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Letters

Suppose, however, that the transaction had taken place in the following manner:

1/1/67 Tom sells 100 shares of B short for $1600.

1/5/67 Tom buys 100 shares of A to cover his short position, correctly anticipating that the merger will take place.

He then sits down to compute his annual rate of return:

$$(-\$1600)\ (1 + i)^{4/365} + \$1400 = 0$$

Tom is very disappointed to discover that he lost money and isn't quite certain what to do with his $200.

Mason Hess

Sir:

Tom, the complex stock market investor described in Mr. Coward's letter succeeded in earning an interest rate, i, equal to a complex number.

Tom's imaginary brother Thumb, a simple man, could have earned an interest rate i, equal to a pure imaginary number, namely, the square root of minus one (which, coincidentally, has also been referred to as i).

The transactions which Thumb could have completed are:

12/31/63, 11:59 A.M. Price of Stock Z $100. Thumb buys 10 shares for $1,000.

12/31/67, 11:59 A.M. Thumb sells 20 shares at $120, for $2,400, goes short 10 shares.

12/31/67, 12:01 P.M. Thumb buys 10 shares at $640, for $6,400, covers short position.

The equation to determine the compound interest rate i is
$$1,000\ (1 + i)^4 - 2,400 + 6,400 = 0$$

This reduces to $(1 + i)^4 = -4$, which can be expressed as
$$i^4 + 4i^3 + 6i^2 + 4i + 5 = 0$$

Factoring $(i^2 + 1)\ (i^2 + 4i + 5) = 0$

One of the four roots is i = the square root of minus one = i.

Stuart J. Kingston

Sir:

Thomas S. Ferguson's use of the standard exposure technique to obtain a "unique solution" to Sam's dilemma (*The Actuary*, November 1968) produces, in effect, a *simple* interest rate of 5.88% for a 3-year period or an annual simple interest rate of 1.96%. This result can be obtained directly by solving

$$\$1,000(1 + 3i) - \$3,180(1 + 2i) + \$3,370.70(1 + i) - \$1,190.91 = 0$$

This suggests that a fourth hypothetical bank may be added to Mr. Ferguson's illustration.

BANK D (1.96% annual simple interest)

Date	Deposits	Withdraws or Borrows	Balance (less interest)	Balance (inc. interest)
12/31/64	$1,000.00		$1,000.00	$1,000.00
1965 interest	19.60		1,000.00	1,019.60
12/31/65		$3,180.00	—2,180.00	—2,160.40
1966 interest		42.73	—2,180.00	—2,203.13
12/31/66	3,370.70		1,190.70	1,167.57
1967 interest	23.34		1,190.70	1,190.91
12/31/67		1,190.91	—.21	0

I conclude that if we are to tell Sam what rate of return was realized on his transactions, he will have to tell us where he does his banking.

Robert E. Reuter

MIDDLE ATLANTIC ACTUARIAL CLUB

by Robert J. Dymowski

The October 1968 meeting of the Middle Atlantic Actuarial Club provided a varied bill of fare, reflecting current actuarial interests in topics ranging from mutual funds to the International Congress of Actuaries.

Of unusual interest was a stimulating talk by Joseph Dowling of the investment banking firm of Dean Witter and Company on life insurance stocks and current activity in the financial world relating to insurance companies. He began with a brief discussion of the forces affecting the price of insurance stocks, especially those factors which tend to raise prices.

These factors included company earnings and the price-earnings ratio; supply and demand, with the current trend towards take-overs and tenders taking perhaps 100 million of 500 million shares out of the market, thereby increasing demand and prices on those remaining; adjusted earnings, and their varying definitions in the lack of a completely accepted source; expansion of the money supply; and changes in the rate of flow of funds, with special regard to tax attitudes and the differing views of long and short-term investors.

The feeling on the part of conglomerates that they can realize better earnings by more diversified uses of company assets makes life and casualty insurers of continuing interest to the conglomerates, according to Mr. Dowling. He further indicated specific characteristics of life insurance companies which stimulated this interest: sales organizations, highly developed and trained but selling only one product; under-utilized assets in bonds and mortgages which might produce greater returns by investment in subsidiaries; and under-utilized borrowing power, especially with regard to expansion capability.

Mr. Dowling closed his remarks with a brief discussion of tender actions and reactions. He stressed the importance of communication with the stockholder, keeping him informed of what he has and the value of what he has, as a prime factor in keeping him happy. The enthusiastic response to Mr. Dowling's presentation was most indicative of the interest by those assembled.   ☐