduction in loan values to account for expected nonrepayment losses—the amount of delinquencies—is a crude metric. It is not clear, though, whether this over- or understates expected losses. Third, the costs do not include losses due to the deterioration of assets that are taken from the private sector into a govemment agency. These costs are higher for losses due to defaulted mortgages than to interest-rate increases because property acquired from defaulted mortgages often deteriorates in value when it is managed by govemment agents rather than property owners. Outstanding and current commercial real estate loans also tend to lose value after a thrift is taken over by a conservator or govemment agency because of their practice of calling the loans and refusing to extend additional credit. Finally, we do not include loss due to fraud that was not discovered until after a thrift was closed. Hence, the costs incurred by the FSLIC (now the FDIC and RTC [Resolution Trust Corporation]) are likely to exceed the numbers generated by our market-value model.

Table 10.16 and figure 10.1 show the losses the FSLIC would have incurred had market-value insolvent thrifts been closed plus the negative market values of the thrifts that were closed in each year 1984 through 1988. These amounts then are put on comparable basis for each year. We calculated these costs first

Table 10.16 **Ex Post Annual Closure Costs (in $ millions), 1984–1988 (based on negative market-value net worth (NW) at year-end before closure)** [a]

	1984	1985	1986	1987	1988
1984:					
Insolvents in operation at year-end	3,920	4,250	4,524		
1986 closures not 1984 insolvent [b]			3		
Total through 1986			4,527	4,833	
1987 closures not 1984 insolvent [b]				150	
Total through 1987				4,983	5,365
1988 closures not 1984 insolvent [b]					155
Total through 1988					5,520
1985:					
Closed in 1985 (NW 1984) [b]	150				
Insolvents in operation at year-end	2,109				
Total 1985		2,259	2,405	2,568	
1987 closures not 1985 insolvent [b]				15	
Total through 1987				2,583	2,780
1988 closures not 1985 insolvent [b]					155
Total through 1988					2,935
1986:					
Closed in 1986 (NW 1985) [b]	588				
1985 closures plus interest of 6.45%	160				
Total closures through 1986	748				
Insolvents in operation at year-end	1,841				
Total 1986			2,589	2,764	2,976
1988 closures not 1986 insolvent [b]					62
Total through 1988					3,038
1987:					
Closed in 1987 (NW 1986) [b]	518				
Prior closures plus interest of 6.77%	799				
Total closures through 1987	1,317				
Insolvents in operation at year-end	2,047				
Total 1987				3,364	3,621
1988:					
Closed in 1988 (NW 1987) [b]	265				
Prior closures plus interest of 7.65%	1,417				
Total closures through 1988	1,682				
Insolvents in operation at year-end	2,110				
Total 1988					3,792

[a] Previous year's cost compounded (earned forward) at one-year Treasury bill rate.

[b] Including interest for one-half year at one-year Treasury bill rate.

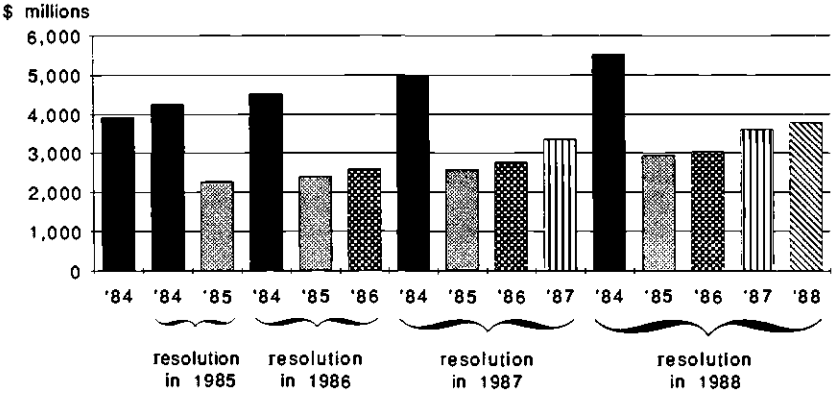

Fig. 10.1 Cost of resolution – current year and carryforward amounts had resolution been accomplished in previous year

by summing the negative market-value net worth of thrifts operating at year-end. For 1984 this is $3,920 million.[41] By year-end 1985, this amount (had it been incurred) would be equal to $4,250 million ($3,920 million plus interest at the Treasury bill rate of 8.42 percent). In fact, the 1984 insolvents that were not closed partially recovered and had market-value net worth of −$2,109 million. To this amount we add $150 million, the negative net worth of the 1984 insolvents that failed in 1985 (and hence were not operating at year-end) plus interest. (On the assumption that these thrifts failed at mid-year, on average, we added interest for six months at the U.S. Treasury bill rate.) Thus, the amount that the FSLIC would have incurred by year-end 1985 had it closed all insolvent thrifts is $2,259 million. The amount is less than the comparable 1984 amount of $4,250 million because of the decline in interest rates.

A walk through the 1986 calculations is necessary to illustrate an additional adjustment required to make the numbers comparable at a point in time. As we did before, the 1984 carryforward to 1985 of $4,250 million is increased by interest of 6.45 percent to $4,524 million. An additional $3 million is added to this figure to account for thrifts closed in 1986 that were not insolvent in 1984, and hence are not included in 1984 amounts but are included in the 1986 amounts to which the 1984 amounts are compared. The 1985 amount of $2,259 million is carried forward similarly, but there is no additional amount because all of the thrifts that closed in 1986 were insolvent at year-end 1985. The negative net worth of insolvents in operation at year-end 1986 is $1,841 million. The thrifts that failed in 1986 had negative net worth at year-end 1985 (plus a half-year's interest) of $588 million. For comparability with the data from 1984 and 1985, we carried forward the negative net worth of 1985 failures of $150 million plus interest for a full year of $10 million, a total of $160

million. Thus, the total for closures through 1986 is $748 million, which together with the negative net worth of thrifts in operation at year-end 1986 equals $2,589 million.

From table 10.16 and figure 10.1, it appears ex post that it was better not to have closed insolvent thrifts at year-end 1984, but to have waited until year-end 1985. This assumes, of course, that the authorities knew interest rates would decline in 1985. However, after 1985 the costs increased. We estimate that waiting until year-end 1986 would have cost $184 million ($2,589 less $2,405). Waiting until year-end 1987 would have cost $600 million more than acting in 1986 and $781 million more than acting in 1985. Waiting until year-end 1988 would have cost $171 million more than acting in 1987, $735 million more than acting in 1986, and $831 million more than acting in 1985. Figure 10.1 presents the data given in table 10.16 graphically.

An indication of the extent to which the losses presented in table 10.16 are due to pre-1985 factors (primarily interest-rate risk) is the amount of costs to the FSLIC (or the taxpayers) of closed and insolvent though still operating thrifts that are due to thrifts that were insolvent at year-end 1984. These figures are given in table 10.17 for each year, 1984 through 1988. In 1985 and 1986 almost all the losses (99 and 91 percent) are attributable to thrifts that were insolvent at year-end 1984. In 1987 the 1984 insolvents are responsible for 87 percent of the total, and in 1988 for 83 percent of the total. These percentages understate the effect of the pre-1985 interest-rate-induced losses,

Table 10.17 **Amount of Insolvency Cost (in $ millions) of Closed and Operating Thrifts Due to Thrifts that Were Insolvent at Year-End 1984**

	Total Amount	1984 Insolvents	Percentage of Total
1984:			
Insolvents in operation at year-end	3.920	3,920	100
1985:			
Closed in 1985	150	150	100
Insolvents in operation at year-end	2,109	2,097	99
Total	2,259	2,247	99
1986:			
Closures through 1986	748	745	100
Insolvents in operation at year-end	1,841	1,621	88
Total	2,589	2,366	91
1986			
Closures through 1987	1,317	1,164	88
Insolvents in operation at year-end	2.047	1,754	86
Total	3,364	2,918	87
1988:			
Closures through 1988	1.682	1,362	81
Insolvents in operation at year-end	2,110	1,777	84
Total	3,792	3,139	83

because this exercise considers thrifts that were brought close to insolvency by these losses to have become insolvent later from other causes.

10.9 Conclusions

In this paper we examine data on southeastern thrifts. From reports in other studies and from impressionistic press reports, we must conclude that our findings are somewhat at odds with the general perception of the causes and extent of the thrift debacle. It is reported that most of the losses incurred by the southwestern thrifts (particularly those in Texas) are due to defaulted commercial real estate loans for which the value of the collateral is much less than the amounts owed. Allegations of massive fraud also have been made, particularly with respect to some very large thrifts.

We were unable to determine whether the reports made to the Federal Home Loan Bank of Atlanta, on which we based our study, were fraudulently prepared. However, we examined opportunistic behavior, defined as thrifts taking advantage of expanded investment powers and funding risky assets with federally insured money. In the aggregate, we conclude that insolvent thrifts did not expand more rapidly than did solvent thrifts and, in general, did not take greater risks. At the margins, we found some examples that the thrift charter was taken advantage of and that several of these extreme cases proved to be the most costly in terms of resolution. But the fact that this behavior was not characteristic of southeastern thrifts indicates that, in this region at least, existing controls generally were effective. The principal reason that many thrifts ultimately were closed, we found, is that they were initially weak and could not absorb the losses they incurred in the early 1980s due to high interest rates. Later decreases in interest rates offset some of the losses, but were insufficient in part because they occurred after thrifts had reduced the duration of their portfolios, principally by shifting into adjustable-rate mortgages. The remaining deficits could not subsequently be overcome by normally profitable operations.

In short, we draw the following conclusions:

- The most important cause of the thrift debacle, at least in the Southeast, is losses incurred as a result of the increase in interest rates in 1979–81.
- Deposit insurance is not a proximate cause of insolvencies and losses, except in that it allowed the thrift industry to subject itself to interest-rate risk while holding low levels of capital. Absent deposit insurance, it is doubtful that thrifts would so heavily invest funds derived from short-term liabilities in long-term fixed-interest mortgages.
- Insolvent thrifts did not take advantage of the deregulation of interest rates and brokered deposits to grow excessively.
- Deregulation of assets (primarily commercial real estate and multifamily mortgage loans) played a role in the losses incurred by some thrifts, particularly newly chartered thrifts and those with low (though positive) levels of

net worth at year-end 1984, but this was generally subsumed under portfolio-wide credit problems. Furthermore, investment in nontraditional assets tends to reduce exposure to interest-rate risk. Had interest rates gone up instead of down during the period studied, losses incurred by thrifts with lower proportions of nontraditional assets might have exceeded the credit losses experienced by those with relatively more of these assets.

- Change in control of thrifts after 1982 had some negative effect on their net profits (measured on a market-value basis) in only one year (1987). (We do not have data on change in control before 1983.)
- Changes in real estate prices and perhaps in the tax law are inversely associated with higher delinquency rates and directly associated with market-value net profits.
- Credit losses (measured by delinquencies) during a year are directly associated with failures after 1986, and inversely related to thrifts' market-value net worth and 1–4 family mortgages at the beginning of the year.
- Most of the losses incurred by southeastern thrifts through 1988 are the result of interest-rate-risk losses and the insolvent but operating thrifts' cost of funding their negative net worth.

Notes

1. The Financial Institutions Reform, Recovery, and Enforcement Act (FIRREA) of 1989 transformed the Federal Savings and Loan Insurance Fund (FSLIC) into the Savings Association Insurance Fund (SAIF), and transferred the assets of the Federal Deposit Insurance Corporation (FDIC) to the Bank Insurance Fund (BIF). Both funds and insolvent S&Ls and banks now are administered by the FDIC. Premiums on deposits for S&Ls increased from 20.8 basis points to 23 basis points in 1991–93. Premiums for banks increased from 8.3 basis points to 12 basis points in 1990 and to 15 basis points in 1991.

2. Kane overstates the negative net worth, as he deducts his estimate of the interest-rate-caused decrease in mortgage values from book net worth, which does not include unbooked intangible assets, such as charter value, mortgage-servicing rights, and the value of core deposits. (The measurement of these assets is described below.) Kane's estimate of 1983 aggregate net worth is negative $73 billion.

3. As is explained next, RAP net worth is greater than GAAP net worth.

4. See Barth and Bradley (1989, table 3) for details.

5. See Benston (1985, 14) for details.

6. See Benston (1985, 84–85) for details.

7. Thrifts with tangible capital of at least 6 percent could hold direct investments and "equity risk investments" (land loans and nonresidential construction loans with loan-to-value ratios over 80 percent) equal to three times tangible capital. Thrifts that met regulatory capital requirements but with less than 6 percent tangible capital could hold these assets in amounts not exceeding the greater of 3 percent of assets or two-and-one-half times the thrift's tangible capital. Thrifts not meeting regulatory capital requirements were prohibited from holding such assets without approval from federal regulators. Also, additional capital equal to 10 percent of the assets must be held.

8. The description of the hypotheses should be read with the caveat, *ceteris paribus*, assumed.

9. There actually are not tangible accounting *principles*. This commonly used term refers to GAAP net worth less intangible assets, primarily goodwill, whether purchased in an arm's length market transaction or recorded as a result of a supervisory merger.

10. See Benston and Kaufman (1990) for citations to works on which this conclusion is based.

11. The IRS application of the QTL should not be confused with the regulatory application of the Competitive Equality and Banking Act (CEBA) of 1985, which required regulators to enforce a QTL but which had not been implemented before it was superceded by the FIRREA QTL.

12. See Horvitz (1989) for a very good descriptive account of the failures of Texas banks and S&Ls.

13. It is possible, though, that the solvent S&Ls held much more diversified portfolios, and hence avoided losses resulting from local economic declines.

14. Casual observers claim that the removal of interest-rate ceilings increased costs to depository institutions which resulted in their incurring losses that led to failures. It is true that deposit interest-rate ceilings can, in the short run, result in transfers of wealth from savers with relatively interest-rate-inelastic savings supply functions to S&Ls and banks with locational advantages. However, the ceilings induced the development and promotion of alternatives (most notably MMMFs), which also benefited from computer developments that lowered costs. Consequently, had deposit-ceiling rates not been removed, S&Ls would have suffered greater losses from disintermediation or increased borrowing from unregulated sources (such as jumbo CDs, which were exempt from the Regulation Q ceiling).

15. See Flannery (1989) for a model that explicitly includes these costs.

16. "Regulation of Direct Investments by Insured Institutions," 51 *Fed. Reg.* 32925.

17. See Barth, Benston, and Wiest (1990) for an explication and critique of FIREA.

18. See, for example, Pizzo, Fricker, and Muolo (1989), Pilzer (1989), and a series of articles in the *Houston Post* claiming that the CIA and the Mafia were involved in S&L failures.

19. An FDIC summary of bank failures between 1934 and 1958 concluded: "In approximately one-fourth of the banks, defalcation or losses attributable to other financial irregularities by officers or employees appear to have been the primary cause of failure. Such irregularities have been responsible for most of the cases since World War II" (FDIC 1958, 29). Benston (1973) analyzed the 56 bank failures that occurred from January 1958 through April 1971. He reports that "most of the reasons for bank failures were fraud, defalcation and similar irregularities on the part of bank officers and, occasionally, lesser employees. Inept or poor management, which was adjudged responsible for from a quarter to a half of bank failures before the Great Depression, . . . has been a very small cause of bank failures in recent years" (pp. 39–40). The Comptroller of the Currency (1988) published an evaluation of 171 national bank failures from 1979 through 1987, and compared these to 38 healthy and 51 rehabilitated banks. This study found that "insider abuse . . . was a significant factor leading to failure in 35 percent of the failed banks. About a quarter of the banks with significant insider abuse also had significant problems involving material fraud" (p. 9). However, the principal problems identified were overly aggressive, incompetent management and weak boards of directors.

20. Also see Garcia (1988, table 4) for a comparison of GAAP-solvent and -insolvent thrifts as of 30 September 1986.

21. The preceding brief review of studies necessarily obscures some possibly im-

portant anomalies revealed in those studies, and this summary suffers even more from compression. Hence, it should be read with caution.

22. As of year-end 1988, only seven of the thrifts in our study held more than 1.0 percent of their assets in junk bonds, and none held more than 1.6 percent. We do not know whether these junk bonds were held in subsidiaries (in which event they would be valued at market) or as investment securities (in which event we would discount their cash flows at the agency rate). Discounting at the agency rate results in an overstatement of about 28 percent for a 10-year security, which would overstate assets at the thrift with 1.6 percent in junk bonds by no more than 45 basis points.

23. The ratio of the change in asset value to net worth is not a useful measure because many of the net worth balances are very small and negative, giving rise to very large ratios and ambiguous signs.

24. Delinquencies (which are available only for aggregate mortgage and nonmortgage loan portfolios) were allocated among the four kinds of mortgages in proportion to their market values. Because delinquencies in 1984 are relatively small, this crude allocation method probably makes little difference, particularly for the averages, although it might have a significant effect on individual thrifts.

25. Consumer loans' book values were assumed to equal their market values due to their heterogeneity and short duration.

26. The servicing spread on a thrift's own mortgages is already included in the net cash flow attributed to those mortgages.

27. Further reductions in negative RAP net worth are recorded as negative percentages.

28. Data separating first and second mortgages, construction and other loans, fixed- and adjustable-rate mortgages were not reported in 1982.

29. Real estate held for investment is not included because it amounted to less than one-half of 1 percent of the assets at almost all southeastern thrifts. We inadvertently did not include brokered deposits and other than passbook deposits in this table; these liabilities are included in the other tables.

30. The approximately 150 thrifts that joined the fourth district either as de novos or the Maryland thrifts that joined the FSLIC are not included.

31. The year-end 1984 number excludes thrifts that ceased independent operations after 1984. One of these thrifts failed; we did not record the market values of thrifts that ceased operations for other reasons.

32. Congressional testimony by former FHLBB Chairman Danny Wall indicates that the targeting of smaller thrifts for closure was a consequence of the FSLIC's inability to resolve large institutions.

33. We failed to record brokered deposits and some other data for table 10.5, which was created early in the project.

34. The numbers decline over time as some thrifts failed or voluntarily merged.

35. The median market value percentages in 1987 and 1988 are -7.5 and -6.8. The large mean values are due primarily to two thrifts.

36. Because *GAPI* is an incomplete measure of duration, the coefficients estimated do not provide a sufficient measure of the magnitudes of the relationship between interest-rate risk and the independent variables specified.

37. The regulators calculated this gap number and, after March 1987, encouraged thrifts to minimize interest-rate risk through the use of capital credits.

38. The Financial Accounting Standards Board's Statement 91, which became effective after 15 December 1987, limits lenders' ability to record up-front fees in excess of associated expenses as current income.

39. Eight thrifts had to be dropped from the regressions because their locations were not on the data tapes.

40. The change in sample size as thrifts are closed or merge may affect the comparison of the annual coefficients estimated.

41. This is less than the $8,078 million in losses incurred by the southeastern thrifts; the balance was absorbed by net worth.

References

Barth, James R., George J. Benston, and Phillip R. Wiest. 1990. The Financial Institutions Reform, Recovery, and Enforcement Act of 1989: Description, Effects and Implications. *Issues in Bank Regulation* 13 (Winter):3–11.

Barth, James R., and Michael G. Bradley. 1989. Thrift Deregulation and Federal Deposit Insurance. *Journal of Financial Services Research* (September):231–60.

Barth, James R., R. Dan Brumbaugh, Jr., and Daniel Sauerhaft. 1986. Failure Costs of Govemment-Regulated Financial Firms: The Case of Thrift Institutions, Research Working Paper no. 123. Office of Policy and Economic Research, Federal Home Loan Bank Board, Washington, D.C.

Barth, James R., R. Dan Brumbaugh, Jr., Daniel Sauerhaft, and George H. K. Wang. 1985. Thrift Institution Failures: Causes and Policy Issues. *Proceedings of the Conference on Bank Structure and Performance*, Federal Reserve Bank of Chicago, 184–216.

Barth, James R., and Martin A. Regalia. 1988. The Evolving Role of Regulation in the Savings and Loan Industry. In *The Financial Services Revolution: Policy Directions for the Future*, ed. Catherine England and Thomas Huertas, 113–61. Boston and Washington, DC: Kluwer Academic Publishers and the Cato Institute.

Benston, George J. 1973. *Bank Examination*. New York University Graduate School of Business Administration, Institute of Finance (*The Bulletin*), nos. 89–90, May.

———. 1985. *An Analysis of the Causes of Savings and Loan Association Failures*. New York University Graduate School of Business Administration, Salomon Brothers Center for the Study of Financial Institutions (*Monograph Series in Finance and Economics*), Monograph 1985–4/5.

———. 1989. Direct Investments and FSLIC Losses. In *Research in Financial Services*, vol. 1, ed. George J. Kaufman. Greenwich, CT: JAI Press.

Benston, George J., Mike Carhill, and Brian Olasov. 1991. Market-Value vs. Historical Cost Accounting: Evidence from Southeastem Thrifts. In *Reform of Deposit Insurance and the Regulation of Depository Institutions in the 1990s: Setting the Agenda*, ed. James R. Barth and R. Dan Brumbaugh, Jr. New York: Harper Collins.

Benston, George J., and George G. Kaufman, 1990. Understanding the savings-and-loan debacle. *The Public Interest* 99 (April):79–95.

Benston, George J., and Michael F. Koehn. 1990. Capital Dissipation, Deregulation, and the Insolvency of Thrifts. Emory University, typescript.

Brumbaugh, R. Dan, Jr. 1986. Empirical Evaluation of the Determinants of Losses for the Federal Savings and Loan Insurance Corporation (FSLIC), 1982–1984. Washington, D.C.: Federal Home Loan Bank Board, February 28.

Carhill, Mike. 1989. Fourth District Thrift Profitability in 1988. *Federal Home Loan Bank of Atlanta Review* 38 (June):1–6.

Carhill, Mike, and Iftekhar Hasan. 1990. Mutual vs. Stock Behavior at Southeastem Thrifts. Federal Home Loan Bank of Atlanta, typescript.

Carhill, Mike, and Patrick D. Mauldin. 1989. A Critical Comparison of Altemative Thrift Management Strategies. *Federal Home Loan Bank of Atlanta Review* 38 (March):1–11.

Carron, Andrew S. 1982. *The Plight of the Thrift Instiutions*. Washington, DC: The Brookings Institution.

Comptroller of the Currency. 1988. *Bank Failure: An Evaluation of the Factors Contributing to the Failure of National Banks.* Washington, DC: Government Printing Office.

FDIC (Federal Deposit Insurance Corporation). 1958. Operations of the Federal Deposit Insurance Corporation to Protect Depositors in Failing Banks, 1934–1958. *Annual Report*, 27–127.

Flannery, Mark J. 1989. Capital Regulation and Insured Banks' Choice of Individual Loan Default Risks. *Journal of Monetary Economics* 24 (September):235–58.

Fritz, Richard G. 1989. Florida's Housing Market: Prospects for the 1990s. *Federal Home Loan Bank of Atlanta Review* 38 (December):4–13.

Garcia, Gillian. 1988. The FSLIC is "Broke" in More Ways Than One. In *The Financial Services Revolution: Policy Directions for the Future*, ed. Catherine England and Thomas Huertas, 235–49. Boston and Washington, DC: Kluwer Academic Publishers and the Cato Institute.

Hasan, Iftekhar. 1989. More Branching is Increasing Competition for the Florida Thrift Industry. *Federal Home Loan Bank of Atlanta Review* 38 (December):14–24.

Horvitz, Paul. 1989. The Causes of Texas Bank and Thrift Failures. CBA Working Paper Series, no. 222. University of Houston, College of Business Administration.

Kane, Edward J. 1985. *The Gathering Crisis in Federal Deposit Insurance.* Boston, MA: MIT Press.

———. 1989. *The S&L Insurance Mess: How Did It Happen?* Washington, DC: Urban Institute Press.

Pilzer, Paul Zane, with Robert Dietz. 1989. *Other People's Money: The Inside Story of the S&L Mess.* New York: Simon and Schuster.

Pizzo, Stephen, Mary Fricker, and Paul Muolo. 1989. *Inside Job: The Looting of America's Savings and Loans.* New York: McGraw-Hill.

Rudolf, Patricia M., and Sharon Topping. 1988. Which Thrift Strategies Have Worked? *Federal Home Loan Bank Board Journal* 18 (December):16–20.

Strunk, Norman, and Fred Case. 1988. *Where Deregulation Went Wrong: A Look at the Causes Behind Savings and Loan Failures in the 1980s.* Washington, DC: U.S. League of Savings Institutions.

Welfling, Weldon. 1968. *Mutual Savings Banks: The Evolution of a Financial Intermediary.* Cleveland, OH: The Press of Case Western Reserve University.