
Life Insurance Company Investment Portfolio Composition and Investment Regulation

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Abstract: Has the investment portfolio composition of life insurance companies shifted over time? Does regulation impose a binding constraint on portfolio investments? Data for 55 life insurance companies (stock, mutual, and fraternal) has been analyzed to answer these questions. The study concludes that for bonds and real estate, the investment percentage has not changed significantly over time. However, for stock, mortgages and “other” assets, the change has been significant. Of note, there has been a substantial increase in the use of the “other” asset account. Regulations focusing on permissible investment percentages do not seem to have imposed a binding constraint.

INTRODUCTION

Total assets of life insurance companies have significantly increased during the last decade. On an aggregate basis, the total asset size of the industry has nearly doubled—from 1.13 trillion dollars in 1988 to 2.09 trillion dollars in 1995 (Board of Governors of the Federal Reserve System). Given this substantial increase in investable dollars, one wonders where the money has been invested.

Historically, life insurance companies have been quite conservative in their investing activities. Since the introduction of variable rate policy products in the early 1980s, two distinct investment “tracks” have developed—general fund accounts and separate accounts. Premiums for whole life policies are still invested by the life insurance company via a general

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account, and the insurer retains the investment risk. Variable rate policyholders are allowed some control over the investment choices and retain some of the investment risk. Therefore, the premiums for the variable rate types of policies are invested by the insurer, via separate accounts for each policyholder. Since the inception of variable rate policies, the market share of whole life has declined, but still represents over one-half of the policies sold. This study focuses on the general account, whole life premium investments of life insurers.

The insurance industry is regulated at the state level. However, most states are willing to accept the results of financial examinations performed by the regulators in a company's domiciliary state in order to avoid excessive duplication of effort. Life insurance company investment activities fall under the regulatory umbrella and are thus artificially constrained by non-market limits. The authors are interested in determining whether these regulatory constraints are truly binding.

In order to address these issues, this study examined the largest 50 stock and mutual life insurers and the 5 largest fraternal life insurers. Individual company asset allocations were analyzed over the period 1988 to 1995. The initial analysis examined all companies as a group, using regression and difference of means techniques. To address the issue of regulatory influence, the 55-company data set was subdivided by state of domicile. The portfolio compositions were analyzed using ANOVA to determine what, if any, differences existed across regulatory jurisdictions.

LITERATURE REVIEW

Considering that the total asset holdings of the life insurance industry in 1995 exceeded 2 trillion dollars, one would have expected substantial research in the area of life insurer investment portfolio asset allocation. However, to date, very little has been done.

Orson H. Hart (1965) expressed the view that regulations notwithstanding, life insurance companies are by nature predominantly long-term, fixed-income investors. As such, they would not have invested greater amounts in equities even if permitted to do so by state laws. Hart's position reaffirmed the philosophy expressed by Bailey in his famous 1862 paper—that is, that a life insurer's primary responsibility is to safety and soundness rather than investment return.

In a 1968 book, Lawrence D. Jones examined life insurance company portfolio selection by focusing primarily on the relationship between asset selection and interest rates. He discussed the impact of both internal investment goals and external constraints, including regulations, on invest-

ment decisions. For his analysis, Jones used 1946–1964 aggregated industry data and information related to the larger companies in the industry.

One of the most interesting findings of Jones's study was his conclusion that "the primary effect of statutory investment regulations and the rules governing asset valuation has been to restrict life companies willing to accept more investment risk from doing so" (Jones, p. 543). Jones went on to conclude that had there not been statutory restrictions, life insurance companies would have invested considerably more in corporate equity shares. Jones's conclusions are directly opposite to Hart's view.

Robert A. Rennie (1977) analyzed life insurance company investment strategies between 1952 and 1975. He concluded that changes in portfolio choices were shaped by both internal and external factors. Although no statistical analysis was performed, comparisons were made of the portfolio mix of the industry as a whole during the 1952–1975 period. Rennie concluded that strategic investment decisions of individual companies were conditioned upon their relative financial strength, top management's attitude towards risk and risk taking, and unique considerations involved in forward commitments. According to Rennie, "life insurers acquire most of their corporate bonds and mortgages by first extending commitments to the borrowers seeking such funding" (Rennie, p. 31).

Although Rennie noted significant growth in common stock holdings by life insurers, especially in the early 1970s, most of this growth is attributable to the increase in separate accounts. Rennie stated, "The percentage of common stocks in the regular portfolios was less at the end of 1974 than it had been in 1960" (Rennie, p. 8).

Mendes Hershman (1977) analyzed the impact of regulation on life insurer investment activities by concentrating on the New York laws, which historically have been the most restrictive. He examined the impact of regulation on levels of investment in corporate debt, mortgages, real estate, and preferred and common stock. Hershman concluded, from the industry's attempts to liberalize the quality restrictions on corporate debt, that these restrictions may have had some limiting effect on investments in lower-grade bond issues. However, as most companies, at the time of his study, had "not taken significant advantage of the leeway provision to invest in securities which did not meet earnings requirements" (Hershman, p. 327), this effect appears to be small.

At least in 1976, the limitations on levels of investment in mortgages of 50% were not even close to being binding, as the industry aggregate investment in mortgages was running at around 31%. Similarly, companies in the aggregate have never reached allowable limits in investments in real estate held for the purpose of income generation. Hershman's conclusions as to the impact of statutory limits on the levels of common stock invest-

ment were the same as Hart's (1965)—that is, they make little difference for most insurance companies.

However, Hershman considered the effects of reserve requirements for common stock to be significantly limiting. Since common stock must be valued at market value at year-end, and the maximum limit on the reserve account is one-third of the value of the stock holdings, common stock holdings can have an immediate and negative impact upon reserves and surplus. This tends to discourage investment in equities and to reinforce the industry's traditional attitudes about investment policy.

John D. Stowe (1978) analyzed the portfolio mix of the 92 largest life insurance companies (as of 1971) over the time frame 1957–1971. He examined holdings in bonds, mortgages, total fixed-income securities, and common stock as percentages of total assets. These variables were regressed against surplus levels, corporate debt yields, the ratio of mortgage to corporate debt yields, and dummy variables for company organizational type and whether the company was licensed or domiciled in New York. Stowe found that the level of surplus was the most important exogenous variable.

A recent article by Cummins, Phillips, and Smith (1997) examined the use of financial derivatives in the insurance industry using 1994 statements filed with the NAIC. The authors found that for the life insurance industry, derivative usage was reported by 12% of the 1207 companies in their data set. In the largest quartile of companies, 38% reported using derivatives, while only 0.66% of companies in the smallest quartile reported using derivatives. The study reported that interest rate swaps are the most frequently held derivative; however, a number of companies also reported using other financial risk management tools such as interest rate caps and floors as well as bond futures.

FINANCIAL SERVICES INDUSTRY COMPARISONS

Aggregate data for banks, credit unions, pension funds, and life insurers were obtained for 1988 and 1995 from the Board of Governors of the Federal Reserve System *Flow of Funds Accounts* and are presented in Table 1. Selected asset categories are shown as percentages of total assets for each industry. The data in Table 1 indicate that there are differences in the portfolio compositions of the various financial institutions.

The investment choices available to banks and credit unions are severely limited by law, almost completely excluding corporate equities and non-investment-grade corporate bonds from consideration. Thus, the majority of assets for banks and credit unions are held in U.S. government

Table 1. Financial Services Industry Comparisons

	Banks		Credit Unions		Pension Funds		Life Insurers	
	1988	1995	1988	1995	1988	1995	1988	1995
Total Assets (billions)	2940.27	4487.58	192.80	310.66	1375.30	2651.61	1132.94	2086.76
Percentage of Total Assets								
U.S. Government Securities	12.26%	16.63%	11.19%	20.62%	14.90%	14.83%	11.85%	16.82%
Municipal Securities	5.16%	2.08%	NR	NR	0.03%	0.02%	0.81%	0.57%
Corporate and Foreign Bonds	3.03%	2.47%	NR	NR	9.04%	9.97%	40.38%	41.69%
Mortgages	23.02%	24.29%	19.74%	21.39%	1.21%	0.63%	20.55%	9.94%
Corporate Equities	0.00%	0.11%	NR	NR	35.28%	44.28%	7.89%	16.49%
Mutual Fund Shares	0.00%	0.05%	0.71%	0.91%	1.61%	8.97%	1.63%	1.33%

NR = Not Reported; line item is not reported.

Source: Board of Governors of the Federal Reserve System *Flow of Funds Accounts*.

securities and loans, primarily mortgages. Consistently, banks held approximately one-fourth of their assets in mortgages. However, between 1988 and 1995, banks increased their holdings of U.S. government securities, while decreasing their holdings of municipal securities. Over the same period, credit unions approximately doubled their holdings in U.S. government securities, such that the amount is nearly equal to their holdings in mortgages.

Pension fund holdings of corporate equities increased from 35.28% to 44.28% between 1988 and 1995. Their mutual fund shares holdings increased from 1.61% to 8.97%. These numbers reflect the fact that the investment activities of pension funds, unlike those of banks and credit unions, are not regulated. Life insurers' portfolio holdings of corporate and foreign bonds have been relatively stable at around 40%, while their equity holdings have increased from 7.89% to 16.49%. Life insurer investment activities are regulated, but life insurers are allowed greater latitude in selecting investments than are banks and credit unions. (See Thygerson [1995] for an explanation of financial services regulations.)

DATA

The majority of life insurance companies can be classified as one of three types: stock companies, mutual companies, or fraternal. Recognizing this, the authors wished to include representative companies of all three types in the data set. Since the study examines changes in investment portfolios, and larger companies are generally thought to be the most likely to adopt new ideas, techniques, and technology in portfolio management, the largest of each type of life insurer were selected for inclusion in the study.

Using year-end 1995 total asset values, the 50 largest stock and mutual companies were selected using *Ward's Insurance Results Life-Health, 1996*. In order to include a representative sample of fraternal, data for the five largest fraternal organizations were also included in the study. One stock company, AUSA, was dropped from the data set because of the extreme difficulty in tracing its identity through mergers during the time period of the study. Therefore, the final data set (see Appendix) contains 49 of the largest 50 stock and mutual insurers, plus the five largest fraternal insurers, for a total of 54 companies.

There are more than 1750 life insurance companies as of year-end 1995, with a total aggregate asset size of 2.09 trillion dollars. While the 54 companies included in this study represent about 3% of the number of life insurers, their total assets comprise nearly 72% of the total aggregate assets held by the industry.

In collecting the data set used for this study, two primary factors were considered. First, because the data set is based upon the 50 largest stock and mutual life insurers and the top five fraternal insurers as of year-end 1995, the most recent year for which data were available, mergers and acquisitions in prior years had to be considered. The more years included in the data set, the more noise encountered from such activity. Even since 1988, seven of the companies included in the study were involved in at least one merger or acquisition.

Second, the major market correction, which occurred in the U.S. stock market in October of 1987, placed a backward limit on the data set. That correction severely affected almost all investors in the market quite near the end of the year, causing 1987 data to be abnormal. This study, therefore, begins with 1988 data.

The five categories of investments considered in this study are: bonds, mortgages, real estate, stocks, and "other" assets. The category of stocks includes both common and preferred stocks. "Other" assets include separate account holdings, cash and short-term investments, and all other investment activities not otherwise accounted for, such as derivatives. The

percentages of admitted assets invested in bonds, stocks, and “other” assets were taken directly from the 1993 and 1996 editions of *Best’s Key Rating Guide Life-Health*. The *Rating Guide* contains five years of data in each volume, but it combines mortgages and real estate into a single category. For this reason, the mortgages and real estate percentages were derived from various editions of *Best’s Insurance Reports Life-Health*. For the 1988–1992 data, the percentages of admitted assets invested in mortgages and real estate were taken directly from the 1989–1993 editions of *Best’s Insurance Reports Life-Health*. After 1993, *Best’s Reports* ceased to provide these percentages directly. The 1993–1995 mortgage and real estate investment percentages, therefore, were computed from the balance sheets in the 1994–1996 editions of *Best’s Reports*.

Ward’s and Best’s provided the state of domicile and licensed territories for these companies. While insurers licensed in more than one state must obey the regulations of all states in which they operate, the state of domicile is the most important state as far as financial regulation is concerned, since most states have reciprocal agreements to accept the state of domicile’s regulatory controls. Not all states, however, have such agreements. New York is the most commonly recognized exception.

The National Association of Insurance Commissioners (NAIC) provided the information on statutory limits on investments in mortgages, real estate, and stocks for each state. Non-mortgage bonds are limited only as to quality; they are not capped in terms of a percentage of admitted assets or capital and surplus. The NAIC provided information that was current as of 1993; more recent data were unavailable.

METHODOLOGY AND RESULTS

Single Group Analysis

Table 2 provides arithmetic averages, standard deviations, minimums, maximums, and medians per year for each investment category for the 54 companies included in the study. It is clear from this table that bonds are the dominant investment of life insurance companies, on the basis of average percentage investment, followed by “other,” mortgages, stock, and, finally, real estate. According to standard deviations, minimums, and maximums, it is clear that these 54 companies have made a wide range of investment choices.

A graphical representation of average investments in each category over time is provided in Figure 1. From this graph and Table 2, one can conclude that bond investment is fairly constant over time—about 55%. The next largest category of investments is the “other” category, the average

Table 2. Descriptive Statistics of Selected Asset Categories Over Time

	Bonds	Mortgage Loans	Real Estate	Stocks	Other Assets
1988					
Average	54.85	17.12	1.92	5.23	21.72
Standard Deviation	19.94	12.80	1.77	7.85	13.14
Minimum	3.80	0.00	0.00	0.00	2.70
Maximum	91.20	47.00	6.00	43.20	71.30
Median	55.45	18.00	1.50	3.00	20.85
1989					
Average	54.99	16.56	1.83	5.13	21.61
Standard Deviation	20.63	12.34	1.78	7.74	14.08
Minimum	1.80	0.00	0.00	0.00	3.10
Maximum	91.30	43.00	7.00	40.30	75.70
Median	52.35	18.00	1.00	3.10	18.90
1990					
Average	55.58	14.80	1.67	4.06	22.16
Standard Deviation	21.07	11.34	1.71	5.28	14.88
Minimum	1.60	0.00	0.00	0.00	2.30
Maximum	92.30	41.00	7.00	31.00	72.40
Median	52.75	17.50	1.00	2.65	19.75
1991					
Average	54.11	14.22	1.83	3.14	24.60
Standard Deviation	21.00	10.37	1.85	2.96	16.16
Minimum	0.00	0.00	0.00	0.00	0.00
Maximum	92.70	38.00	7.00	12.10	70.20
Median	55.05	16.00	1.00	2.55	21.30
1992					
Average	55.16	12.57	1.91	3.11	24.98
Standard Deviation	21.18	9.40	2.05	2.83	16.70
Minimum	0.00	0.00	0.00	0.00	0.00
Maximum	92.00	34.00	9.00	13.10	72.90
Median	55.40	14.00	1.00	2.70	21.65
1993					
Average	54.61	10.63	2.04	3.22	27.40
Standard Deviation	22.10	8.04	2.32	3.05	20.48
Minimum	0.00	0.00	0.00	0.00	0.00
Maximum	92.10	29.50	12.40	13.80	87.70
Median	56.10	10.90	1.40	2.70	23.40
1994					
Average	55.43	10.01	1.98	3.21	29.74
Standard Deviation	20.72	7.47	2.65	3.20	20.56
Minimum	17.60	0.00	0.00	0.10	3.50
Maximum	95.60	27.60	16.70	14.00	82.30
Median	52.30	9.40	1.35	2.60	27.95
1995					
Average	54.28	8.99	1.76	3.34	32.08
Standard Deviation	21.42	7.23	2.39	3.22	21.84
Minimum	13.90	0.00	0.00	0.10	4.00
Maximum	92.90	27.40	15.30	16.00	85.70
Median	48.90	7.90	1.15	2.75	31.00

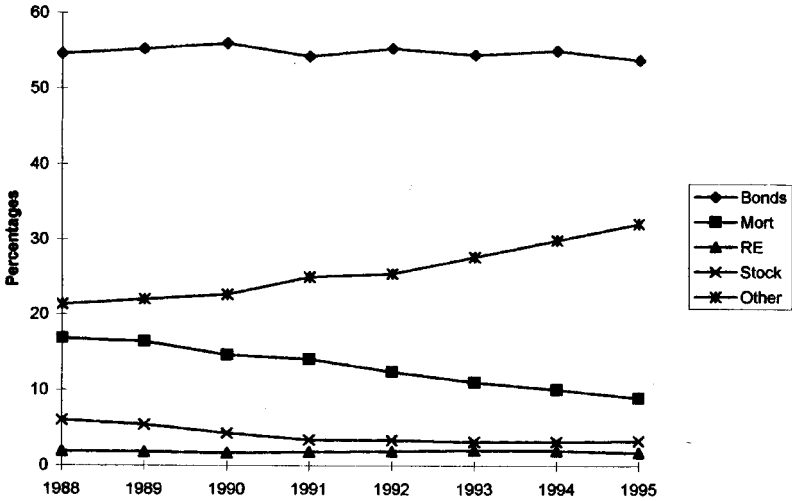


Fig. 1. Life insurer investment levels in selected asset categories over time.

of which increased every year during the study. It is apparent from Figure 1 that the rate of increase in “other” assets was relatively slow for the first few years, but increased substantially after 1992. The investment percentage for mortgages exhibits a steady decline throughout the period of the study, from a high of 17.12% in 1988 to 8.99% in 1995. Investment in stocks also declined throughout most of the period. The rate of decline was more dramatic during the 1988–1991 period than during the last half of the time period. Real estate remained relatively constant throughout the period, ranging from 1.67% to 2.04% of the portfolio.

In order to determine whether these trends are significant, the authors regressed the individual company portfolio percentages (not the group averages) on time and time squared. Table 3 reports the results of the linear regression and whether the results were statistically significant at the 5% level. None of the regressions on time squared were statistically significant and so do not appear in Table 3. The results shown in Table 3 verify that any changes in bonds and real estate are not significant over time, while the observed changes in percentage investment in mortgages, stocks, and “other” are statistically significant.

Noticing that the rates of change in mortgages, stocks, and “other” appeared to alter about the middle of the time period studied, the authors split the data set into two four-year periods. It is interesting to note that these rate changes coincide with three major events. First, the economy was coming out of a recession in the 1991–1992 time period. Second, the

Table 3. Regression Results of Investment Percentage vs. Time

Asset Type	Constant	Time
Bonds	55.253*	-0.111
Mortgages	17.175*	-1.175*
Real Estate	1.798*	0.011
Stock	5.377*	-0.397*
Other	20.327*	1.557*

*Significant at the 5% level

commercial real estate market was experiencing serious difficulties, especially in the northeastern states. Third, the NAIC adopted their risk-based capital (RBC) standards model law. While not binding in a legal sense, this model law nonetheless can be expected to have some impact upon life insurer financial behavior.

Table 4 shows the results of *t*-test analyses comparing the investment percentages in each category in the 1988–1991 period to those of the 1992–1995 period. The differences between the average levels of investment for the two time periods are significant only for the mortgages, stocks, and “other” categories. The decline in mortgages is logical in light of the problems in many major U.S. real estate markets and the decline in interest rates, which resulted in a high rate of mortgage prepayments. The stable investment level in bonds, however, appears to indicate that bond investment decisions are relatively insensitive to changes in interest rates over time. The increase in the rate of change in the “other” category may well be linked to NAIC’s RBC model law. Insurers may be moving money from targeted investment categories into those not specifically mentioned in the law or those categories for which the capital requirements are lower, such as cash and short-term investments. These findings may indicate that life insurance companies are beginning to take more advantage of the leeway provisions in the statutes than they were during the time frame of the Hershman (1977) study.

State of Domicile Analysis

Recognizing that there has been a change over time in the portfolio mix of the 54 companies, the authors wish to explore one potential explanation of these changes. As mentioned in the data section, the state of domicile is the most important state for financial regulatory effects. Therefore, the authors have divided the sample by state of domicile. The state with the largest number of companies was New York with eight, followed

Table 4. Results for Difference of Means Tests of Selected Asset Categories for Two Subperiods, 1988–1991 and 1992–1995

BONDS	1988–91	1992–95	MORTGAGES	1988–91	1992–95
Mean	55.0291	54.6977	Mean	15.4818	10.6459
Variance	418.0972	446.4055	Variance	137.2227	67.8247
t Stat	0.1672		t Stat	5.0091	
P(T ≤ t) two-tail	0.8673		P(T ≤ t) two-tail	0.0000	
t Critical two-tail	1.9654		t Critical two-tail	1.9654	
REAL ESTATE	1988–91	1992–95	STOCKS	1988–91	1992–95
Mean	1.7795	1.8909	Mean	4.7436	3.2295
Variance	3.1282	5.4692	Variance	49.0952	9.9604
t Stat	-0.5633		t Stat	2.9224	
P(T ≤ t) two-tail	0.5735		P(T ≤ t) two-tail	0.0037	
t Critical two-tail	1.9654		t Critical two-tail	1.9654	
OTHER	1988–91	1992–95			
Mean	22.7505	28.7986			
Variance	217.8432	397.4581			
t Stat	-3.6165				
P(T ≤ t) two-tail	0.0003				
t Critical two-tail	1.9654				

by Connecticut with seven, and four each in Illinois and Minnesota. Since a minimum of four companies was required to generate sufficient observations for statistical analysis, the remaining 31 companies were grouped together and labeled as “Other States” in Tables 5 and 6. Specifically, these 31 companies were domiciled in the following 20 states: Arizona, California, Delaware, Georgia, Indiana, Iowa, Maine, Massachusetts, Michigan, Missouri, Nebraska, New Jersey, North Carolina, Ohio, Rhode Island, Tennessee, Texas, Virginia, Washington, and Wisconsin.

Table 5. State Statutory Limitations* on the Percentage of the Investment Portfolio Allocated to Mortgages, Real Estate, and Stocks

State	Mortgages	Real Estate	Stocks
Other States**	10% to No Limit	5% to No Limit	10% to No Limit
New York	25%	12.5% investment 10% offices	10%
Connecticut	No Limit	10%	25%
Illinois	60%	No Limit	100% Capital & Surplus
Minnesota	25%	25%	25% 30% Stock + Real Estate

*Limits derived from 1993 NAIC Tables.

**Figures represent the range of limitations in states of domicile included in our study: AZ, CA, DE, GA, IN, IA, ME, MA, MI, MO, NE, NJ, NC, OH, RI, TN, TX, VA, WA, WI.

Table 5 presents a summary of state statutory limitations on selected investment activities. This table was generated from information provided by the NAIC. Separate entries are listed for those states where there are four or more companies domiciled: New York, Connecticut, Illinois, and Minnesota. The remaining states are grouped into "Other States" and ranges of statutory limitations are provided.

A general review of the state laws shows that different states emphasize different asset categories in their investment regulations. There are no states that fail to regulate investment activities. However, within each asset category the range of limitations is substantial. For example, some states place more stringent limitations on real estate and very few limits on mortgages, while other states regulate both categories more equally.

Bonds are not regulated as to quantity, and only quality considerations are important; therefore, bonds are excluded from Table 5. Mortgages are regulated as to permissible loan-to-value ratios, percentage invested in any one property's mortgages, and the percentage of the investment portfolio allowed. The numbers in Table 5 under the column headed "Mortgages" refer to the percentage of admitted assets that may be invested in mortgages and mortgage instruments. There is a substantial range of permissible percentages across the various states. Of the specific states selected, Connecticut is the least restrictive in this investment category, with no limit placed on mortgage investment. In contrast, New York and Minnesota limit mortgage investments to 25% of admitted assets. The range in the "Other States" group runs from a low of 10% to a high of "no limit." Of the 20 states

included in “Other States,” 13 have “no limit” statutes for mortgages. Clearly, most states have considered mortgages one of the safer investment categories.

In contrast, real estate is more stringently regulated. There are three states that limit real estate holdings to no more than 5% of admitted assets and only three states that place no limits on holdings. Some states, in regulating real estate investment, split limits along types of holdings. For example, New York limits real estate holdings for the purpose of investment income to 12.5% and holdings for the company’s own office space to 10% of admitted assets.

The data set used in this study combines common and preferred stocks in the stocks category. The numbers in the column headed “Stocks” in Table 5 refer to limits on common stock holdings. For almost all of the states included in this table, the lower limits, and hence those most likely to be binding, are for common stocks rather than preferred stocks. The variation in the language of the laws governing stock investments is much greater than that for the other investment categories. The basis of limitations also varies across states. For example, Illinois, among others, limits stock investments in terms of a percentage of capital and surplus rather than admitted assets. Some other states, such as Minnesota, place an aggregate limit on the combined totals of stock and real estate investments. Unless otherwise noted, the numbers in Table 5 refer to percentage of admitted assets.

Table 5 does not contain information on limitations placed on the category of “other,” because such information was unavailable from the NAIC. Generally, this category contains assets such as separate account holdings, cash, and short-term investments. Many states have “basket” or “leeway account” laws, which permit companies with sufficient surplus and reserve holdings to invest limited amounts in assets that are not permitted under other sections of the insurance statute. The paper by Cummins, Phillips, and Smith (1997) gives some indication that, for at least some life insurance companies, the “other” category also includes investments in derivatives.

While Table 5 provides information on the regulatory differences between the groups of states, Table 6 presents the results of an ANOVA analysis to determine if there are statistically significant differences in the portfolio compositions across these groups. The left side of Table 6 presents summary information across state of domicile groupings by investment category. The “Count” number represents the number of observations in each group. For example, the number 248 for “Other States” is derived from the 31 companies \times eight years of data. The column labeled “Average” is the arithmetic average of all the observations in the group. The column labeled “Variance” is the variance within the group.

Table 6. ANOVA Results by State for Selected Investment Categories

BONDS SUMMARY					BONDS ANOVA						
Groups	Count	Sum	Average	Variance	Source of Variation	SS	df	MS	F	P-value	F crit
Other States	248	14723.4	59.369	488.717	Between Groups	19250.229	4	4812.557	12.222	2.03809E-09	2.393
New York	64	2737.0	42.766	181.186	Within Groups	168130.401	427	393.748			
Connecticut	56	2596.5	46.366	311.580	Total	187380.630	431				
Illinois	32	1914.9	59.841	424.461							
Minnesota	32	1734.6	54.206	184.108							
MORTGAGES SUMMARY					MORTGAGES ANOVA						
Groups	Count	Sum	Average	Variance	Source of Variation	SS	df	MS	F	P-value	F crit
Other States	248	3041.6	12.265	104.177	Between Groups	1883.160	4	470.790	4.494	0.001446223	2.393
New York	64	1132.9	17.702	82.527	Within Groups	44737.003	427	104.770			
Connecticut	56	781.9	13.963	185.707	Total	46620.162	431				
Illinois	32	326.0	10.188	52.824							
Minnesota	32	382.6	11.956	63.055							
REAL ESTATE SUMMARY					REAL ESTATE ANOVA						
Groups	Count	Sum	Average	Variance	Source of Variation	SS	df	MS	F	P-value	F crit
Other States	248	373.2	1.505	1.981	Between Groups	503.264	4	125.816	39.633	3.11892E-28	2.393
New York	64	280.9	4.389	10.597	Within Groups	1355.539	427	3.175			
Connecticut	56	95.8	1.711	3.031	Total	1858.803	431				
Illinois	32	24.0	0.750	0.154							
Minnesota	32	33.0	1.031	0.878							
STOCKS SUMMARY					STOCKS ANOVA						
Groups	Count	Sum	Average	Variance	Source of Variation	SS	df	MS	F	P-value	F crit
Other States	248	1058.7	4.269	37.021	Between Groups	403.335	4	100.834	4.182	0.002475011	2.393
New York	64	296.3	4.630	11.573	Within Groups	10295.828	427	24.112			
Connecticut	56	91.2	1.629	2.132	Total	10699.163	431				
Illinois	32	109.5	3.422	6.912							
Minnesota	32	87.6	2.738	2.940							
OTHER SUMMARY					OTHER ANOVA						
Groups	Count	Sum	Average	Variance	Source of Variation	SS	df	MS	F	P-value	F crit
Other States	248	5375.2	21.674	261.144	Between Groups	12795.360	4	3198.840	11.142	1.31932E-08	2.393
New York	64	1954.4	30.538	216.274	Within Groups	122588.136	427	287.092			
Connecticut	56	2050.3	36.613	216.864	Total	135383.495	431				
Illinois	32	825.5	25.797	696.059							
Minnesota	32	963.2	30.100	353.386							

The right side of Table 6 contains the ANOVA results for variation between groups by investment category. For all of the investment categories, the reported F values are greater than the critical F value and are statistically significant at the .01 level (based on the P-values).

The average percentage invested in bonds varies from a low of 42.766% in New York to a high of 59.841% in Illinois. Even with this range, it is clear that bonds still make up the bulk of investments by life insurers. Their traditional role as fixed-income investors has not been abandoned. Looking at Table 6, it is possible to rank the state groups from lowest to highest investment in bonds: New York, Connecticut, Minnesota, "Other States" and Illinois. As one would expect, the variance for the "Other States" group, which contains 31 companies, is greater than that for the individual state groups.

The ranking pattern for average investment percentages is almost exactly reversed for investments in mortgages, with Illinois lowest and New York highest. Since this is the reverse of what one would expect, given the limitations listed in Table 5, the portfolio percentage limits apparently are not what drives life insurer investment in mortgages. As for the variances across state groups, Connecticut's variance implies that there are greater differences between companies in their mortgage holdings in that state than there are for the other state groups.

The group averages for investment in real estate shown in Table 6 are all well below even the most stringent state limitation. The average for New York, which at 4.389% is more than double the average for any other state group, is still less than half of the limit placed on company offices alone. Although the average for New York is high, so is the variance, which implies that there are substantial differences in the real estate holdings across the companies domiciled in New York. Illinois, which has no limit on real estate, has the lowest group average, at 0.750%. Illinois also exhibits the smallest variation across company holdings. It is interesting to note that both the average investment and variance are quite low for the "Other States" group. The most restrictive limitation for any of the 50 states, not just the states of domicile in Table 5, allows for a 5% investment in real estate. State limits on real estate investments, therefore, appear to be non-binding constraints. These results are consistent with Hershman's 1977 study.

The information in Table 6 on stock investments shows that there is a fairly wide variation across state groups, though the differences are not as great as for real estate. New York has the highest average investment in stocks despite having one of the more restrictive limitations on stock holdings, as shown in Table 5. Table 5 shows that New York allows 10% of admitted assets to be invested in stocks, yet the average for the group is

only 4.630%. If this were a binding constraint, the average investment values would more closely approach the upper limit. All of the other state groups are even further below their statutory limits. These results are consistent with Hart's (1965) view of life insurer investment behavior, but counter to Jones's (1968) belief that stock investments would increase if the upper caps were relaxed.

The New York and Connecticut groups have the highest average holdings in the "other" investment category. Four of the eight companies in the New York group are in the top ten largest companies, on the basis of year-end 1995 total assets. Two more of the top ten are domiciled in Connecticut. It may be expected that these ten largest companies have access to more sophisticated investment tools, which in turn enable them to incorporate complex investment instruments into their portfolios. These instruments typically appear in the "other" investment category. Illinois has one of the lower average values, but its variance is not only the largest in the "other" investment category, it is nearly double that of the next highest variance. This indicates that there is a substantial difference in the "other" category holdings across companies domiciled in Illinois.

An alternative examination of the information presented in Table 6 is a state-by-state rather than category-by-category analysis. An examination of the two states (New York and Connecticut) with the largest number of domiciled companies, which are also traditionally considered among the most restrictive regulatory environments, yields some interesting results. New York has the lowest average investment in bonds at 42.766%, but a relatively high average investment in "other" at 30.538%. Although bonds are not expressly regulated, the percentage invested in bonds should be responsive to the availability of alternatives. For example, New York is the domiciliary state for three of the four largest life insurers. These companies are the most likely to engage in highly sophisticated investment activities including experimentation with new types of securities, which would be classified as "other" in this study. This explanation could account for the investment pattern observed for New York.

Companies domiciled in Connecticut display an investment pattern similar to those located in New York, but they have slightly higher percentages in bonds and "other" and they invest less in mortgages, real estate, and stock, despite the more lenient allowances for mortgages and stock investments under Connecticut law. Table 5 shows that Connecticut has "no limit" on mortgages, while New York limits them to 25% of admitted assets. Connecticut allows 25% investment in stocks, compared to New York's 10%. The observed investments are a reversal of the pattern expected on the basis of the insurance laws.

CONCLUSIONS AND IMPLICATIONS

Portfolio compositions of financial institutions changed between 1988 and 1995, as demonstrated in Table 1. However, these shifts occurred in different asset categories, depending upon the type of financial institution involved. The 54 life insurance companies included in this study represent about 3% of life insurers, with total assets comprising nearly 72% of the total aggregate assets held by the industry. The results of this study do not differ greatly from the data presented in Table 1 for life insurance as an aggregate group, except in the corporate equities holdings, as discussed below.

On balance, the results of this study agree with the findings of Robert A. Rennie's 1977 essay, which examined portfolio asset mixes over the period 1952 to 1975. Specifically, the current study found that bond investment levels shifted little between 1988 and 1995, ranging from about 54% to about 56% of admitted assets. These percentages are very similar to those found for the 1952–1975 time frame. Bonds are still the dominant component of life insurance investment portfolios, and state insurance laws still focus on regulating bond investments in terms of quality rather than quantity.

However, the results of this study (1988–1995) differ from those of Rennie (1977) in that the level of investment in mortgages is, on average, only about half that of the 1952–1975 period. Furthermore, the level of investment in mortgages declined throughout the 1988–1995 time period. This decline could be explained by any or all of several factors: (1) the depressions in several regional real estate markets, which led to higher default rates in those areas; (2) the overall decrease in interest rates, which resulted in the prepayment of many mortgages; and (3) the increased attractiveness of alternative investments after the end of the 1990–1991 recession. State insurance laws limiting the level of investment in mortgages for the four specific states examined (New York, Connecticut, Illinois, and Minnesota) do not appear to be binding. However, for the "Other States" group, such a statement cannot be made, as the average level does exceed that allowed by the most stringent of those state laws.

This study found that real estate holdings remained relatively constant throughout the 1988–1995 time period, with an average value of approximately 2% of admitted assets. If New York is removed, this average is lower. Even though the state statutory limitations for real estate investment are lower than those for the other categories, the average levels observed in each state group are well below these limits. Thus, these limitations do not appear to be binding constraints.

Since the 1950s the regulatory limitations on stock holdings have been relaxed, but there has not been a rush to invest general account funds in corporate equity shares. The investment in common stocks declined from 1988 to 1991 and then leveled off. None of the average levels of investment in common stock approach even the most restrictive legal limit; thus these limits are non-binding constraints. The investment level values in this study, however, are for the general account only, and do not reflect investments for the separate accounts. These results, in conjunction with the aggregate increase in equity holdings exhibited in Table 1, clearly indicate that the 1990s bull market has had a far greater impact upon separate account investments, where the policyholder retains some of the investment risk.

In a recent speech, Brian O'Neil (1996) highlighted a shift toward more investment in separate accounts. He pointed out that the risk levels of the general account have declined since the early 1990s as managers responded to the aftermath of the collapse of several major life insurance companies and the regulatory reaction to those collapses. This managerial behavior is evidenced by the drop in common stock holdings for the general account and by the shift of funds into the "other" category, which contains cash, short-term investments, and derivatives.

The data from Best's group all assets in the "other" category as a single entry. No detailed information on specific asset choices is available. An additional impetus towards increasing investment in the "other" category could well be the NAIC's RBC model law, which requires higher capital standards for some investment categories, such as common stock.

It appears from the data and the above discussions that none of the state limits on any of the investment categories in Table 5 represent a binding constraint. One must wonder why, then, these laws are written in terms of limiting percentage investment.

The answer may be found in regulators' application of the laws. Through discussions with several different state regulatory agencies, the authors have found that, in practice, many regulators view their state statutory limits as upper bounds for life insurers exhibiting the strongest financial condition. Since these regulators have discretion in applying restrictions and punitive actions, their perceptions of what is appropriate are at least as important as the stated upper limits in state laws. It appears, therefore, that the *de jure* limits are being supplanted by regulators' application of lower *de facto* limits.

It could be argued, then, that the state laws should be rewritten to reflect actual regulatory practices. Alternatively, it could be argued that the regulators should allow insurers to increase their holdings up to the stated regulatory limits. In spite of current regulatory practices, there have been

some spectacular failures of major life insurers (e.g., First Executive, Fidelity Bankers Life, and Mutual Benefit).

As economic growth continues, life insurance companies will continue to have more money to invest. The question arises, into what will they invest? If recent history repeats itself, they will continue to place money into bonds and mortgages and to a lesser extent into stocks and real estate. However, they will also place more money into other types of investments, which currently carry no regulatory limits.

On the basis of the above discussion, the authors come down on the side of rewriting the laws to reflect reality—specifically, lower the limits on currently regulated types of investments to reflect the levels applied in actual practice. Laws that more accurately reflect actual regulatory practices would allow the public to more easily determine the risk level of their life insurers. Also, new laws should be carefully drafted to regulate investments in the “other” category, in order to protect the public while not hampering life insurance companies’ ability to manage risk exposures.

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Appendix

Companies Included in the Sample

Company Name	Type	Domicile	Total Admitted Assets (\$000s)	Capital and Surplus (\$000s)
Aetna Life Ins. & Annuity Co.	S	CT	24,298,548	670,747
Aetna Life Insurance Co.	S	CT	46,124,046	1,750,710
Aid Association of Lutherans	F	WI	15,442,524	942,683
Allianz Life Ins. Co. of North America	S	MN	10,906,926	299,186
Allstate Life Insurance Co.	S	IL	24,854,384	1,642,144
American Family Life Asr. Co. of Columbia	S	GA	18,366,860	1,246,397
American Life Insurance Co.	S	DE	12,370,416	1,373,430
Connecticut General Life Ins. Co.	S	CT	57,912,571	2,138,333
Connecticut Mutual Life Ins. Co.	M	CT	12,384,994	527,781
Continental Assurance Co.	S	IL	11,270,186	1,127,685
Equitable Life Asr. Soc. of the U.S.	S	NY	51,399,267	2,202,870
Equitable Variable Life Ins. Co.	S	NY	12,410,450	720,937
First Colony Life Ins. Co.	S	VA	8,513,878	394,332
General American Life Insurance Co.	M	MO	9,566,163	589,783
Guardian Life Ins. Co. of America	M	NY	10,961,011	1,115,023
Hartford Life Ins. Co.	S	CT	46,640,678	1,124,788
IDS Life Insurance Co.	S	MN	35,096,042	1,398,650
ITT Hartford Life & Annuity Ins. Co.	S	WI	8,852,944	238,333
Jackson National Life Ins. Co.	S	MI	24,099,816	1,196,149
John Hancock Mutual Life Ins. Co.	M	MA	50,776,578	2,533,488
Keyport Life Insurance Co.	S	RI	11,597,897	535,177
Knights of Columbus	F	CT	5,775,910	719,058
Lincoln National Life Ins. Co.	S	IN	43,291,890	1,732,853
Lutheran Brotherhood	F	MN	10,953,936	661,022
Massachusetts Mutual Life Ins. Co.	M	MA	38,032,587	2,072,577
MBL Life Assurance Corp.	S	NJ	14,162,665	132,199
Merrill Lynch Life Ins. Co.	S	AZ	11,955,021	303,950
Metropolitan Life Ins. Co.	M	NY	142,131,926	6,564,203
Minnesota Mutual Life Ins. Co.	M	MN	10,057,605	801,565
Modern Woodmen	F	IL	3,258,259	323,626
Mutual Life Ins. Co. of New York	M	NY	11,371,092	689,017
Nationwide Life Ins. Co.	S	OH	35,656,625	1,383,031
New England Mutual Life Ins. Co.	M	MA	16,261,137	623,993
Now York Life Ins. & Annuity Corp.	S	DE	15,976,537	877,862
New York Life Insurance Co.	M	NY	59,414,523	3,756,398
Northwestern Mutual Life Ins. Co.	M	WI	54,873,320	2,786,031
Pacific Mutual Life Ins. Co.	M	CA	17,588,812	723,251
Phoenix Home Life Mutual Ins. Co.	M	NY	12,807,375	675,666
Principal Mutual Life Ins. Co.	M	IA	51,268,198	2,208,404
Provident Life & Accident Co.	S	TN	577,362	566,989
Providian Life and Health Ins. Co.	S	MO	10,062,972	578,494
Prudential Insurance Co. of America	M	NJ	179,734,199	8,667,800
Safeco Life Insurance Co.	S	WA	10,452,146	504,683
State Farm Life Ins. Co.	S	IL	20,342,941	2,210,221
Sunamerica Life Ins. Co.	S	AZ	7,524,053	943,755
Teachers Ins. & Annuity Assn. of Amer.	S	NY	79,794,613	4,056,180
Transamerica Life Ins. & Annuity Co.	S	NC	13,886,571	503,856
Transamerica Occidental Lic.	S	CA	14,121,286	1,115,691
Travelers Ins. Co. (Life Dept.)	S	CT	31,195,567	3,197,666
United of Omaha Life Ins. Co.	S	NE	7,542,903	512,613
Unum Life Insurance Company of America	S	ME	9,933,480	850,778
Variable Annuity Life Ins. Co.	S	TX	25,703,462	926,654
Western National Life Ins. Co.	S	TX	8,628,991	426,106
Woodmen of the World	F	NE	3,983,154	305,335

Sample data for 1995 year-end numbers, *Best's Key Rating Guide, Life-Health*.

