The continued underwriting losses of most companies on private passenger automobile insurance, which is the focal point of the current controversy, would seem to make this proposition academic to the objective ratemaker. In addition, the accelerating trend toward California-type rate regulation, in which competition and not a formula calculation is the predominant factor as respects price structure, would seem to push the investment income question even further into the twilight zone of actuarial intramurals. Nevertheless, discussion continues.

A basic economic fact of life that all actuaries must face at the moment is that the ownership of a number of large companies is passing into the hands of individuals who are not accustomed to business losses. Regardless of company ownership, if underwriting losses continue to have an adverse effect on company earnings and if the prospect of lower rate levels as a result of inclusion of investment earnings is threatened, any reasonable person can anticipate further restriction of premium writings in such losing lines as private passenger automobile and Homeowners. Stated another way, current property-casualty insurance company assets can be expected to be increasingly invested in non-insurance ventures, not in the expansion of insurance capacity, unless an overall rate of return commensurate with the risk involved can be achieved.

I would hope that future actuarial studies into the subject of investment income will not be unmindful of this probability.

DISCUSSION BY FRANK HARWAYNE

Mr. Goddard has performed a very useful service in drawing attention to some of the previous writings dealing with earnings of insurance companies. It would have been more complete had he included the well distributed Prices and Profits report of Arthur D. Little, Inc. for the American Insurance Association, which concluded that the total rate of return for insurance companies in recent years has been significantly below those achieved on investments in other sectors of the American economy. It reached this conclusion mainly from an examination of almost the same time period that Mr. Goddard used and cited rates of return ranging from 2.0% to 9.0% of varying measurement criteria. The results most comparable to Mr. Goddard's are an average return of 9.0% for net income including unrealized gains after current taxes, all related to policyholders' surplus. Mr. Goddard's figure for underwriting profit plus investment in-

come including unrealized gains for the years 1956 through 1965 was 8.9 per cent of capital and surplus plus prepaid expense.

Also, Mr. Goddard might have included this reviewer's paper on Insurance, Investment and Profit which appeared in the *Annals* of the CPCU, March, 1967 and in the June, 1966 *Proceedings* of the National Association of Insurance Commissioners.

In his formula (1) Mr. Goddard begins with the usual accounting concept of measuring rate of return on capital and surplus at risk. Next, in formula (2), he includes prepaid expenses as part of the sums at risk in the business, but nowhere does he indicate that prepaid expenses also result in reduced statutory underwriting profit. In other words, if insurers prorated the prepaid expenses over the life of the insurance policy their profit would be greater than shown under the statutory formula. The prepaid expenses which should increase income for the years in question are measured by the change in prepaid expenses between the beginning of the period and the end of the period. As to the amount of prepaid expenses, Mr. Goddard tends to understate this when he identifies only the commissions and taxes as being prepaid. It would make more sense to include at least some part of other acquisition and general expense since underwriting, policy issuance, etc. occur at the beginning of the policy term. Other literature such as the NAIC Subcommittee on Cost and Profit Factory Study of 1952 utilized amounts equal to 27 per cent of unearned premium reserves. It may be that in today's climate of improved expense efficiency the appropriate value may be 2 or 3 percentage points less than 27% but Mr. Goddard's figures do seem to be low.

Some of Mr. Goddard's definitions and their usage could be made clearer. In his formula (3), U should be *rate* of underwriting profit rather than underwriting profit. He does not define P to indicate that his usage is based on earned premiums and not on written premiums. Also there does not appear to be an explanation of the different bases for footnotes (a) and (b) in his Table indicating relative success in the investment market for life companies vs. stock fire and casualty companies; however, his estimate that 85% of total assets of fire and casualty companies are invested, while reasonable, appears to be on the low side. At some places in the text I was not quite sure when he meant interest income solely or when he included capital gains. It was only by verifying his source figures that I realized his figure of 5.0 per cent return is intended to include capital gains.

Yields in the stock market on stocks and bonds during the 1957-1966

period averaged 4.6% on corporate bonds and 3.5% on common stocks. In addition, the averages of stock values increased 83% or approximately 6.2% annually for the 10 year period, which is equal to a combined rate on common stocks equivalent to 9.7%. For the 10 years ended 1965 and 1967, comparable values are 11.6% and 10.9% respectively as shown in the following table:

Table of Ten Year Average Yields and Annual Growth Rates

Ten Years Ended	Yields*		Average Annual Growth of Common Stock Prices**	Combined Return on Common Stocks (3) + (4)
	Corporate Bonds	Common Stocks		
(1)	(2)	(3)	(4)	(5)
1965	4.4%	3.5%	8.1%	11.6%
1966	4.6	3.5	6.2	9.7
1967	4.8	3.4	7.5	10.9

* Based on data of Moody's Investor's Service published in Statistical Abstract of the U.S.

** Based on data of Standard and Poor's indexes for 500 common stocks published in Statistical Abstract of the U.S.

Of course, for comparison with invested assets in insurance, the combined return on common stocks should be diluted with bond yields; nevertheless, Mr. Goddard's figures still appear to be a bit on the low side. Whether the difference is attributable to computational methods, to the inherent conservatism of the insurance business, or to the possibility that the investment departments of insurance companies have not performed as well as could be expected, or to some other reason, is not known.

Mr. Goddard's method of arriving at a time period equivalent to the period when insurers hold customers' dollars paid to cover loss amounts is analogous to an approach taken by myself in a recent report to the Pennsylvania Insurance Department and other internal reports used in the New York Insurance Department.

This reviewer attempted to apply Mr. Goddard's technique to published insurance figures of New York workmen's compensation and automobile bodily injury liability policy year losses paid according to calendar period. My figures for workmen's compensation produced an equivalent time of 3.24 years compared to Mr. Goddard's of 2.25. For auto liability my figure was 2.82 compared to Mr. Goddard's of 2.44. The composite product (fol-

lowing Mr. Goddard's procedure and using a .30-.70 split of expenses and losses) gives an equivalent period for workmen's compensation of 2.42 years and for auto liability of 2.12 years. All of these values including Mr. Goddard's are quite different from the figure of .99 which he develops in Exhibit II and applies in his formula (4).

A careful review of formula (4) shows it is equivalent to the sum[1] of investment and underwriting related to policyholders surplus (adjusted); it could produce better insight into what Mr. Goddard is attempting if the first term of his numerator (Ci) were identified as the yield on capital utilized in the insurance business while the remaining terms represent the return associated with the premium generated by the insurance business itself. It should also be observed that in accordance with the previous discussion of prepaid expenses and formula (2), formula (4) should be modified in the numerator to include the difference between *pe* at the end of the period and *pe* at the beginning of the period and this adds approximately .4% to the total return.

I question whether Mr. Goddard's .99 really is an equivalent time period. It is substantially less than the time period which would be produced from a straight development of the type he outlined in connection with workmen's compensation and auto liability insurance. Part of the reason this is so is that he utilizes the element which he calls invested assets other than capital and surplus. Perhaps a better term would be that portion of liabilities assumed to be invested. I find myself in minor disagreement with his figure of invested assets equal to 85 per cent of total assets and would be more inclined to take this figure at something like 87 to 88 per cent. Moreover, it should be pointed out that liabilities other than liabilities for unearned premium and loss and loss adjustment make up about 10 to 12 per cent of all liabilities. These include liabilities for Federal income tax and other items which are not necessarily related to premiums or to the insurance transaction. Thus, if these elements were taken into account it would be seen that the .99 ratio is too low. The alternative of following through on the direct approach which uses the period when funds are held would appear to be more productive.

In connection with workmen's compensation it is pertinent to observe

[1] If we call invested assets $\overline{A}$ and investment income I, then his $Q=\frac{\overline{A}-C}{P}$ and $i=\frac{I}{\overline{A}}$; formula (4) becomes $\frac{I+PU}{C+pe}=\frac{investment+underwriting}{policyholders'\ surplus\ (adjusted)}$, or his formula (2).

that underwriting and investment cannot be entirely divorced from each other; this is so because investment amounts at assumed interest rates are ultimately carried into claim amounts used for long term cases via the standard definition of incurred loss (paid amounts plus present value of reserves *as of a given reporting date*); this also is of some importance in maintaining accurate loss development procedures in ratemaking.

Mr. Goddard says it is doubtful if any group of insurance commissioners could force the insurance companies as a whole to earn the full profit allowance included in the rates; during my years in this business, such has never seemed to be the problem; perhaps Mr. Goddard means that competition probably would not permit insurance companies to earn the full allowance built into the rates for any protracted period of time. On such levels the total return could become exorbitant and the alternative of investment income taxed at lower rates may be more palatable. Or perhaps Mr. Goddard means that realization of the full allowance, on a *statutory basis,* implies such a large real return that other problems of customer relations and exorbitance might be created.

It is gratifying to live during a time when investment is no longer considered taboo for people concerned with insurance underwriting. For those who might wish to pursue the enigma of investment return, reference is made to this reviewer's communication in the March, 1968 *Annals* of the CPCU pointing out that automobile bodily injury liability premiums can be expected to generate interest income equivalent to 2.96 per cent of such premiums; whether or not one should include some part of the long term appreciation of assets could likewise be weighed. Also, referring to my study of "Insurance, Investment and Profit" in the March, 1967 CPCU *Annals,* the bases on which that study proceeded could be contrasted with Mr. Goddard's in a number of features. Whereas Mr. Goddard used a combined equivalent interest and capital gains rate of .049 my paper used a rate of .035 for each, applied to invested funds. With respect to the underwriting profit values, Mr. Goddard used the actual statutory figure of −.010 whereas my paper utilized a theoretical provision of +.035 for casualty insurance and +.060 for fire insurance. His income figure might have been augmented by the prepaid expense, just as his base also included prepaid expense. His definition of prepaid expense leaves some room for debate; he includes no part of the policy-writing and other general expenses which are paid mostly at the beginning of, rather than during, the policy term. As a result of this omission his prepaid expense averages to 22.1% of unearned premiums; had he used a figure only 15% higher (25.4%) and reflected the change in

prepaid expense as part of income, then his 7.7% figure would have increased to 8.0%, and his 8.9% figure for 1956–1965 would also have increased. Mr. Goddard used the actual reported capital and surplus without reflection of stock company interownerships and he also used actual earned premiums. My study utilized a ratio of the two which was intended to reflect both the elimination of the inflated capital and surplus resulting from stock company interownerships and a reasonably efficient use of capital in the insurance business. (This latter has become recognized as a vexing problem to the insurance industry in that there are a number of deliberate movements currently in process which would divest the "surplus" surplus from the insurance business through the creation of holding companies.) In addition, my study utilized written premiums, which represents a 2 to 5 per cent difference from the lower earned premiums used by Mr. Goddard.

It is interesting to note the effect of stock company subsidiaries and interownerships and the achievements of some traditional companies. In general, the elimination of inter-company ownerships to consolidate the investment results of groups of insurers will not dramatically affect those results, since the reduction in total return caused by eliminating duplicated earnings of parent and subsidiary companies is generally more than offset by a corresponding reduction in the total policyholders' surplus of the group. The relationship of underwriting results to policyholders' surplus, however, will be greatly affected by consolidation, since total underwriting profit or loss remains unchanged by consolidation, while consolidation decreases policyholders' surplus and therefore increases the ratio of profit or loss to that surplus. For example, the Hartford Fire Insurance Group, on an unconsolidated basis, had total earnings for the year 1965 of 9.4 per cent; on a consolidated basis it was 9.1%, which reflects the underwriting loss sustained by the group in 1965. For comparative purposes, the Hartford Fire Insurance Company for the ten years ended December 31, 1966 had average annual total earnings of 8.7%.[2]

An approximate way of recognizing the inflated effect of insurance company subsidiaries and interownerships would be to reduce surplus totals in Best's figures by the market value of insurance company stocks

[2] Investment gains of $482,070,000, underwriting losses of $45,052,000, and change in prepaid expenses of $12,632,000 (25% of the change in unearned premium reserve) related to mean surplus of $4,785,111,000 and prepaid expenses of $404,320,000 (25% of the unearned premium reserve).

held as assets; when this is done,[3] 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

[3] 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.