



SOCIETY OF ACTUARIES

Article from:

The Actuary

January 1977 – Volume 11, No. 1

AGGREGATE LIFE INSURANCE ADMINISTRATIVE COST RATIOS

by Hillary J. Fisher

Net cost projections for life insurance policies involve estimates of dividends for many years in the future and assumed elections of cash values on only the tenth or twentieth anniversaries. Historical policy costs, on the other hand, seldom are indicative of current or future costs, since premiums, dividends, and cash values for policies sold 10 or 20 years ago are not likely to be representative of policies now being sold. Furthermore, a cost calculation for a given amount of a particular plan of a company does not take into account probable future changes in coverage: rewriting (often several times) of the policy to provide an increased face amount of insurance, reduction in amount, change in plan, conversion of term, and so on.

A measure of policy cost that reflects actual recent experience is the "aggregate administrative cost ratio." This ratio is based on the figures reported in a company's annual statement filed with the state insurance commissioners. The statement indicates how efficient the company is over its whole range of products.

A person who buys a term policy, for example, then would have some idea of how good a deal he would get on conversion to a permanent plan without having to calculate the combined net cost of term-permanent at different conversion points. Knowing that a company had a high aggregate administrative cost would put a prospect on guard when considering a convertible term plan with a very competitive net cost.

While a number of companies with high net costs have one or two low-cost plans for competitive reasons, a company with a low aggregate administrative cost should be more likely to have lower net costs over a broad range of plan-age-amount combinations than a company with high administrative costs. And a company that has maintained low administrative costs year after year is more likely to continue doing so.

Variations in claim experience and lapse rates, changes in reserve bases, block reinsurance and mergers and other fluctuations and discontinuities can appreciably affect aggregate average costs based on data for a single year; several years, therefore, should be combined. Deferred and uncollected premiums, benefits due and unpaid, reinsurance ceded, and skewed distributions of income and disbursements within a calendar year tend to distort results. A more nearly ideal basis for aggregate cost would be a monthly cash record of transactions, with direct business and reinsurance separated.

Aggregate administrative cost measures only net cost to policyholders as a whole, with all benefits and reserve increases deducted. Net average *payments* for single policies include the expected cost of benefits while net *costs* are net of assumed surrender or maturity benefits, although expected mortality benefits may be deducted also to give a net cost similar to an aggregate administrative net cost. A company with a low aggregate administrative cost might have a relatively high individual policy cost because premium rates are relatively high due to liberal risk selection and correspondingly high claim experience. A prospective purchaser, especially one who could qualify for a "select risk" policy in another company,

therefore, should compare individual policy costs as well as aggregate administrative costs.

Calculation of Aggregate Administrative Costs

From the policyholders' point of view, neglecting inflation, the cost of administering their insurance in force is the excess of payments over benefits received, plus interest for the period between payment of premiums or deposit of funds and receipt of benefits. In order to estimate this cost, using data for a short time-span of one to five years, increases in policyholders' equity are treated as benefits and interest is calculated on the average amount of equity. Since NAIC statement data are used, the policy reserves are taken as the best available approximation to policyholders' equity, thus tending, on the one hand, to overstate interest charges and, on the other hand, to overstate changes (+ or -) in equity.

The aggregate administrative cost for a given line of business and calendar year is calculated by the following formula:

$$C^1 = (i \cdot R_0 - \Delta R_0) \times (1 - i/2) + (P - B)$$

Where:

C^1 = midyear cost at interest rate i

i = rate of interest expected (realistically) by a policyholder

R_0 = policy reserves at beginning of a calendar year (equal to reserves on 12-31 of previous calendar year, if no discontinuity due to corrections, etc. plus premium deposit funds*)

R_1 = policy reserves, etc. at end of a calendar year

ΔR_0 = increase in reserves during calendar year, including increases due to changes in valuation basis = $(R_1 - R_0)$

P = payments by policyholders: premiums and considerations, supplementary contract considerations and deposit administration funds received, and increase in premium deposit funds

B = benefits, including dividends to policyholders

Payments and benefits are assumed to be received or credited at mid-calendar year, on the average. Interest on reserves and increases in reserves are discounted back from year-end to midyear by the approximate factor, $(1 - i/2)$.

Comparison of Aggregate Administrative Costs

Costs for different companies may be compared by relating aggregate administrative costs to premium incomes. The main drawback to this method is that a company with high premiums, as on participating business, would tend to have a lower ratio. A substantial proportion of premiums ceded to reinsurers or of experience refunds credited against premiums, also, will materially affect a cost/premium ratio. For life insurance and accident indemnity the annual cost per thousand average in force probably provides a more meaningful means of comparison.

*Although premium deposit funds and increases therein usually are relatively small and are not accounted as part of the insurance operation, they are included here because interest on such funds, presumably, is included with insurance benefits on page 4 of the NAIC statement.

Administrative Cost Ratios

(Continued from page 4)

When $C^1 = 0$, the yield (payments and credits to policyholders less payments by policyholders) on funds equals the expected interest. That is, if the actual yield rate is j , and $j = i$ (the expected rate),

$$(j \cdot R_0 - \Delta R_0) (1 - j/2) + (P - B) = 0$$

$$j \cdot R_0 = \Delta R_0 - (1 + j/2) (P - B),$$

assuming $(1 - j/2)$ and $(1 + j/2)$ are approximations for $(1 + j)^{-1/2}$ and $(1 + j)^{1/2}$, respectively. Then:

$$j = \frac{\Delta R_0 - (P - B)}{R_0 + \frac{1}{2}(P - B)}$$

For some lines of business, particularly annuities and supplementary contracts, j should be a good indicator of a company's relative performance.

Some examples will show how the calculations work out for Ordinary Life:

(Thousands)	Company A	Company B	Company C
(P) Payments by policyholders	12,189	2,276	1,969
(B) Benefits	8,640	2,297	1,331
P - B	3,549	- 21	638
(R ₀) Initial reserve	76,024	19,531	8,623
(ΔR ₀) Reserve increase	5,072	270	527
(i) Expected interest rate	4%	4%	4%
(C ¹) Administrative cost	1,559	480	460
(M) Mean insurance in force	400,640	79,490	54,030
(C ¹ /.001M) Cost per thousand	3.89	6.04	8.51
(j) Actual yield rate	2%	1.5%	-1.2%

How good an indicator of individual policy cost is a company's aggregate ordinary life administrative cost ratio? Fairly good, though rough. Many companies in all cost brackets have one or two low-cost plans which they sell in competitive situations. A company may have a low aggregate cost mainly because it specializes in reinsurance*, franchise, or large amount business; because of a relatively less con-

servative reserve basis or rapid growth in reserves; because of a non-typical underwriting classification; or for some other reason. A new company would tend to have a high aggregate cost because claim rates are lower and lapse rates are higher than on more mature business, while benefit amounts are lower.

Interest-adjusted net costs and net payments for individual policies still would be needed. But a comparison of aggregate administrative costs reduces the number of companies to choose from to perhaps a dozen or two. Net costs or net payments for these companies then may be calculated for a variety of plans to determine which of these companies are consistently low over a wide range.

To get a numerical measure of the relation between aggregate cost and individual policy cost for ordinary life, aggregate administrative costs per thousand average in force were calculated for a number of companies. Also, for each of these companies, the means of the interest-adjusted average annual net costs and average annual net payments per thousand for one or more whole life and/or term plans were determined. The Aggregate Administrative Cost Rankings (AACR's) of the companies then were correlated tabularly with their Individual Policy Cost Rankings (IPCR's).

While some companies with low aggregate costs had one or more high-cost plans, and a few companies with high aggregate costs had one or two low-cost plans, by and large individual plan costs varied directly with aggregate costs. A company with a low AACR was twice as likely to have low IPCR's as a company with a medium AACR, and six times as likely as a company with a high AACR.

A tabulation of AACR's by line of business would be a useful addition to the information now available to a prospective purchaser of insurance in selecting intelligently a life insurance company with a policy that is most likely to be the best buy for him. Knowing that a particular company charges an average of \$21.50 a year more for service on a \$10,000 policy, he can be more objective in considering whether or not to let his cousin handle his life insurance, especially if he finds that several of the companies in the lowest cost bracket also have well-established reputations for safety, for service, and for quality of products. □

*The proposed separation of direct business and reinsurance business in the NAIC statement would be an advantage.

Actuarial Meetings

March 10, Baltimore Actuaries Club
 March 17, Boston Actuaries Club
 April 13, Actuaries Club of Des Moines
 April 14, Baltimore Actuaries Club

PLEASE send your scheduled meetings as far ahead as possible. And thanks to those who send us a year at a time!

Letters (con't.)

Cartoon

Sir:

Readers of *The Actuary* may be interested to know that the cartoon in the November issue was an original created by Stephan L. Christiansen, ACAS, of the Colonial Penn Insurance Company. *The Actuarial Review* hopes that Mr. Christiansen will be able to dream up more such drawings in the future. If so, we will print them.

Matthew Rodermund, F.C.A.S.

(Continued on page 6)

Compound Interest Book

The third printing of *Mathematics of Compound Interest* by Society of Actuaries members M. V. Butcher and C. J. Nesbitt is now available. It may be ordered, prepaid (\$10 plus 75 cents postage and handling), from Ulrich's Books, Inc., 549 East University, Ann Arbor, MI 48104.

The original edition is reviewed in *TSA XXIII*, pp. 628-629.