Nebraska Law Review

Volume 48 | Issue 4 Article 3

1969

Life Insurance Prices

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I. INTRODUCTION

Life insurance textbooks refer only briefly to the subject of price competition, and even some of these references contain statements that are inconsistent in certain respects. On the one hand, in discussions of regulation, the statement is sometimes made that life insurance rates generally are not regulated and that competition is felt to be a sufficient protection against excessive rates.[1] On the other hand, in discussions of differences among insurance carriers, the statement is sometimes made that price comparisons in life insurance are sufficiently complex to be well beyond comprehension for the layman.[2]

Taken together, such statements raise an important question: is it possible to have effective price competition when the problem of price analysis is as complicated as it is in life insurance? The purpose of this paper is to examine this question through the analysis of some life insurance price data.

The article is organized in six parts. Following the introduction are discussions of price measurement in life insurance, the manner in which the rate of return on the savings element in cash-value life insurance may be calculated, the relationship between benefits and premiums, the variation in price among companies for essentially the same coverage, and the author's conclusions.

II. PRICE MEASUREMENT

The premium for a life insurance policy is the periodic amount needed to provide a combination of protection and savings for the policyholder. In other words, the different types of life insurance policies may be viewed as different combinations of protection and savings. Even term insurance fits this statement, since it may be viewed as a type of policy that contains little or no savings.

In contrast, the word "price," as it is used in this article, refers to the price of the protection element alone. In order to arrive at the price of the protection in a policy, it is necessary to perform

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1 *See e.g.*, S. HUEBNER & K. BLACK, JR., LIFE INSURANCE 688 (6th ed. 1964).

2 *See, e.g., id.* at 596-98.

certain calculations that separate the protection element of the policy from the savings element, at least in a theoretical sense. Also, if the policy is participating, the so-called dividends must be taken into consideration in computing the price of the protection.

The process of computing the price of the protection element of a life insurance policy involves the making of various assumptions. For this reason, no single price figure can be established as *the* price; rather, any price figure that is determined must be accompanied by a statement concerning the assumptions used in computing that figure.

A. General Nature

The nature of a life insurance price figure may be illustrated by an analogy. Assume that an individual is purchasing a package AB that consists of an item A and an item B. Even if the price of the package AB is given, no single figure can be established as the price of either A or B alone. In order to calculate the price of A, it is necessary to make an assumption about the price of B, and vice versa. Thus, any figure established as the price of A must be accompanied by a statement about the assumed price of B, and vice versa.

In life insurance, the two parts of the package are protection and savings, and any figure established as the price of the protection must be accompanied by a statement about the assumed rate of return on the savings element. Conversely, it is possible to make a statement about the rate of return on the savings element only if an assumption is made about the price of the protection. In this section, an assumption is made concerning the net interest rate at which the savings element could be invested by the policyholder in an alternate savings medium with safety comparable to that found in life insurance. Price data are then developed on the basis of that assumption.

Although several methods of measuring the price of life insurance have been developed, the so-called traditional method (or "net cost" method) has been the most widely used. Under the traditional method, the cash value at the end of some arbitrarily-determined period such as twenty years and the sum of the dividends payable during the period are subtracted from the sum of the premiums payable during the period. The resulting figure is then divided by the number of years in the period.

The traditional method has the important attribute of simplicity, but the combined effect of ignoring certain important factors impairs its reliability. For example, interest is ignored in the traditional method, and this leads to a serious understatement of price. Indeed, it sometimes leads to the absurd conclusion that the twenty-year "net cost" is negative. The traditional method also ignores the fact that the actual amount of protection at any point in time is not the face amount but rather is the difference between the face amount and the savings element, and this also leads to an understatement of price.

A more refined method of price measurement is needed to overcome the deficiencies of the traditional method. One such method—the "level-price" method—is discussed in this section of the article.

The level-price method consists of two stages. The first is the calculation of *yearly* prices per $1,000 of protection, and the second is the calculation of *level* prices per $1,000 of protection.

B. YEARLY PRICES

In the calculation of the *yearly* prices per $1,000 of protection, each year in the period of analysis is treated as a separate entity. To compute a price figure for a given year, five items are considered —the premium, the interest that the policyholder assumes he would earn if the savings element of the policy were invested elsewhere with safety comparable to that found in life insurance, the amount by which the savings element changes in size, the dividend (if any), and the amount of actual protection in effect.

The calculation of yearly prices per $1,000 of protection may be illustrated by the computation for the sixth year of a $10,000 participating straight life policy issued at age 35. The data for this policy, which pertain to the 1968 issues of a major mutual company, were graciously furnished to the author by the company. The annual premium is $229.40, the cash value at the end of the fifth policy year is $770, the cash value at the end of the sixth policy year is $960, and the dividend payable at the end of the sixth policy year (according to the company's 1968 dividend scale) is $41.80. It is assumed that the policyholder would earn a net interest rate of 4 percent if the savings element of the policy were invested elsewhere. Under these assumptions, the three steps in the calculation of the yearly price per $1,000 of protection in the sixth policy year would be as shown in Appendix A.

The cash values, annual dividends, yearly prices of protection, amounts of protection, and yearly prices per $1,000 of protection for each of the first fifty years of the illustrative policy are shown in Appendix B.[3] Two points should be noted. First, the price per

[3] For a detailed description of the yearly-price calculations *see* J. M. BELTH, THE RETAIL PRICE STRUCTURE IN AMERICAN LIFE INSURANCE 33-38

$1,000 of protection in the first year is high relative to the corresponding figures for the other early policy years. This is a reflection of the "front-end load," which is typical of cash-value life insurance policies.

Second, after the first year, the trend in the yearly prices per $1,000 of protection is upward.[4] Indeed, the shape of the curve resembles a mortality rate curve. This illustrates the point that the price per $1,000 of life insurance protection tends to increase with increasing age not only in the case of term policies, but also in the case of level *premium* policies.

C. Level Prices

For some purposes, the yearly price figures are sufficient. In many situations, however, it is desirable to reduce a series of unequal yearly figures to a "level price" per $1,000 of protection.

The calculation of the level price may be illustrated by reference to the yearly prices per $1,000 of protection shown in Appendix B. It is improper for several reasons to add the fifty figures together and divide by fifty. First, since there are time differences among the figures, interest must be recognized once again. Second, since the policyholder may die or discontinue the policy before incurring the various yearly prices, probabilities of survival and continuation should be used in the leveling process. Third, the amount of actual protection frequently changes, and the differences should be taken into account through a procedure that is analogous to the calculation of a weighted average. When the fifty yearly prices per $1,000 of protection are "leveled" using 4 percent interest, one particular set of mortality and lapse assumptions,[5] and the appropriate amount

(Bloomington, Ind.: Bureau of Business Research, Graduate School of Business, Indiana University, 1966). The first-year price of protection and price per $1,000 of protection have been adjusted to reflect the fact that the first-year dividend is contingent on the payment of the second-year premium. For a description of this adjustment, *see id.* at 43.

4 For an explanation of the jaggedness of the yearly prices per $1,000 of protection, particularly in policy years 2 through 20, *see id.* at 99.

5 The mortality rates used in the calculations are those in the 1957-1960 ultimate basic table for male lives. *See 1962 Reports of Mortality and Morbidity Experience*, 14 Transactions of the Society of Actuaries 48 (1962). The lapse rates used in the calculations are those in Moorhead's Table R. *See* E. Moorhead, *The Construction of Persistency Tables*, 12 Transactions of the Society of Actuaries 533 (1960). Table R shows lapse rates only for the first thirty policy years, so the table has been arbitrarily extended by the author for the purpose of this article.

weights, the resulting fifty-year level price per $1,000 of protection is $10.01.[6]

Although the arithmetic involved in level-price calculations may seem to be an extremely time-consuming task, the arithmetic presents no problem when a computer is used. For example, the computer used by the author handles a problem of the type illustrated in Appendix B in about one second.

III. RATES OF RETURN

In the preceding section of this article, price figures for the illustrative policy are developed on the assumption that the rate of return on the savings element is 4 percent. As mentioned there, it is also possible to calculate the rate of return on the savings element if an assumption is made about the price of the protection. In this section of the article, an assumption is made about the price of protection, and the rate of return on the savings element of the illustrative policy is calculated on the basis of that assumption.

The method employed here for calculating the annual rate of return is the one used for many years by the late M. Albert Linton. He described the essentials of the method as follows:

> [T]he analysis must show how the life insurance policy may, in effect, be duplicated by establishing an investment fund and supplementing it with renewable term insurance bought in the open market on which the amount of the term insurance will decrease as the investment fund accumulation increases. Assuming that the amounts to be invested in each program are equal, the figure we are seeking is the net rate of compound interest that must be earned on the investment fund so that at the end of a given period, such as twenty years, the fund will equal the twentieth-year guaranteed cash value of the life insurance policy.[7]

Linton made his calculations on a trial-and-error basis. Thus, he tried various rates of return until he found the rate (correct to the nearest hundredth of a percentage point) that came closest to making the assumed separate fund equal to the policy's cash value at the end of the designated period. When his technique is applied to the fifty years of data for the illustrative policy shown in Appendix B, and when one particular assumption is made about the

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[6] For a detailed description of the level-price calculations, *see* J. M. BELTH, THE RETAIL PRICE STRUCTURE IN AMERICAN LIFE INSURANCE, *supra* note 3 at 38-43.

[7] A. Linton, *Life Insurance as an Investment*, LIFE AND HEALTH INSURANCE HANDBOOK 241 (2d ed. 1964).

yearly prices per $1,000 of protection,[8] the annual rate of return on the savings element is 5.47 percent.[9]

IV. BENEFITS VERSUS PREMIUMS

In the second section of the article, an assumption is made about the rate of return on the savings element, and prices of protection are calculated. In the third section of the article, an assumption is made about the prices of protection, and the rate of return on the savings element is calculated. A third approach to the evaluation of a life insurance policy is to (1) compute the present value of the benefits under the policy, (2) compute the present value of the premiums for the policy, and (3) examine the relationship between the two present-value figures. In this section of the article, the results of this third approach are shown, using the data for the illustrative policy.

A. Elements of the Relationship

At least four elements enter into the relationship between benefits and premiums—the protection element, the savings element, the premiums, and, in the case of participating policies, the dividends. The present value of the protection for the period of analysis is the sum of the respective present values of the protection for the individual policy years. Each of these present values, in turn, is the product of the amount of protection in the year and the probability of death in that year according to the assumed mortality table, multiplied by the probability of the policyholder's surviving and continuing the policy from its inception to the beginning of that year, and multiplied by the appropriate discount factor. For the illustrative policy, and based on the same interest, mortality, and lapse assumptions mentioned in the second section of the paper, the present value of the protection for the fifty-year period is $642.25.

The present value of the savings element for the period of analysis is the sum of the respective present values of the savings increments for the individual policy years. Each of these present values, in turn, is the savings increment for the year, multiplied by the probability of the policyholder's surviving and continuing the

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8 The yearly prices per $1,000 of protection used in the calculations are equal to 300 percent of the mortality rate at age 35 under the 1957-1960 ultimate basic table for male lives, 296 percent at age 36, 292 percent at age 37, and so forth, down to 104 percent at age 84.

9 For a detailed description of Linton's method, *see* J. M. Belth, *The Rate of Return on the Savings Element in Cash-Value Life Insurance*, 35 Journal of Risk and Insurance 569-81 (1968).

policy to the beginning of that year, and multiplied by the appropriate discount factor. For the illustrative policy, and based on the above-mentioned assumptions, the present value of the savings increments for the fifty-year period is $1,189.64.

The present value of the premiums for the period of analysis is the sum of the respective present values of the premiums for the individual policy years. Each of these present values, in turn, is the premium for the year, multiplied by the probability of the policyholder's surviving and continuing the policy to the beginning of that year, and multiplied by the appropriate discount factor. For the illustrative policy, and based on the above-mentioned assumptions, the present value of the premiums for the fifty-year period is $3,208.60.

The present value of the dividends for the period of analysis is the sum of the respective present values of the dividends for the individual policy years. Each of these present values, in turn, is the dividend for the year, multiplied by the probability of the policyholder's surviving and continuing the policy to the beginning of that year, and multiplied by the appropriate discount factor. For the illustrative policy, and based on the above-mentioned assumptions, the present value of the dividends for the fifty-year period is $981.03.

B. Ratio of Benefits to Premiums

One of the ways in which to construct a ratio of benefits to premiums is to treat the present value of the protection and the present value of the savings increments as "benefits" under the policy, and to treat the present value of the premiums less the present value of the dividends as the "premiums" for the policy.[10] Using this approach, the ratio of benefits to premiums for the fifty-year period of the illustrative policy is calculated as follows:

$$\text{Ratio} = \frac{\$642.25 + \$1{,}189.64}{\$3{,}208.60 - \$981.03} = .822.$$

C. An Absolute Measure

An absolute measure of the relationship between benefits and premiums is simply the difference between these two items. Thus,

[10] For a discussion of various other ratios of benefits to premiums, as well as a detailed description of the calculations referred to in this section of the article, *see* J. M. Belth, *The Relationship Between Benefits and Premiums in Life Insurance*, Journal of Risk and Insurance 19-39 (1969).

if E is designated as the absolute measure, then E is equal to the present value of the premiums minus the present value of the benefits. More specifically, E is equal to the present value of the premiums minus the present value of the dividends minus the present value of the protection minus the present value of the savings increments. Using this approach, the value of E for the fifty-year period of the illustrative policy is calculated as follows:

$$E = \$3{,}208.60 - \$981.03 - \$642.25 - \$1{,}189.64 = \$395.68.$$

V. VARIATION AMONG COMPANIES

The data in this section of the article was computed from information gathered in the course of several studies conducted by the author between late 1962 and early 1965. Some of the information was obtained directly from companies by means of a comprehensive questionnaire, and some was obtained from various trade publications. All of the companies included in this discussion are United States legal reserve companies operating through agents.[11]

The data pertain to the $10,000 participating straight life policies issued in 1962 to standard males aged 35 by eighty-eight companies. The twenty-year level prices per $1,000 of protection for these policies, using the method described in the second section of this article and one particular set of interest, mortality, and lapse assumptions, range from $4.98 to $13.63, with a mean of $7.55 and a standard deviation of $1.52. The frequency distribution of these price figures, together with the assumptions used in calculating the figures, is shown in Appendix C.[12]

The annual rates of return on the savings element for the above eighty-eight companies, using the method described in the third section of this article, a twenty-year period of analysis, and one particular assumption about the prices of protection, range from 5.42 percent to 0.90 percent, with a mean of 4.11 percent and a standard deviation of 0.80 percent. The twenty-year ratios of benefits to premiums for the same companies, using the method

[11] The companies included in the studies were chosen on the basis of availability of data rather than through sampling techniques, so it is not possible to apply statistical procedures to the results for the purpose of making inferences about the life insurance business as a whole. For this reason, the results presented in this article should be interpreted as applicable solely to the companies studied and should not be interpreted as necessarily typical of the life insurance business.

[12] The data in Appendix C are taken from Table 10 on page 73 of the book cited in note 3, *supra*.

described in the fourth section of this article and one particular set of interest, mortality, and lapse assumptions, range from .919 to .629, with a mean of .820 and a standard deviation of .054. The twenty-year E-values for the same companies, using the method described in the fourth section of this article and one particular set of interest, mortality, and lapse assumptions, range from $175 to $1,078, with a mean of $439 and a standard deviation of $159.[13]

Two important points should be noted concerning the above-mentioned data. First, the data show a large amount of variation among companies in terms of prices, rates of return, benefits-premiums ratios, and E-values for essentially the same coverage. More will be said about this point in the concluding section of the article.

Second, the different evaluation techniques described in this article produce approximately the same ranking of companies. For example, when the eighty-eight companies are ranked from low to high in level prices and from high to low in rates of return, Spearman's coefficient of rank correlation is −.96.[14] And when the eighty-eight companies are ranked from low to high in level prices and from low to high in E-values, Spearman's coefficient of rank correlation is .99. These correlations suggest that the rankings of the companies are quite similar regardless of the evaluation method used, and that any of the refined methods described in this article will provide important guidance for the buyer in his selection of a company.[15]

VI. CONCLUSION

In the introductory section of the article, the following question was asked: is it possible to have effective price competition when the problem of price analysis is as complicated as it is in life insurance? In order to appraise the effectiveness of competition against the charging of excessive prices, it is necessary to establish at least a general working definition of an excessive price. One possibility is to define an excessive price as one at which virtually no sales

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[13] Because the frequency distributions of the data referred to in this paragraph are similar in appearance to the distribution shown in Appendix C, they are omitted from this article to conserve space. The distribution of the rates of return, together with the assumptions used in calculating the figures, is shown in the article cited in note 9, *supra.* The distributions of the ratios and E-values, together with the underlying assumptions, are shown in the article cited in note 10, *supra.*

[14] For an explanation of Spearman's coefficient of rank correlation, *see* F. MILLS, STATISTICAL METHODS 311-12 (3d ed. 1955).

[15] For a further discussion of these correlations see the articles cited in notes 9 and 10, *supra.*

would be consummated if buyers were aware of both the price in question and the prices of available alternatives. In other words, if the price in question is only slightly above the price of an available alternative, the buyer might decide to pay the higher price because he is impressed by the agent, or because he has heard favorable reports about the company, or because he feels strongly about certain policy provisions. As the price differential grows, however, the probability of his paying the higher price declines. When the price differential is so large that the buyer is virtually certain to avoid the higher price, then the higher price might be considered excessive.

With such a definition, it is possible to test subjectively some of the data in this article in order to determine if any of the prices appear excessive. The data suggest a large amount of price variation in life insurance. Thus, the prices charged by some of the companies appear excessive in relation to the prices charged by some of the other companies for essentially the same coverage.

To the extent that excessive prices exist in life insurance, it would seem that price competition is not effective. One possible explanation for this situation is the complexity of life insurance policies and the attendant general lack of buyer sophistication. However, even when the facilities are available for refined price calculations, the analyst is faced with formidable problems in securing the necessary policy data, especially in connection with participating policies.[16]

What, then, can be done to increase the effectiveness of price competition in life insurance? In the author's opinion, the solution to the problem lies in the development of a rigorous system of price disclosure that would make it possible for careful buyers of life insurance to obtain enough price information to permit them to make reasonably informed purchase decisions. Such a disclosure system would have to be based upon a standardized method of price measurement and a standardized set of interest, mortality, and lapse assumptions.[17]

This article is not intended to suggest that price is the only factor that should be considered in the purchase of life insurance. The financial integrity of the company and the services of the capable and conscientious agent are very important. It is essential to secure the proper types and amounts of coverage for the indi-

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16 For a discussion of the policy data problem, *see* J. M. BELTH, THE RETAIL PRICE STRUCTURE IN AMERICAN LIFE INSURANCE, *supra* note 3, at 62-69.

17 For a detailed description of one possible approach to such a disclosure system, *see id.* at 217-29.

vidual's circumstances and to have the beneficiary arrangements drawn properly. The settlement options and various other policy provisions should be considered. In conjunction with such items, however, price is or should be a factor of great importance to the careful buyer, particularly in view of the substantial variation that exists among life insurance prices.

Price disclosure is important not only to the buying public but also to the life insurance business. Price information is so vital in the marketplace and is so fundamental in a company's operations that some of the most serious problems facing the life insurance business may stem directly or indirectly from inadequate price disclosure. Perhaps the most serious problem is the relative decline of life insurance in recent years as a savings medium in the American economy. It is possible that inadequate price disclosure and the attendant lack of effective price competition have contributed in two ways to the apparent relative decline of life insurance as a savings medium. First, many buyers may become suspicious when they are unable to determine readily the price of their protection, with the result that they buy either term insurance or no insurance at all. Second, a lack of effective price competition may have denied the life insurance business some of the desirable effects that flow from competition, such as the results of a continuous and intensive search for more efficient ways of furnishing life insurance protection to the public.

To those who feel that the life insurance business cannot be successful if price information is given to the buying public, it can be suggested that a business dependent upon concealment of relevant information will gradually become engulfed in the wave of disclosure requirements that has been gaining momentum in every area of business activity in the last three decades. The broadening of disclosure requirements has accompanied the growing sophistication of American buyers, and it seems unlikely that the life insurance purchases of this increasingly knowledgeable public will support a satisfactory growth rate for the life insurance business in the face of inadequate and often misleading price information.

It is to be hoped that the near future will witness the evolution of techniques through which meaningful price information can be channeled to policyholders and prospective purchasers of life insurance.[18] Such a trend should raise the stature of the business and strengthen public confidence in the institution of life insurance.

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[18] In recent months, there has been considerable discussion of this subject in the insurance press and in the general business press. *See, e.g.*, *Life Insurance Prices*, PROBE 3 (June 12, 1967); Stanford Sesser, *Insurers Under Fire*, Wall Street Journal, September 5, 1967, at 1;

Appendix A

Calculation of Yearly Price per $1,000 of Protection in Sixth Year of Illustrative Policy

1. Price of protection in sixth year:

Cash value at end of fifth year	$	770.00
Add premium for sixth year		229.40
Total "investment" at beginning of sixth year	$	999.40
Add 4 percent interest		39.98
Total "investment" at end of sixth year	$	1,039.38
Subtract cash value at end of sixth year		960.00
	$	79.38
Subtract dividend at end of sixth year		41.80
Price of protection in sixth year	$	37.58

2. Average amount of protection in sixth year:

Face amount at beginning of sixth year	$	10,000.00
Subtract "investment" at beginning of sixth year		999.40
Amount of protection at beginning of sixth year	$	9,000.60
Face amount at end of sixth year	$	10,000.00
Subtract "investment" at end of sixth year		1,039.38
Amount of protection at end of sixth year	$	8,960.62
Average amount of protection in sixth year	$	8,980.61

3. Price per $1,000 of protection in sixth year:

Price of protection in sixth year	$	37.58
Divide by average amount of protection in sixth year, expressed in thousands of dollars		8.98061
Price per $1,000 of protection in sixth year	$	4.18

Letters to the Editor in Wall Street Journal, September 14, 1967, at 16; R. B. MITCHELL, *Yardstick Needed to Put Cost in Proper Perspective*, NATIONAL UNDERWRITER 4 (Life ed. June 8, 1968); *Life Insurance Probe*, WASHINGTON INSURANCE NEWSLETTER 3 (June 10 and 17, 1968); *Better Price Comparison Data is Sought for SGLI Converters*, NATIONAL UNDERWRITER 1 (Life ed. June 22, 1968); *The Need for Full Price Disclosure*, PROBE 3 (October 14, 1968); *Life Insurance Probe*, WASHINGTON INSURANCE NEWSLETTER 7 (October 14 and 21, 1968); *Hart Assails 'Disclosure Gap' Seen Between Life Insurers and Holders*, JOURNAL OF COMMERCE 9 (October 16, 1968); *Editorial Comment: The Nasty Problem of Cost Comparisons*, NATIONAL UNDERWRITER 28 (Life ed. October 19, 1968); AUGUST GRIBBIN, *Senator Demands More Truth in Insurance*, NATIONAL OBSERVER 7 (October 21, 1968); *Hart Warns of 'Truth in Life Insurance' Bill*, NATIONAL UNDERWRITER 15 (Life ed. October 26, 1968); *Life Insurance Probe*, WASHINGTON INSURANCE NEWSLETTER 1 (November 4, 1968); *Cost Comparison Editorial Draws Comment from Belth*, NATIONAL UNDERWRITER 24 (Life ed. November 9, 1968); *Let's Talk Sense about Price Disclosure*, PROBE 1 (November 11, 1968); A. PICONE, *Sen. Hart's 'Truth in Life Insurance Cost' Drive Is Slowed, VA Refuses to Cooperate*, JOURNAL OF COMMERCE 7 (November 14, 1968); *Possible Senate Study of Costs: Some Background*, NATIONAL UNDERWRITER 1 (Life ed. November 23, 1968); *Is 'Truth in Life Insurance' Coming?*, LIFE INSURANCE SELLING 15 (December, 1968).

Appendix B

Policy Data and Price Information for Illustrative $10,000 Participating Straight Life Policy Issued in 1968 to Standard Males Aged 35

Annual premium: $229.40
Assumed interest rate: 4 percent

(1) Policy Year	(2) Cash Value	(3) Annual Dividend	(4) Yearly Price of Protection	(5) Amount of Protection	(6) Yearly Price per $1,000 of Protection
1	$ 70	$ 21.20	$148.86	$9,766.01	$ 15.24
2	240	24.80	46.58	9,694.61	4.80
3	410	28.90	49.28	9,521.21	5.18
4	590	33.00	41.98	9,347.81	4.49
5	770	37.40	44.78	9,164.21	4.89
6	960	41.80	37.58	8,980.61	4.18
7	1,150	46.30	40.68	8,786.81	4.63
8	1,330	50.80	53.78	8,593.01	6.26
9	1,530	55.50	36.28	8,409.41	4.31
10	1,720	60.20	49.58	8,205.41	6.04
11	1,900	65.20	62.18	8,011.61	7.76
12	2,090	70.40	54.18	7,828.01	6.92
13	2,280	75.80	56.38	7,634.21	7.38
14	2,460	81.00	68.78	7,440.41	9.24
15	2,650	85.90	61.08	7,256.81	8.42
16	2,840	90.20	64.38	7,063.01	9.11
17	3,030	94.50	67.68	6,869.21	9.85
18	3,220	98.70	71.08	6,675.41	10.65
19	3,420	103.10	64.28	6,481.61	9.92
20	3,610	107.40	77.98	6,277.61	12.42
21	3,800	111.20	81.78	6,083.81	13.44
22	3,990	115.50	85.08	5,890.01	14.44
23	4,180	119.90	88.28	5,696.21	15.50
24	4,370	124.10	91.68	5,502.41	16.66
25	4,560	128.30	95.08	5,308.61	17.91
26	4,750	132.60	98.38	5,114.81	19.23
27	4,930	136.90	111.68	4,921.01	22.69
28	5,120	141.00	104.78	4,737.41	22.12
29	5,300	145.20	118.18	4,543.61	26.01
30	5,480	149.30	121.28	4,360.01	27.82
31	5,660	152.50	125.28	4,176.41	30.00
32	5,830	155.70	139.28	3,992.81	34.88
33	6,000	158.80	142.98	3,819.41	37.43
34	6,170	161.80	146.78	3,646.01	40.26
35	6,330	164.70	160.68	3,472.61	46.27

(Appendix B continued on next page)

(Appendix B continued)

(1) Policy Year	(2) Cash Value	(3) Annual Dividend	(4) Yearly Price of Protection	(5) Amount of Protection	(6) Yearly Price per $1,000 of Protection
36	$6,480	$167.40	$174.38	$3,309.41	$ 52.69
37	6,640	169.90	167.88	3,156.41	53.19
38	6,790	172.30	181.88	2,993.21	60.76
39	6,930	174.30	195.88	2,840.21	68.97
40	7,080	176.10	189.68	2,697.41	70.32
41	7,220	178.00	203.78	2,544.41	80.09
42	7,360	179.80	207.58	2,401.61	86.43
43	7,490	181.50	221.48	2,258.81	98.05
44	7,620	183.10	225.08	2,126.21	105.86
45	7,750	184.60	228.78	1,993.61	114.75
46	7,870	186.30	242.28	1,861.01	130.19
47	7,980	187.80	255.58	1,738.61	147.00
48	8,090	189.10	258.68	1,626.41	159.05
49	8,190	190.20	271.98	1,514.21	179.62
50	8,290	191.10	275.08	1,412.21	194.78

Appendix C

Distribution of Eighty-eight Companies by Prices of $10,000 Participating Straight Life Policies Issued in 1962 to Standard Males Aged 35

Level prices*	Number of Companies
$ 4.00-$ 4.99	1
5.00- 5.99	10
6.00- 6.99	22
7.00- 7.99	26
8.00- 8.99	18
9.00- 9.99	3
10.00- 10.99	5
11.00- 11.99	2
12.00- 12.99	0
13.00- 13.99	1
Total companies	88
Mean	$7.55
Standard deviation	$1.52

* Twenty-year level prices per $1,000 of protection, using 3 percent interest, X_{18} mortality rates with Buck's select modification, and one-half Linton's A lapse rates.