

Why the life insurance industry did not face an "S&L-type" crisis

Elijah Brewer III, Thomas H. Mondschean,
and Philip E. Strahan



Since August 1989, the Resolution Trust Corporation has spent \$84.4 billion of taxpayers' money to close 653 savings and loan associations (S&Ls).¹ In addition, between 1986 and 1990, over 900 commercial banks were closed with assets totaling over \$100 billion. On July 16, 1991, in response to policyholder runs during the previous three months totaling approximately \$500 million, New Jersey regulators seized the Mutual Benefit Life Insurance Company. The asset quality problems that led to this and other runs on life insurance companies in the early 1990s have led some to wonder whether yet another category of financial intermediaries might suffer widespread failures requiring government intervention at taxpayer expense. Government closings of financial institutions can be extremely costly to taxpayers, and the safety of life insurance policies and annuity contracts is of concern to millions of policyholders. For these reasons alone, it is important to assess the risk exposure and regulatory structure of the U.S. life insurance industry.²

But there are other reasons as well. First, according to the Federal Reserve *Flow of Funds*, the industry held approximately \$1.2 trillion in assets at the end of 1991, accounting for 11.4 percent of total financial assets. Capital adequacy or asset quality problems in this industry could lead to disintermediation, or the transfer of saving and borrowing activities from life insurance companies to other financial institutions. This in turn would result in less efficient allocation of capital. Second, most state governments bear part of the cost of an insurance failure by

providing tax credits to life insurance companies (LICs) that pay guaranty fund assessments. Third, losses from failures are partially borne by insurance and pension policyholders, reducing potential income to retirees. Finally, the experiences of the life insurance industry can provide some lessons for bank regulators.

The 1980s witnessed two important changes in the mix of LIC business: continued growth in pension and annuity business relative to life insurance, and a shift toward interest-rate-sensitive products. Competitive pressures led some LICs to shift their asset portfolios from low- to high-risk investments in order to cover the higher rates on these new liabilities. By the end of the decade, this strategy had begun to unravel. The sudden but short-lived collapse of the junk bond market and the fall in the value of commercial real estate reduced LIC profitability. In reaction, LICs pulled back from the commercial real estate market and certain segments of the corporate bond market.

At first glance, there are many similarities between the savings and loan and the life insurance industries. Both S&Ls and LICs act as financial intermediaries and face substantial government regulation. Life insurance policyholders, like S&L depositors, are protected by government-administered guaranty funds.

Elijah Brewer III is a senior economist with the Federal Reserve Bank of Chicago. Thomas H. Mondschean is assistant professor of economics at DePaul University and consultant to the Economic Research Department of the Federal Reserve Bank of Chicago. Philip E. Strahan is an economist with the Federal Reserve Bank of New York.

Because of the partial guarantee of their liabilities, firms in both industries have incentives to take risk. Many have argued that regulators exacerbated the S&L crisis by allowing thrifts to invest heavily in high-risk loans and securities and by not closing insolvent firms promptly, while private creditors did not impose market discipline on S&Ls because their deposits were guaranteed. Yet despite the similarities between S&Ls and LICs, the life insurance industry has not suffered widespread failures.

In this article we explore possible explanations for the divergence in behavior and performance between these two classes of financial institutions. First, we argue that in contrast to commercial banks and LICs, S&Ls were dangerously exposed to interest rate risk. As a result, when nominal interest rates rose sharply in the late 1970s, S&Ls experienced a larger decline in the market value of their portfolios than did LICs or banks. Then we suggest five key differences that reduced the moral hazard problem for LICs relative to S&Ls:

- 1) LICs possessed a larger capital cushion than S&Ls;
- 2) S&L creditors had more confidence in their government guarantees than did LIC creditors;
- 3) a smaller proportion of LIC liabilities were subject to a government guarantee;
- 4) LICs were subject to greater market discipline from uninsured creditors; and
- 5) LICs were subject to greater monitoring by other LICs.

The article is organized into six sections. First, we present financial information about the life insurance industry both to document the importance of LICs as financial intermediaries and to describe the environment in which they operate. Second, we describe the recent financial problems of the industry. Third, we sketch the regulatory framework that protects policyholders and manages insolvencies. Fourth, we discuss how interest rate risk differs across financial institutions. Fifth, we examine key differences that reduced the moral hazard problem for LICs compared to S&Ls. Finally, we discuss the implications of these findings for regulatory policy.

Background

Traditionally, life insurance companies offer customers risk protection by agreeing to

indemnify them against losses specified in a policy. Insurance guards against economic loss by compensating those policyholders suffering losses from a pool of funds paid by all policyholders who are exposed to similar risks. At the end of 1991, the most recent year for which data are readily available, over 375 million policies were in force in the United States, with coverage totaling approximately \$10 trillion. LICs' total 1991 revenues from premium and investment income were \$411 billion.

LICs raise funds primarily from the sale of life insurance policies, annuities, and pension plans that have a savings feature as part of their contract. LICs must set up reserve accounts for the excess of the value of benefits payable in future years over the value of the premiums to be collected for each contract. The reserve accounts are divided into two types of liabilities: (1) life insurance reserves, which cover LIC obligations to policyholders and beneficiaries; and (2) pension reserves, which cover expected payments to retirees and other annuitants. These liabilities of LICs are savings instruments by which households can accumulate wealth for retirement and bequests. In turn, LICs use the premiums paid for these products to invest in debt and equity securities. In doing so, they help transform a large portion of the financial assets of households into real capital investment by businesses and governments.

Premium income from life insurance products represented 44 percent of total gross income of LICs in 1970 but fell to 19 percent by year-end 1991 (see table 1). Much of this decrease occurred because traditional life insurance contracts with savings components offered policyholders a substantially lower return after taxes than did alternative investments. During the 1970s and early 1980s, rising inflation rates and high yields on alternative investments created greater competition for household savings. Returns on traditional life insurance contracts were tied to the average rate of return on the insurer's portfolio. However, because LICs held a large share of fixed-rate bonds purchased previously at lower interest rates, the average rate of return on their portfolio did not increase as rapidly as market rates of interest. As a result, a large gap emerged between prevailing interest rates and the return on traditional LIC contracts. In addition, many policyholders exercised their right to borrow against their policies or cashed them in for their surrender value in order to invest the

TABLE 1
Gross income of life insurance companies
(billions of dollars)

Source of income	1970	1980	1985	1990	1991
Life insurance premiums	21.7 (44.3) ^a	40.8 (31.2)	60.1 (25.7)	76.7 (19.1)	79.3 (19.3)
Annuities ^b	3.7 (7.5)	22.4 (17.1)	53.9 (23.0)	129.1 (32.1)	123.6 (30.1)
Health insurance premiums	11.4 (23.3)	29.4 (22.5)	41.8 (17.9)	58.2 (14.5)	60.9 (14.8)
Investments	10.1 (20.6)	33.9 (25.9)	67.9 (29.0)	111.8 (27.8)	119.0 (28.9)
Other	2.1 (4.3)	4.3 (3.3)	10.2 (4.4)	26.3 (6.5)	28.2 (6.9)
Total	49.0 (100.0)	130.9 (100.0)	234.0 (100.0)	402.2 (100.0)	411.0 (100.0)

^aNumbers in parentheses are the percent of total income.
^bIn 1986, there was a large increase in annuity premium receipts because of an NAIC-mandated change in statutory reporting.
 Note: Numbers may not add to totals because of rounding.
 Source: American Council of Life Insurance.

funds where they could earn higher rates. This created outflows of LIC funds.

To stem outflows and attract additional funds, LICs developed new products such as universal and variable life insurance policies. These differed from traditional whole life policies in that the size of the death benefit and/or the annual premium could change to reflect investment performance over the duration of the policy. Such interest-rate-sensitive products offered new options, including the ability to move the investment portion of the policy among alternative assets to reflect policyholders' current preference between risk and return. As table 1 shows, premium income from annuity business accounted for 30 percent of gross income at the end of 1991, compared with only 7 percent at year-end 1970.

In addition to standard annuity products, some life insurance companies have sold guaranteed investment contracts (GICs). Widely used as funding instruments for defined contribution pension plans, GICs typically obligate an insurance company to repay principal and interest accruing at a predetermined rate in a single payment at maturity. Thus GICs have no insurance element. Competition for this business has resulted in very favorable contract terms for

customers, including liberal surrender provisions that allow withdrawals without penalty when promised yields fall below benchmark rates (Cabanilla 1992). Because GICs are relatively short-term liabilities, these contracts tend to reduce the average duration of insurance companies' liabilities. Table 2 reports that the share of life insurance industry general account assets financed by GICs rose from 8.1 percent in 1986 to 10.8 percent in 1990. By year-end 1991, however, this share had fallen to about 8 percent, primarily because some highly publicized failures caused GIC holders to shift funds to alternative investments.

Because the interest income credited on universal life policies and other liabilities affected the demand for these instruments, insurance companies have an incentive to offer high rates during the early years of these policies to attract new customers and to forestall policy

lapses and surrenders by existing customers. Wright (1991) claims that in order to maintain the high returns being paid on GICs and other liabilities, many insurance companies sought to increase interest income either by taking on riskier real estate loans or by reducing the quality of their corporate bond portfolios.

Historically, life insurance companies have played an important role in the bond and mortgage markets. In 1960, they held about 50 percent of all outstanding corporate bonds. While

TABLE 2
Guaranteed investment contracts
(billions of dollars)

	Total	Percent of assets
1986	67.1	8.1
1987	74.8	8.0
1988	105.1	10.1
1989	121.6	10.5
1990	134.6	10.8
1991	130.0	8.4

Source: American Council of Life Insurance.

this share has fallen with the growth of mutual funds and pension plans, LICs still hold about one-third of all corporate bonds. Within the bond market, they are major buyers of private placement debt, which are securities issued in the U.S. but not registered with the Securities and Exchange Commission. LICs are also very active in the commercial mortgage market, which provides a market for loans on nonresidential properties such as office buildings and manufacturing plants. Together, LICs, commercial banks, and S&Ls supply about 80 percent of the credit for all commercial real estate loans. During the 1980s, LICs held about 30 percent of all commercial mortgage loans (Cabanilla 1992).

Lending in the private placement and commercial real estate markets requires substantial amounts of information gathering in the form of evaluating credit and monitoring of borrowers' management through covenant enforcement. Recent studies of the private placement and commercial real estate markets have indicated that the loans made by LICs in these markets generally have less uniform terms than do other investments such as publicly traded corporate bonds. As a result, private placements and mortgage loans are less liquid. Yields are higher to reflect information gathering costs and greater default risk. According to data from the American Council of Life Insurance, private placements and mortgage loans represented about 86 percent of new life insurance investments in 1980. At the end of 1991, they accounted for only about 29 percent. Conversely, the share of new funds that LICs invested in publicly traded corporate bonds and mortgage-backed securities has been increasing during the 1980s and early 1990s. In 1980, these assets accounted for about 13 percent of all new investments of LICs. By year-end 1991, that figure had risen to 70 percent. The shift towards marketable and more liquid securities stemmed from the increased securitization of debt as well as from changes in liability structure and from the asset quality problems of life insurers.

Life insurers' emerging financial problems

Table 3 examines the financial characteristics of LICs classified by their 1986 book value statutory capital-asset ratios. More than three-quarters of the industry's assets were held by LICs with capital and surplus less than 9 percent of general account assets (low-capital LICs)³. Low-capital LICs held greater proportions of

mortgage loans and junk bonds than did companies with capital ratios above 9 percent (high-capital LICs). Guaranteed investment contracts are a relatively more important funding source for low-capital LICs than for high-capital companies. Figure 1 presents the market capitalization-asset ratios for a sample of 44 publicly traded life insurance companies classified as "high" junk bond holders (9), "high" commercial mortgage loan holders (11), and "others" (24).⁴ All three groups of LICs experienced a deterioration in market capitalization over the 1986-1990 sample period. However, the deterioration was the greatest for the high junk bond holders. Other things held constant, lower market capitalization-asset ratios at high junk bond LICs indicate a greater exposure to the risk of failure.

During the late 1980s and early 1990s, the increased emphasis on nontraditional insurance products along with shifts towards ex ante riskier assets took its toll. Declines in the market values of below-investment-grade bonds and commercial real estate reduced the market value of capital of many LICs; a few have been rendered insolvent. Two announcements in 1990 highlighted the industry's emerging financial difficulties. In January, First Executive Corporation, a large holder of below-investment-grade bonds, announced that it would take a charge of \$515 million in the fourth quarter for junk bond losses. Then in October, Travelers Corporation, one of the largest holders of commercial real estate loans, announced it was setting aside \$650 million in reserves for anticipated losses on its commercial real estate portfolio. These and similar problems at other LICs led to policyholder liquidity runs and the collapse of several large companies such as First Executive Corporation in mid-1991. Liquidity runs could occur because many of the new products sold by LICs provide policyholders with liberal withdrawal provisions in which the holder may demand immediate payment of principal and accrued interest. According to Fenn and Cole (1992), holders of GICs and other interest-rate-sensitive products are more likely than traditional policyholders to exercise withdrawal options on annuity products and to borrow against insurance products when the issuing firm appears troubled. Surviving LICs have responded to these financial problems by reducing their holdings of risky assets and improving capital ratios.

The weakened condition of LICs reduced the supply of credit in both the commercial mortgage market and the below-investment-grade segment

TABLE 3

Financial characteristics of life insurance companies
(billions of dollars)

High-capital companies^a	1986	1987	1988	1989	1990
	(————— <i>billions of dollars</i> —————)				
Mortgage loans	22.3	24.4	26.7	30.1	32.2
Junk bonds	4.7	6.7	5.6	6.8	7.7
GICs	2.3	3.4	5.3	10.2	13.8
Total general account assets	179.7	201.2	229.7	259.0	290.5
	(————— <i>percent</i> —————)				
Book value of net worth/ mortgage loans	163.8	157.4	153.9	148.8	144.4
Book value of net worth/ junk bonds	783.8	572.6	739.0	659.0	606.3
Book value of net worth/ total assets	20.3	19.1	17.9	17.3	16.0
Low-capital companies^a	1986	1987	1988	1989	1990
	(————— <i>billions of dollars</i> —————)				
Mortgage loans	173.1	193.5	211.2	229.5	242.6
Junk bonds	28.9	40.3	38.9	44.7	43.3
GICs	67.6	82.4	95.7	110.0	117.7
Total general account assets	683.6	757.1	842.1	918.2	979.1
	(————— <i>percent</i> —————)				
Book value of net worth/ mortgage loans	16.7	16.5	17.2	18.1	19.3
Book value of net worth/ junk bonds	100.8	79.0	93.2	93.3	108.5
Book value of net worth/ total assets	4.2	4.2	4.3	4.5	4.8

^aLow-capital life insurance companies are those with book capital-asset ratios less than or equal to 9 percent at the end of 1986. The remaining companies are classified as high-capital.

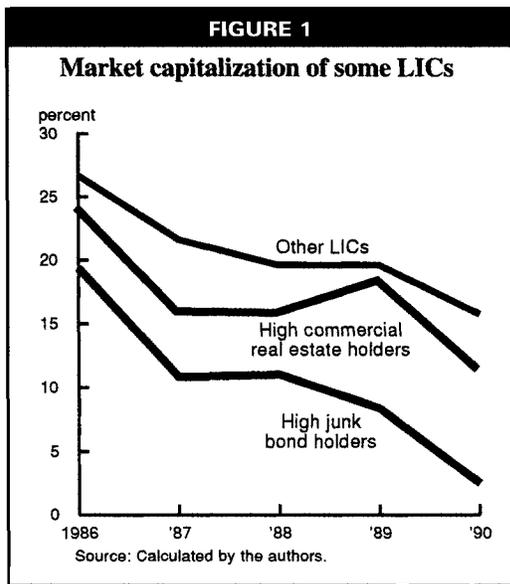
Source: National Association of Insurance Commissioners (NAIC), Database of Annual Statements.

of the private placement market. Carey, *et al.* (1992) show that in the below-investment-grade segment of the private placement market, loan volume was down and loan rates were up. The rise in rates was not caused by a general increase in loan risk, but rather by LICs' flight to quality. Corcoran (1992) also concludes that the reduced willingness of insurance companies to make new loans exacerbated the credit problems of the recent recession. The deterioration of commercial real estate values and an increase in mortgage delinquency rates, as illustrated in figure 2, led LICs to reduce their exposure to both commercial real estate as well as the private placement market.

As a result of these problems, the industry capital-asset ratio fell in 1990 to 8.5 percent. In 1991, the life insurance industry increased its capital-general account asset ratio to 9.3 percent, signalling an improved ability of firms to absorb losses without becoming insolvent. This cushion should help reassure policyholders about the solvency of LICs.

Regulation of life insurance companies

Just as a capital cushion protects policyholders and other creditors from losses at LICs, government regulation also safeguards their interests. Life insurance companies are regulated for many of the same reasons as are other



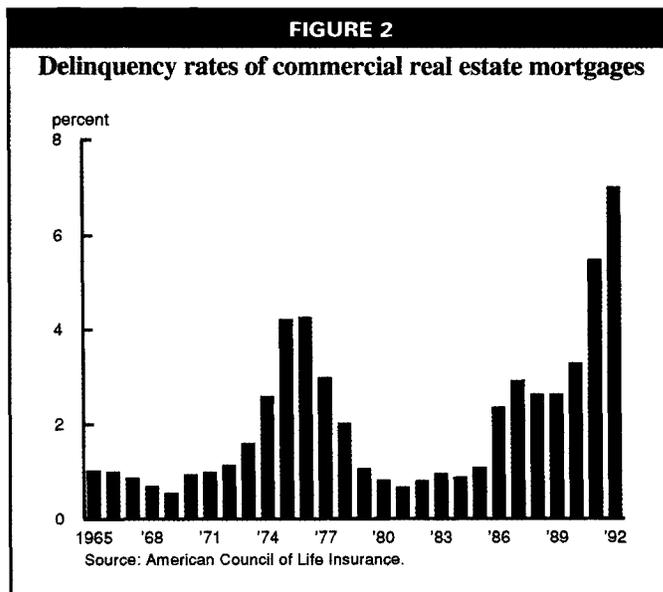
financial intermediaries: first, to offset the moral hazard problems exacerbated by government guarantees of LICs' liabilities; second, to decrease the probability that failure of one LIC may cause policyholders at other LICs to exercise their surrender options after losing confidence in their companies' ability to meet obligations;⁵ and third, to protect taxpayers from losses resulting from LIC failures.

State insurance departments are the agencies charged with regulating LICs. State regulators enforce rates, asset restrictions, and other policies established by state legislation. If a company wishes to write insurance in a particular state, it must first receive permission from the state insurance commissioner. Thereafter, LICs must provide regulators with income statement and balance sheet information annually. In addition, state insurance departments usually audit companies operating within their borders once every three years. Most states levy a tax on insurance premiums to finance part of the cost of regulation. The National Association of Insurance Commissioners (NAIC) also monitors LICs by performing annual computerized audits. Companies failing four or more of eleven NAIC audit ratio tests face increased monitoring from state regulators (see Cummins 1988 for more details).

Despite the uniform standards proposed by the NAIC, life insurance companies are still subject to widely varying degrees of regulatory scrutiny. Examinations vary with the size and sophistication of state insurance departments or with the level of resources that states allocate to regulation. Further, LICs vary in their ability to lobby for less restrictive regulations or scrutiny, and states vary in their susceptibility to such pressures.

To protect policyholders and to manage insolvencies, all fifty states and the District of Columbia have established guaranty funds. Prior to 1970, only one state had a guaranty system to cover the obligations of life and health insurance companies. Then in 1970, the NAIC adopted a "model" guaranty system for subsequent consideration by individual state legislatures. In addition to provisions stating what the guaranty fund covered, the NAIC model also allowed insurance companies to credit guaranty fund assessment costs on their state premium taxes. Within a year, nine states adopted legislation based on or similar to the NAIC model. Guaranty systems satisfy benefit claims of policyholders and annuitants in the event that an insolvent company lacks sufficient assets after liquidation. Harrington (1991) claims that the growth of these guaranty funds has contributed to the increased number and magnitude of insolvencies in the insurance industry in recent years.

Guaranty funds are financed by ex post assessments on surviving insurance firms operating in the particular state, with each company



paying an assessment based on its share of total premium income. As of December 31, 1992, in 39 states, LICs may offset assessments against their state taxes, thereby shifting the cost of failure directly onto state taxpayers. In the remaining states, LICs may impose a premium surcharge to cover the cost of the assessment.

In most states, coverage under guaranty funds is \$300,000 in death benefits, \$100,000 in cash or withdrawal value for life insurance, \$100,000 in present value of annuity benefits, and \$100,000 in health benefits. Some states cover all insurance policies written by an insolvent firm located in the state; others cover the policies of residents only. In the case of unallocated annuities such as GICs purchased by companies to fund pension plans, some states cover up to a certain amount, usually \$5 million. Other states, such as California, Massachusetts, and Missouri, do not cover GICs.

Because of variations in state guaranty funds and in the way insolvencies are handled, the parties bearing the costs of an insurance failure differ across states. Surviving insurance companies initially pay their assessments and claim them as an expense on their federal corporate income tax return, reducing their federal income taxes. As companies receive tax credits in subsequent years, these credits become taxable income. As a result, the federal government bears part of the cost of an insolvency since it does not fully recover the present value of the tax decrease granted in the assessment year. In states with premium tax offsets, however, the majority of the cost is paid by state taxpayers. A study of 1990 life/health guaranty fund assessments found that 73.6 percent was paid by state taxpayers, 8.9 percent by federal taxpayers, and 17.5 percent by the equity holders of the surviving firms.⁶

The way in which state guaranty systems manage insolvencies raises several policy concerns. First, LICs pay nothing *ex ante* to receive the guarantees. Assessments are based on the *ex post* cost of a given failure and bear no relationship to current or future LIC risk exposure. Second, companies in states with premium tax offsets have little incentive to monitor each other, since over 80 percent of the assessment will be recouped through lower taxes. Third, insurance guaranty funds reduce the incentive for policyholders to exercise market discipline. In the absence of guaranty funds, policyholders would have more incentive to buy from safe LICs or to

demand lower premiums from high-risk firms. As the S&L crisis demonstrated, government guarantees of firm liabilities could create a moral hazard problem. If these guarantees are mispriced, institutions with low net worth may have strong incentives to gamble for resurrection by investing in riskier assets.⁷

Interest rate risk at financial institutions

The value of LIC portfolios has traditionally been relatively insensitive to changes in interest rates.⁸ A large proportion of LICs' liabilities consists of life insurance reserves, and most of the payments for these products occur in the distant future. Most LIC assets consist of long-term corporate debt, mortgages, and long-term government securities. In the absence of credit risk, both the nominal death benefits and the payoff of these long-term assets are determined at the outset. As a result, the firm is less exposed to unanticipated changes in interest rates. If the firm decides to hold short-term assets such as Treasury bills or commercial paper against life insurance policies, it would have no guarantee that its portfolio could support future claims. Declines in interest rates would reduce the firm's earnings and its ability to meet future obligations.

Regulation of savings institutions, on the other hand, has encouraged these firms to hold long-term, fixed-rate mortgage loans financed with short-term deposits. This strategy worked well during the period of stable interest rates from the end of World War II to the 1960s. But S&Ls remained vulnerable to changes in the level of interest rates. Because of Regulation Q interest rate ceilings, S&Ls were prevented from offering depositors competitive rates when market interest rates rose above the ceiling rate. When this occurred, many depositors withdrew their funds in order to invest them in higher-yielding money market instruments, which caused outflows of S&L deposits. To stem the outflow, S&Ls were allowed to offer several deposit products not subject to Regulation Q ceilings. However, because over 80 percent of S&L assets were invested in long-term, fixed-rate mortgage loans made previously at lower rates, their interest income did not increase as rapidly as their cost of funds. As a result, S&Ls suffered negative interest rate margins. This predicament—interest rate risk—is particularly characteristic of the S&L industry. Figure 3

compares the capital-asset ratios for the S&L and life insurance industries. Between 1978 and 1982, the S&L capital ratio fell from 5.6 to 0.6 percent but the LIC capital ratio actually rose from 8.3 to 9.1. Since there is a better correspondence between the durations of assets and liabilities of LICs, these institutions were less exposed to interest rate risk; hence, they did not experience the large losses and subsequent declines in capital as a result of high nominal interest rates from 1978 to 1982.

To judge a firm's exposure to interest rate risk, we use stock market data. The stock returns of financial institutions depend on many economic variables besides interest rates, such as expectations of future economic conditions, future investment opportunities, productivity, and tax policies. Using a two-factor market model from the finance literature, we relate the return on a portfolio of each type of institution to the return on an index of the overall stock market and the return on a portfolio of long-term government securities. The following equation allows us to compare the relative exposure of the three types of financial institutions to interest rate risk:

$$(1) R_{j,t} = \alpha_j + \beta_{M,j} R_{M,t} + \beta_{L,j} R_{L,t} + \varepsilon_{j,t}$$

where

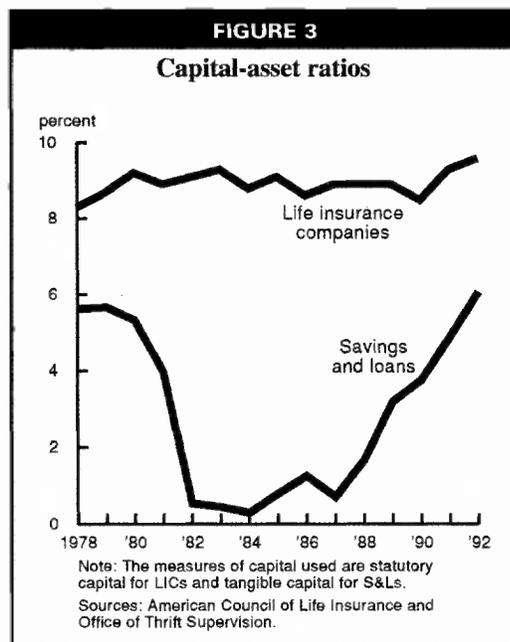
$R_{j,t}$ = return on financial institution j at t ,

$R_{M,t}$ = return on stock market,

$R_{L,t}$ = return on portfolio of long-term government bonds.

The variable $R_{M,t}$ controls for all economic variables that would affect profits for all corporations. The value of the second variable, $R_{L,t}$, depends solely on interest rates, so its coefficient provides an estimate of the interest rate sensitivity of each type of financial institution.

We estimated equation 1 using monthly returns for two sample periods, 1972-1982 and 1983-1991. We split the sample at the end of 1982 for several reasons. During the first period, S&Ls and banks faced government-mandated interest rate ceilings. After the passage of the Depository Institutions Deregulation and Monetary Control Act of 1980, these regulations began to be phased out. Moreover, the Garn-St Germain Depository Institutions Act of 1982 substantially liberalized S&L asset-holding



powers. Both of these laws allowed S&Ls to reduce interest rate risk. Also, the market value of S&L capital dropped sharply during the 1981-1982 period. Brickley and James (1986) show that stock returns for poorly capitalized firms may respond less to economic variables since the deposit insurer bears the brunt of all losses.

The results of estimating equation 1 appear in table 4. They show that S&Ls were much more exposed to interest rate fluctuations than either banks or LICs. In the first sample period, for instance, interest rate changes did not significantly influence the stock returns of LICs. By contrast, S&L stock returns were highly sensitive to those changes. For example, the estimated coefficient shows that S&L stock returns exhibited 90 percent as much sensitivity to interest rate changes as did a portfolio of twenty-year government bonds. In fact, one cannot reject the null hypothesis that during the 1972-1982 period, S&L stock prices were as sensitive to interest rates as were long-term government bond prices.

Flannery and James (1984) show that the degree of sensitivity of bank stock returns to interest rates depends directly on the duration mismatch between its assets and liabilities. Since life insurance companies actively try to match the maturity of both sides of their balance sheet, it is not surprising that LIC stock returns exhibit little interest rate sensitivity.

In the second sample period, the interest rate sensitivity of S&L stocks decreased from

TABLE 4

**Estimates of interest rate sensitivity for portfolios of commercial bank,
savings and loan, and life insurance stocks^a**

Industry	Intercept	Return on market portfolio	Return on government bond portfolio	R ²	Durbin-Watson statistic
1972-1982					
Savings and loans	-0.003 (0.004) ^b	1.030* (0.066)	0.904* (0.128)	75.4%	2.185
Commercial banks	0.001 (0.002)	0.510* (0.029)	0.150* (0.056)	75.4%	1.866
Life insurance	0.001 (0.002)	0.707* (0.030)	0.074 (0.057)	84.0%	1.819
1983-1991					
Savings and loans	-0.010 (0.004)	0.996* (0.077)	0.484* (0.125)	65.6%	1.622
Commercial banks	0.003 (0.003)	0.662* (0.046)	0.154 (0.075)	67.8%	1.378
Life insurance	0.002 (0.002)	0.722* (0.038)	0.164* (0.062)	79.1%	1.618

^aThe monthly portfolio of returns for each industry includes all publicly traded stocks on the New York and American Stock Exchanges and the NASDAQ. The data are from the Center for Research in Securities Prices (CRSP). The market index is the monthly return on an equally weighted portfolio of all stocks on the three exchanges, inclusive of dividends. The interest rate index is the monthly return on a portfolio of long-term government bonds with maturity of approximately 20 years. These two indices are also from CRSP.

^bStandard errors appear in parentheses.

*significant at the .01 level.

0.90 to 0.48, while neither the bank nor the LIC interest rate sensitivity changed significantly from the first sample period. Evidently, the deregulation the S&L industry may have had the intended effect of reducing but not eliminating interest rate risk. However, with S&L industry capital at historic lows during this period, the lack of responsiveness of stock returns to interest rate volatility may reflect the put protection afforded by deposit insurance. As a firm's capital approaches zero, further declines will be reflected in increased deposit insurer liability rather than in stock returns. Since the capital of LICs and banks did not fall to the same degree in the 1980s, those institutions apparently did not experience a similar decline in interest rate sensitivity. In fact, for LICs the point estimate actually increases from 0.07 to 0.16, although this difference is not statistically significant.

These results indicate that S&Ls were uniquely vulnerable to interest rate movements in the 1970s. We attribute the weakness of this industry to regulations that encouraged savings institutions to hold an unbalanced book. In

contrast, both LICs and commercial banks have been permitted to hold a sufficiently broad array of assets to facilitate better diversification.

Moral hazard at financial institutions

Insurers have long dealt with moral hazard. By its very nature, insurance reduces the costs associated with a particular bad outcome and thus weakens the purchaser's incentive to take costly self protective actions. For instance, holders of fire insurance have less incentive to buy fire extinguishers to protect their property than do uninsured individuals. In private markets, one way in which insurers mitigate this problem is by adding deductibles and copayments to policies. In the case of financial institutions, government liability guarantees weaken the incentive for creditors to discipline the propensity of firms to bear additional risk; fully insured depositors with confidence in the Federal Deposit Insurance Corporation (FDIC) will not waste time monitoring their banks' investment decisions. Effective monitoring by regulators and/or other firms can mitigate this moral hazard problem.

Many analysts have argued that the S&L crisis occurred because government regulators did not control the moral hazard inherent in fixed-premium deposit insurance.⁹ Regulatory oversight declined during the 1980s. Insolvent S&Ls that were permitted to remain in operation were not monitored very closely. In addition, S&Ls were given new rights to invest in high-risk assets such as junk bonds and acquisition and development loans. In pursuit of high profits, many S&Ls responded by collecting federally insured deposits and investing them in high-risk, high-expected-return assets. This action deepened the insolvency problems. As a result, between 1987 and 1992 over 800 S&Ls were resolved by the Federal Savings and Loan Insurance Corporation (FSLIC) and later the Resolution Trust Corporation.

Brewer and Mondschean (1993b) show empirically that life insurance companies face similar moral hazard problems. They found that over the 1986-90 period, low-capital LICs experienced one-time increases in market value capital following a shift from low-risk assets to high-risk assets such as real estate direct investment and equity issues. As expected, increases in risky assets did not have a statistically significant effect on the market value of high-capital LICs.

Brewer and Mondschean (1993c) also show that the largest LICs that failed in 1991 had sizable exposures to junk bonds. In fact, their exposure was so large that a decline of 12 to 14 percent in the value of their junk bond portfolio was sufficient to wipe out their book capital completely. These findings are consistent with a moral hazard problem associated with government liability insurance.

In response to declining asset values, both LICs and S&Ls were forced to set aside funds to reserve against losses on securities and loans. However, regulators anticipate spending over \$200 billion of taxpayers' money to resolve the S&L debacle, while the cost of managing insolvent LICs should be much less. We suggest that five key differences between the environment in which LICs operated relative to S&Ls reduced the moral hazard problem sufficiently to prevent a crisis in the life insurance industry.

Vulnerability to capital shocks

S&Ls faced a massive capital shock when interest rates skyrocketed in the early 1980s. In addition, regulators lowered the minimum capital requirements all S&Ls had to meet.

Neither banks nor LICs faced a comparable decline in net worth.

As capital declines or capital forbearance grows, a firm has an increasing incentive to pursue an aggressive strategy. This is because the firm's capital acts as a deductible payment in a traditional insurance arrangement. In this context, the chance of losing the value of the owners' stake in the firm reduces the incentive to hold risky assets.¹⁰ A firm with little or no capital, however, has little or nothing to lose by pursuing a gambling strategy. This explains why many insolvent S&Ls invested heavily in junk bonds during the 1980s. If the investments paid off, the institution's owners reaped the rewards; if the returns were low, the losses were passed on to the deposit insurer.

Figure 3 compares S&L and LIC book value capital ratios from 1975 to 1991. LIC capital ratios fluctuated between 8.0 and 9.3 percent over the period but exhibited little trend. By contrast, S&L capital ratios, computed using tangible accounting principles, fell sharply after the 1979-1982 recession. Since S&Ls are more exposed to interest rate changes than banks or LICs, they suffered massive losses when interest rates rose in the late 1970s and early 1980s. This capital shock exacerbated the moral hazard problem.

Federal versus state guarantees

S&Ls' guarantees are administered by the federal government and carry the implicit backing of the U.S. Treasury. This fact is widely known and inspires near-universal confidence. By contrast, LICs' guarantees are administered by their respective states and carry no comparable backing. These guarantees are not as well publicized as federal deposit insurance and seem to inspire less confidence in policyholders. As a result, insurance companies are more sensitive to the impact of poor financial health and asset risk on their ability to raise funds.

Three cases from the life insurance industry support this interpretation. Mutual Benefit of New Jersey, like other LICs in that state, had no government guarantee on its liabilities. In early 1991, the company's asset quality problems led its GIC holders to surrender their contracts. The asset writedowns at First Executive Corporation in early 1990 were followed by policyholder liquidity runs at its life insurance subsidiaries in New York and California. Apparently lacking faith in the guaranty fund system, policyholders

increased their surrender requests from the New York subsidiary after the regulatory seizure of First Executive Corporation's California unit in April 1991. Another New York example is the case of Mutual Life Insurance Company of New York (MONY). Despite the existence of a guaranty fund, policy and contract holders withdrew more than \$900 million during the third quarter of 1990, reflecting concern about MONY's large real estate exposure. Similar liquidity runs occurred at S&Ls in Ohio and Maryland that were covered by state deposit insurance funds.

No such panic has occurred in federally insured S&Ls. Depositor confidence in the FSLIC, or at least in the implicit backing of the U.S. Treasury, has remained sufficiently high to prevent runs.¹¹

Breadth of coverage

Because of the breadth of de facto coverage, S&Ls are able to use fully insured deposits as their primary source of funds. Congress increased deposit insurance coverage in 1981 to \$100,000 per depositor per institution. Moreover, all uninsured depositors have received full reimbursement in resolutions not culminating in liquidation. Some of the asset growth by S&Ls in the 1980s was financed by brokered deposits. These funds allowed S&Ls to draw deposits from the national market without giving up the benefit of federal deposit insurance coverage.

By contrast, while some LICs used GICs and single premium deferred annuities (SPDAs) during the 1980s to facilitate growth, these instruments have not received the same level of government backing as did brokered S&L deposits.¹² In several cases, failure resolutions have imposed losses on LIC creditors in the form of delays in repayment and loss of interest. Unlike traditional life insurance products, GICs and SPDAs could be put back to the company at face value. This fact helps explain why the run on Mutual Benefit of New Jersey was started by GIC holders.

Monitoring

Financial institutions may face losses as a result of the failure of a competing institution. In the deposit insurance system, all banks and S&Ls pay upfront for deposit insurance. LIC state guaranty funds make these losses explicit in that surviving LICs pay the costs of a resolution. LICs can reduce these costs by pressuring regulators to tighten enforcement of safety and soundness regulations. In some states, LICs can also pass resolution costs on to taxpayers through

premium tax credits. Brewer, Mondschean, and Strahan (1992) found that in states where premium tax credits do not exist, LICs hold safer portfolios. This is strong evidence that when guaranty systems provide incentives for self-monitoring, they reduce risk-taking and increase industry stability. Calomiris (1989) reached a similar conclusion in his study of antebellum deposit insurance systems. He found that self-regulating mutual liability systems achieved stability and survived financial panics.

Free rider problems

The size of a government insurance fund may also influence the behavior of its members. Larger systems will face greater free rider problems, which lead to less monitoring and weaker enforcement of regulations. As noted earlier, in state guaranty systems, surviving firms pay the costs in the event of failure. In the federal deposit insurance system, taxpayers provide financial backing, yet member institutions also bear some of the costs associated with widespread failures. In fact, the FDIC tripled its fees in the aftermath of the FSLIC's bankruptcy and the deterioration of the reserves in the Bank Insurance Fund. Thus in both systems, firms have an incentive to reduce the costs associated with these government guarantees. But individual firms have more at stake in smaller, state-administered life insurance guaranty funds. As a result, LICs have a greater incentive to pressure regulators to enforce constraints on high-risk behavior.¹³

Conclusions and policy prescriptions

The recent failures of several large insurance companies have raised concerns about the soundness of the life insurance industry. The industry's overall portfolio risk appears to have increased during the 1980s. Moreover, LICs with lower capital ratios have higher concentrations of junk bonds and commercial real estate than do well-capitalized LICs. In response to the liquidity runs in the early 1990s, the life insurance industry has restored profitability and raised new capital. The experiences of the life insurance industry stand in stark contrast to the disastrous problems that S&Ls experienced and suggest some conclusions about how to contain risk-taking of depository institutions.

Like S&Ls and banks, life insurance companies may succumb to moral hazard because government guarantees weaken the incentive for creditors to constrain firm risk-taking. Our research indicates that the use of premium tax

offsets for guaranty fund assessments encourages LICs to increase portfolio risk. In addition, concerns about liquidity runs have caused LICs to reduce their holdings of risky assets and improve capital ratios. These findings suggest a number of policy prescriptions that could help improve the safety and soundness of the life insurance industry. First, since government backing makes life insurance policies more attractive, LICs should pay for access to the guarantees. Premium tax offsets for the costs of resolving failures tend to lead to less industry monitoring because surviving LICs can pass a larger portion of the costs of resolving failures onto taxpayers. These offsets should be eliminated. Finally, regulators could increase market discipline by encouraging LICs to finance a portion of their assets with puttable, uninsured liabilities such as guaranteed investment contracts.

Despite these weaknesses in the regulatory structure of LICs, it also contains strengths that should be extended where possible to depository institutions. For instance, risk-taking may be contained by encouraging financial institutions to monitor each other and thus reduce the need for costly regulation. What is crucial is aligning the incentives of taxpayers and financial institutions to reduce the cost of government guarantees. We believe that state guaranty funds create fewer

incentive problems than does deposit insurance because they encourage self-monitoring to minimize the potential costs of LIC failures. The behavior of financial institutions also may be more effectively controlled by complementing regulatory oversight with market discipline. Discipline could be imposed by a specific class of creditors which is willing to monitor financial institution risk and bear the risk of loss.

The FDIC Improvement Act of 1991 (FDICIA) extends some of the features that exist in the LIC industry to depository institutions. The act improves monitoring with the requirement that all depository institutions, regardless of size, that are determined to have insufficient capital must be closed, recapitalized, or otherwise restructured. These provisions for prompt corrective action allow bank regulatory agencies to intervene early and thus reduce the exposure of the deposit insurance fund to losses. Other provisions of the act authorize the FDIC to implement a system of risk-based deposit insurance with premiums related, in part, to the cost of future bank failures. Thus banks have greater incentives to monitor each other to keep deposit insurance assessments down. As the experience of the life insurance industry has indicated, private monitoring can reduce the cost of government guarantees.

FOOTNOTES

¹See Resolution Trust Corporation (1993).

²The term *life insurance company* refers throughout this article to firms classified as life and/or life-health insurance companies.

³General account assets equals total assets minus separate account assets. Separate accounts are defined as groups of assets designed as backing for specific obligations in which the investment risk is borne by the policyholder, and the insurer's guarantee is limited to mortality and expense charges (see Saunders 1986).

⁴To be considered a "high" junk bondholder, an LIC in our sample must have a junk bond-asset ratio of 6.6 percent, the industry average at year-end 1990. The remaining LICs were classified as "high" commercial mortgage loan holders if their commercial loan-asset ratio was greater than or equal to 21.6 percent, the industry-wide average at the end of 1990. The rest were classified as "others."

⁵Fenn and Cole (1992) analyze the impact of policyholder behavior on the market value of insurance companies in the event of an insolvency.

⁶See Barrese and Nelson (1992).

⁷Harrington (1991) makes this point for property-casualty companies, which also benefit from state guaranty funds.

⁸LICs were not immune to the effects of high interest rates. Because insurance policyholders had incentives to take out policy loans at below-market interest rates, LICs suffered from disintermediation. (Curry and Warshawsky 1986).

⁹See Kane (1989) for a discussion of the theory of moral hazard as applied to S&Ls. For empirical evidence on the subject, see Brewer and Mondschean (1993a) and Barth, Bartholomew, and Labich (1989).

¹⁰See Furlong and Keeley (1989) for an analytical derivation of this result.

¹¹There is some evidence of a loss of confidence in FSLIC insurance. Both Brewer and Mondschean (1992) and Strahan (1993) show that weak S&Ls paid higher rates for both wholesale and retail deposits than did well-capitalized institutions. Moreover, Strahan shows that weak S&Ls that did not raise their rates faced deposit outflows.

¹²Todd and Wallace (1992) detail the growth of GICs and SPDAs during the 1980s.

¹³These free rider problems may be contained by organizations such as the Community and Savings Banks of America and the American Bankers Association.

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