

held as assets; when this is done,<sup>3</sup> Mr. Goddard's formula (4) average annual earnings becomes  $\frac{\$5,246,284 + \$5,374,820 - \$1,173,431}{122,255,624 - 22,292,198}$  or 9.5%

for the ten years ended December 31, 1966. With credit for prepaid expense included, the actual figure would be 9.8% or almost 10%.

If each of the elements in my own paper were to be modified to reflect Mr. Goddard's values then my theoretical fire insurance results would have been quite close to his, namely 7.5 per cent compared with his 7.7 per cent. Conversely, if his figures were adjusted to reflect the theoretical rates of return in my paper the total return on Mr. Goddard's formula (adjusted) would have been 18.3 per cent before taxes in comparison with my values of 19.6 per cent of stockholders' funds before taxes (16.4 per cent of stockholders' funds after taxes) for fire insurance. The differences result from elements such as his invested assets figure at 85% of assets compared to my 90%, his premium to stockholders' equity working out to a ratio of .906 compared to my .92, and his relationship of assets to premium working out to 2.236 compared to my 2.439.

In summary, Mr. Goddard's paper is one actual illustration of the mathematical model described in the June 1966 *Proceedings* of the NAIC. It is an excellent recommencement of Casualty Actuarial Society interest in the interaction of inflation, underwriting, and investment in the insurance business. We should have many more objective analyses of these problems fundamental to the insurance business.

#### AUTHOR'S REVIEW OF DISCUSSIONS

Both Mr. Meenaghan and Mr. Harwayne refer to the Little\* report, so some explanation should be given for my failure to mention it by name in my paper. The fact is that the paper was started long before the Little report appeared, as an outgrowth of a consideration of Mr. Bailey's paper (*PCAS LIV*, p. 1). I found that it was difficult to review his paper without

<sup>3</sup> Some argument could be made for removing some income amounts contributed during the ten year period by insurance company holdings, but this probably is relatively small and would involve an examination of Schedule D of every annual statement, a task which is impracticable.

\* *Prices and Profits in the Property and Liability Insurance Industry* by Arthur D. Little, Inc.

establishing a completely different basis for discussion. To use a common metaphor, it seemed easier to attempt to weigh the whole elephant rather than his trunk, or his tusks, or his tail. In the process I came up with an earning ratio of 8.9% for the ten year period 1956–1965. At about this time the Little report appeared with its figure of 4.4% for the eleven year period 1955–1965. (The Little report bears the date November, 1967, but it was copyrighted in 1968 and was given nationwide publicity at a press conference on January 29, 1968.)

The Little study appears in two versions, the Summary Report of 37 pages and the complete report about four times as long. The figure 4.4% first appears on page 19, as “the average rate of return for the 43 property and liability stock companies studied for the 1955–1965 period.” At this point there is no statement as to whether the rate of return is on net worth, policyholders’ surplus, “policyholders’ equity,” or “total investable funds.” Later in the report, however, on page 24 of the Summary Report, appears Table 3 based on Best’s Aggregates and Averages covering the years 1955–1965, and showing rates of return for the period of 9.0% on policyholders’ surplus and 4.2% on “Total Investable Funds.” This basis, which is called denominator  $D_2$ , is explained by a footnote as follows: “This measure of return is the one which evaluates *overall* economic earnings on *total* economic resources employed. The other measures reported depart from this concept in varying degrees” (emphasis in original).

The same Table 3 appears as Table 4 on page 39 of the full report with a longer explanation on page 40, part of which is quoted below.

“This study does not present a framework for making a risk/return comparison for returns on net worth. However, because the value of  $N_4/D_1 (= 9.0\%)$  may appear ‘reasonable’ on the surface, some comments are in order. It should be recalled that  $N_4$  includes realized and unrealized capital gains as well as operating income. In fact, well over half of this income ( $N_4$ ) comes from stock market capital gains. This rate of return, then, must be compared to stock market portfolios, which, on average, have earned 11-12% after taxes during 1955–1966 period. That was on *unlevered* portfolios. The common stock owner of a property and liability insurance company holds, in actuality, a 50% levered portfolio. Accordingly, the average rate of return he should expect is 22-24%. His return of 9% is a disadvantaged one when viewed against the alternative of direct market investment.”

From my point of view, this was an explanation which did not explain. I could not see why a return of 9%, even though a "disadvantaged one" should be taken at 4.2%. A letter to Mr. Irving H. Plotkin, one of the members of the Little team, asking for further explanation received no reply.

The essential difference, therefore, between the 8.9% return to investors shown in my paper and the 4.4% or 4.2% return selected by the Little organization is in the choice of the denominator. I use policyholders' surplus whereas they used "total investable funds," a figure about twice as large, producing a return about half as great. However correct their method may be as a matter of arithmetic, their index does not seem to be a particularly useful device, since it is hardly distinguishable from the rate of interest earned on invested assets. It does not measure the rate of return to present investors in insurance stocks, nor indicate the capacity of the insurance industry to attract new capital.

In referring to the Little report, Mr. Meenaghan says, "While not addressing itself to the specific question of whether investment earnings should be reflected directly in price structures, the study concluded, etc." The first few pages of the report gave me the opposite idea. Of several sentences on the first two pages that might be quoted, the following is selected: "The aim of the present study is to determine *to what extent* such a proposed treatment of investment income [i.e. inclusion in ratemaking] can be justified in property and liability insurance" (emphasis supplied). The underlined words gave me the impression that the study would provide some quantitative evaluation of investment income derived from premiums and its relationship to the total, or in other words that it "would address itself to the specific question, etc." The fact that it did not follow through on its original aim may have served to confuse Mr. Meenaghan, as well as others.

In one sense, however, it did follow through on its original aim, or at least some of the fifteen people who worked on the report found means to express views in the back pages of the full report which did not appear in the shorter Summary Report. On page 53 of the full report, after a discussion of the possible effects of lessened regulation, these comments appear: "If this were done, the investment income question would melt into the general pricing system. Investment income, like any other resource, would enter the rational, self-interested calculations of any firm seeking an advantage against its rivals."

If there is sufficient actuarial interest in the findings of the Little organization, it might be desirable to invite some member of the organization to present a formal paper for our *Proceedings*. Hopefully, such a paper could present an economist's viewpoint of certain aspects of investment income not covered in the present report, such as:

1. A comparison with life insurance with respect to:
  - (a) Interest earned on invested assets,
  - (b) Use of investment income in ratemaking.
2. Relationship of investment earnings to total earnings for fire and casualty insurance.
3. Total earnings rates for years prior to 1955.

There may be no satisfactory way of measuring the impact on the financial world of the Little report, which had stated that the property and liability insurance industry was underearning and would have difficulty in attracting capital. Possibly one measure would be Best's Index of Property-Liability Insurance Stocks, published weekly by A. M. Best Company. This index has a base of 10 for the years 1941-1943. It reached a high of 63 in 1966 and 1967 and stood at 54 when the Little report was publicized at the end of January, 1968. It sank to 47 in April 1968 and then climbed to 92 in December. During 1968 there was considerable interest in insurance stocks by outside capital, as evidenced by Leasco's purchase of Reliance, and ITT's purchase of an important part of Hartford stock. The significance of these activities is not entirely clear, but it appears that actuaries and other insurance men would do well not to ignore them.

Mr. Meenaghan makes the point in his introductory remarks that the subject under discussion is one of the most controversial in the industry today. I had reached the same conclusion independently, and had resolved before writing on the subject to avoid such hackle-raising words or phrases as "should," or "ought to" or "belongs to" or "attributable to" or even "held in trust for." In particular, I avoided any advocacy of the inclusion of investment income in ratemaking, although Mr. Meenaghan says that I came "perilously close" to doing so.

Mr. Meenaghan has five numbered criticisms to which I should reply:

1. Same interest rate on premiums as on capital. Not so. I made provision for two rates of interest,  $i$  and  $i'$  in the paragraph immediately following formula (4) and for the very reason Mr. Meenaghan mentioned, "in order to handle the sometimes troublesome items of capital gains."

Different rates were not used in the arithmetical demonstration be-

cause data were not available to determine them. Mr. Bailey also used a single interest rate to apply to all invested assets within each company.

2. Equity in unearned premium reserve not included. It was included in the denominator under the name "prepaid expenses." It was not included with capital in the numerator because it is not invested in interest-bearing securities.
3. It is rather surprising that there should be any confusion about the two ways of determining the equivalent time period, since all actuaries are familiar with the relationship between calendar year and policy year statistics. I used the calendar year approach, just as Mr. Bailey did, in the arithmetical demonstration since it was based on annual statement data. For theoretical work the policy-year approach used by Mr. Flynn\* would be preferable, but for lines other than workmen's compensation and auto liability, the results would have to be relatively uneducated guesses. The policy-year method is referred to as the "discounted cash flow analysis" by Mr. MacGinnitie (*PCAS LIV*) in his review of Mr. Bailey's paper.
4. Inclusion of unrealized capital gains. If the subject is total earnings, it seems to me that all capital gains and losses must be fitted into the box somewhere. At this point I appear to agree with the Little report which says (page 22 of the Summary Report) that "Such gain is one of their [the investment companies] principal goals (as it is with fire and casualty companies)." In a short period of time (and ten years may be too short) unrealized gains and losses may distort the result.
5. No recognition to federal income taxes. The paper did mention the different rates of federal income tax, as applied to underwriting investment income. It was impossible to bring this point out in the arithmetical demonstration, since such taxes are reported as one figure in annual statements. The total effect of federal income taxes can be gauged from a comparison of such taxes with earned premiums, as shown in Best's Aggregates and Averages for three recent years (amounts in millions).

<u>Calendar Year</u>	<u>Earned Premiums</u>	<u>Federal Income Taxes</u>	<u>Ratio</u>
1965	13,307	49	0.4%
1966	14,582	135	0.9%
1967	15,775	145	0.9%

\* Flynn, B. D., *op. cit.*

Following his fifth numbered criticism, Mr. Meenaghan goes on to say that I leave "unresolved the basic question as to the amount of investment funds developed from premiums." I had thought that the formula provided a do-it-yourself kit for this as well as for other purposes. For example, in the ten-year period ending with 1966, the amount was slightly larger than the amount available from capital and surplus, if an equivalent period of .99 years is accepted.

Mr. Meenaghan expresses a number of opinions with respect to studies made by others on the earnings question, but he makes no choice as to the base to which such earnings should be related. Should it be net worth, giving a total earnings rate of roughly 9%, or "total investable funds," giving, at the present time, a rate about half as much?

Mr. Harwayne, on the other hand, in referring to the Little report, has no hesitation in selecting their 9.0% rather than 4.4%, and all of his figures, including his amendments of mine, are in the 9.0% ball park rather than the 4.4% one.

He has several minor criticisms of my arithmetical results and one major one, which will be discussed first. He correctly points out that Best's figures do not allow for the pyramiding effect of company interownership, but in his arithmetical correction of my formula (4) he changes only the denominator, whereas it would appear that the first element in the numerator should also be reduced. Some of the investment income of a subsidiary company must become part of the investment income of the parent, even though premiums and underwriting profit would not be affected. My guess is that his change of my 7.7% to 9.5% for the ten years ending with 1966 is an overstatement, but it would be a very tedious job to produce an absolutely correct result.

With respect to the ratio of invested assets to total assets, there would have been no need for an assumption if I had had access to Best's Aggregates and Averages for every year. For those years which are now available, the ratios are as follows:

1955	86.0%
1965	86.4%
1966	85.6%
1967	85.8%

If 86% of total assets had been taken as invested instead of 85% in the calculation of  $Q$ , the value of  $Q$  would have been 1.00 instead of .99

(The value of  $i$  would have decreased and total investment income would not have changed). In a period of rising premium volume, the value determined in this way will always appear low compared to the weighted average of the various  $Q$ 's for individual lines calculated by the direct approach.

Using the direct approach (which I refer to as the policy-year method) his figure of 3.24 years for New York workmen's compensation does not conflict with my figure of 2.25 for a company doing a countrywide business. As I pointed out in the paper, the equivalent periods for this line would be expected to vary from one state to another.

Mr. Harwayne's exposition of an 11% return on common stocks is an interesting one. It is still surprising that fire and casualty companies, with their heavy involvement in stocks, have not done substantially better in the investment field than life companies. At the present time, the investment departments in fire and casualty companies do not have readily available the same records of performance, by type of investment, that are available to their counterparts in the life companies. In particular, the difference in attitude toward mortgages by the two types of companies is quite striking.

Mr. Harwayne asks for an explanation of the footnotes to the table of relative success in the investment market for life companies and fire and casualty companies. The life figures were taken from the *Life Insurance Fact Book*, an annual publication of the Institute of Life Insurance; the other figures result from dividing total investment gain [column (5) of my Exhibit 1] by 85% of total assets [column (1) of my Exhibit II]. If 86% of total assets had been taken as invested instead of 85%, the earnings rate would have been lower.

Mr. Harwayne does not comment on what appears to me to be the most exciting development of the last twenty years: the gradual but decided increase in the ratio of premiums to surplus. There never has been, and probably never will be, any scientific method of determining how large a company's surplus should be, but it seems evident that the yardstick of the future will not be any fixed ratio of total dollar amounts. The hazards to which a surplus is exposed, other than the internal hazards of security depreciation or inadequate loss reserves, might be set forth as follows:

1. Catastrophes, such as Texas City, affecting a few large risks.
2. Windstorms, or possibly floods and earthquakes, affecting many risks in a limited geographical area.

3. Court decisions producing a change in interpretation of the law.
4. Administrative decisions, such as denial of rate increases.

The list might be extended but it should be obvious that a company which wrote primarily private passenger automobile in 51 states would put a lower strain on its surplus per dollar of premium, than a company writing primarily, say, public liability insurance on highway bridges within a comparatively few states. It is probable that many companies today could increase their premium volume without endangering surplus if they were not held back by the traditional two-for-one relationship.

With respect to the question of whether the insurance commissioners could force the insurance companies *as a whole* to earn the full profit allowance in the rates, my feeling was that competition, as expressed in voluntary discounts and deviations, would tend to keep rates down; even in the pre-S.E.U.A. days the fire insurance companies did not earn the full profit allowance consistently.

Mr. Harwayne is correct, of course, in his statements about prepaid expense, both that the amounts should be higher than the bare commissions and taxes and that they should be used to increase the statutory underwriting profit, or, in this case, to reduce the underwriting loss. According to my calculations, these two changes would increase the rate of return for the 1957-1966 period from 7.7% to 8.2%.

In summary, I am grateful for Mr. Harwayne's thorough review, which illustrates quite forcefully that one of the chief values of our Society lies in the opportunity for open discussion. Mr. McCullough's\* study has been discussed many times in the twenty-one years since it was written but always, in my opinion, inadequately and never by members of our profession. Even now, we have been concerned professionally with only the most elementary aspects of problems on which important decisions are being made, with or without our help. Let us hope that future papers will recognize that the way the insurance industry makes money is a question for serious actuarial consideration.

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\* McCullough, Roy C., *op. cit.*