

and Shilling⁵ have discussed this problem. Bailey also ignores our discussion of this problem.

- (2) While Bailey's approach may be an improvement over ADL's in that it tends to correct some of the ADL understatement of profits, he gives us no ideas whether his adjustments also distort the actual comparison.
- (3) Bailey gives no hint as to why ADL has been able to sell its understated income concept so easily to the insurance industry. While we would like Bailey's opinion on this point we can readily understand his reluctance to give it.

DISCUSSION BY J. ROBERT FERRARI

In his paper reviewing the most recent Arthur D. Little (ADL) Report commissioned by the N.A.I.I., Bailey seems to have as his basic objective the development of a rationale for calculating return for property and liability insurance companies as

$$\frac{\text{Net income}}{\text{Net worth}}$$

rather than ADL's preferred approach, which is

$$\frac{\text{Net income}}{\text{Net worth and reserves}}$$

The two ratios produce significantly different returns; the ADL Report shows a return of 8.34% for stock companies with the first formula and only 3.79% with the second formula. Bailey's primary justification for preferring the former ratio and its result is based on certain "returns" to policyholders (discounts on premiums and the time value of deferred loss payments) which he claims exist and which ADL ignored. While I tend to agree with Bailey's choice of a return measure, I have to admit that I did not find his arguments about imputed returns particularly convincing. Furthermore, he failed to discuss the possible relationship of his position with

⁵ J. D. Hammond & N. Shilling, "A Review Article: The Little Report on Prices and Profits in the Property and Profits in the Property and Liability Insurance Industry," *Journal of Risk and Insurance*, March 1969.

my recent paper* in the *Proceedings* which set forth certain relationships among various alternative return measures.

In this paper I expressed a relationship between return on net worth, return on assets (or alternatively, return on net worth plus reserves), and return on premiums, in the formula

$$T/S = \frac{I}{A} \left(I + \frac{R}{S} \right) + \frac{U}{P} \cdot \frac{P}{S}$$

where:

T = Total return

I = Investment profit or loss

U = Underwriting profit or loss

P = Premium income

A = Assets

R = Reserves (excluding equity in unearned premium reserve)

S = Net worth (including equity in unearned premium reserve)

and assuming $T = I + U$ and $A = R + S$.

To illustrate how this formula can be used to compare the two return measures in question, assume that the following data describes stock company performance for the period 1955-1967:

$$I/A = 4.11\%$$

$$R/S = 1.2$$

$$U/P = -0.70\%$$

$$P/S = 1.0$$

Using this data and the preceding formula, return on net worth (T/S) is 8.34%, which corresponds to ADL's figure when net worth is used as the denominator. ADL's return based on net worth plus reserves in the notation developed here amounts to $\frac{I+U}{R+S}$ (or $\frac{I+U}{A}$) which, based on the illustrative data above, is equal to the figure of 3.79% appearing in the ADL

* J. Robert Ferrari, "The Relationship of Underwriting, Investment, Leverage, and Exposure to Total Return on Owners' Equity," *PCAS*, Vol. LV, pp. 295-302.

report. As was pointed out in the original paper, return on net worth (T/S) is based on an equation which shows clearly the logical relationship of well-known financial variables: leverage, margin, and turnover. However, the ADL preferred approach of return on assets which amounts to $\frac{I}{A} + \frac{U}{A}$ offers little in the way of analytical appeal since the U/A component (i.e., underwriting profit or loss as a percentage of assets) is a relatively meaningless measure of insurance company performance. On this basis, I feel one can argue for the return on net worth measure without resorting to Bailey's rather subtle notions about imputed returns to policyholders. Furthermore, the "biases" which Bailey contends may result from the return on total assets measure are shown clearly in the T/S formula above through the impact of the R/S and P/S ratios on total financial results. Additionally, actual or expected underwriting profit can be introduced directly with the U/P ratio.