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TAXATION OF VARIABLE ANNUITIES

by William H. Crosson

The U.S. Treasury Regulations provide that whenever the amount received under a variable annuity is less than the amount excludable, the taxpayer has the option of redetermining the excludable amount. The result of the election of the option is to spread the deficiency as an addition to the excludable amount evenly over the remaining duration of the annuity. The incidence of the additions will depend on the timing of the election and the final results may differ.

When the amount received is less than the excludable amount for two or more successive years, should the taxpayer make the election following *each* such year, or make the election only after the end of the succession of such years? It is easy to demonstrate that the election should be made each year (for a life-contingent annuity), and this demonstration rests on the fact that a life expectancy at any given age is less than one plus the life expectancy at the next following age.

The regulations give an example of a situation where the annuity amount falls short of the excludable amount in two successive years, with the election being made after the second year. Shown herewith are the calculations for this example as given by the regulations, and if the election is made each year.

Example: Variable Life Annuity, Annual payment in arrears, purchased by a male, aged 64, for $20,000.00. Payments received are:

At the end of the	
1st year	$1,000.00
2nd year	0
3rd year	1,500.00

Expected Return Multiples, adjusted for annual payment in arrears are:

Male Age	*Years*
64	15.1
65	14.5
66	13.9

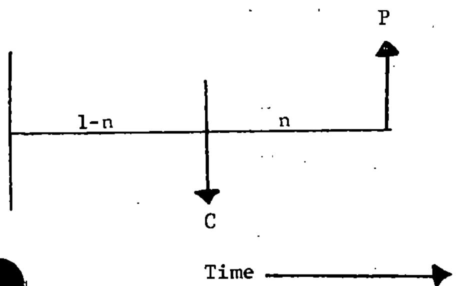
		One Election	*Successive Elections*
First Year	Excludable Limit $\left(\frac{\$20,000}{15.1}\right)$	$1,324.50	$1,324.50
	Amount Received	1,000.00	1,000.00
	Amount Excludable	1,000.00	1,000.00
	Excludable Carry-forward	324.50	324.50
Second Year	Addition to Excludable Limit $\left(\frac{\$324.50}{14.5}\right)$	—	22.38
	Excludable Limit	1,324.50	1,346.88
	Amount Received	0	0
	Amount Excludable	0	0
(A)	Excludable Carry-forward	1,649.00	1,346.88
Third Year	Addition to Excludable Limit $\left(\frac{A}{13.9}\right)$	118.63	96.90
	Excludable Limit	1,443.13	1,443.78
	Amount Received	1,500.00	1,500.00
	Amount Excludable	1,443.13	1,443.78
	Amount Includable	56.87	56.22

Admittedly, the regulations stipulate that the election may only be made when some amount is received under the annuity during the year. The receipt of $1 in the second year would satisfy this requirement and would not materially change the situation. □

SHORT SALES AND INTERNAL RATE OF RETURN CALCULATIONS

by Peter A. Marks & J. L. Dake

In the January issue of *The Actuary* Mason Hess cites an interesting case of return on investment determination. The problem he develops revolves around specifying when the *cash flows* take place.



Let the period between the short sale and the end of the transaction be one time unit. Furthermore, let the period between the instant that the short sale is covered (C) and the end of the transaction (P) be n units, $n<1$. In the case presented by Mr. Hess, he cites that if Tom sells 100 shares of stock Y short on 12/31/66 at $10 a share and covers on 12/31/67 at $8 a share, the interest rate cannot be found by solving the equation $-100(1+i)+800=0$.

This seems obvious, since the $1000 cash inflow and the $800 cash outflow both occur at 12/31/67. What we intend to show is that if a short sale is actually covered at any instant before the time at which the proceeds are received, a reasonable interest rate can be determined. Let n be the period between the cover and the receipt of the proceeds. If P is the proceeds from the transactions and C is the cost of covering, we get the following equation defining the present value of the transactions, at the time of the initial commitment.

$$\frac{C}{(1+i)^{1-n}}=\frac{P}{(1+i)^{1}}$$

or

$$\frac{P}{(1+i)}-\frac{C}{(1+i)^{1-n}}=0$$

The problem cited by Mr. Hess arises when we take the limit of this expression as $n\to 0$ then

$$\lim_{n\to 0}\frac{P\,(1+i)^{1-n}-C\,(1+i)}{(1+i)^{2-n}}=0$$

$$=\frac{P\,(1+i)\;-C\,(1+i)}{(1+i)^{2}}=0$$

$$=\frac{(P-C)}{(1+i)}=0$$

Thus as n approaches zero, the solution to our equation, i, approaches positive infinity. By the proper choice of our time horizon and definition of the cover and inflow we can determine the proper rate of return on a short sale. It does not seem inconsistent that the *rate* of return is infinite if the cover and inflow occur at the same *point* in time since return on investment is a time concept, i.e. a *rate*. □