SOCIETY OF ACTUARIES

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Letters

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"As the data indicate, the estimated price index for the aged for all items rose 7 to 9% faster than the CPI during each of the periods shown. The further adjustment for health insurance for the aged, however, reduces the difference by roughly one-half, with the adjusted index for the aged rising from 3 to 6% faster than the CPI."

An even more detailed study was published earlier by the Bureau of Labor Statistics in Report 238-2 of December 1963. The title of the report was, *The Impact of Rising Prices on Younger and Older Consumers.* This study traced the price changes from 1950 to 1960 and a summary of the results is shown on the following table:

Age of family head	*Percent increase*
Under 25	22.8
25-34	22.9
35-44	23.0
45-54	23.5
55-64	24.0
65-74	24.4
75 and over	25.0
All units	23.5

The Report goes on to say: "In summary, the estimate of total price increase from 1950 to 1960 was larger for each successive age group, but varied by only 2.2 percentage points from the youngest to the oldest group. Thus, even in a period when larger-than-average price changes tended to be concentrated in classes of items which are relatively more important in the spending pattern of older consumers, the total change was not substantially larger for older than younger families. It should be noted that generalizations regarding the nature of price change for families of different ages should not be drawn from these estimates for 1950-60. In a period when prices of other classes of items—for example, clothing or durables—were increasing most rapidly, the differences by age groups observed here might be eliminated or reversed."

From these studies inflation appears to have affected the people over age 65 to a slightly greater extent than those under 65, but the difference is small and could change in the future. Thus it does not appear that the use of the CPI for retired employees' benefits would be unreasonable. Probably other factors—such as the mix of the items, the time lag, the change in quality of the items, etc.—are more significant than the variations by age groups.

Preston C. Bassett

NEW YORK ACTUARIES CLUB DISCUSSES "BELTH" THEORY

The following notes are from a workshop discussion at the October meeting of the Actuaries Club of New York on "yearly price of protection" and "level price of protection" calculation methods advocated by Dr. J. M. Belth in his book *The Retail Price Structure in American Life Insurance.*

Recently the State of Washington issued a replacement regulation which calls for a comparison of the yearly prices per $1,000 of protection for the new and old policies. The prescribed method of calculating these figures is based on Dr. Belth's yearly price calculation method.

In the discussion it was pointed out that the assumption implicit in the method is that a valid comparison can be made between two policies solely on the basis of the "yearly price per $1,000 of protection," without regard to any differences in the amount of savings element in the two policies.

The table below shows the results where the policy terms are identical except that Policy A has generally higher cash values than Policy B. Under the "Belth" method, Policy A had a higher price per $1,000 of protection than Policy B. And yet, Policy A had the same total net cost for the year as Policy B, and was actually preferable from the policyholder's viewpoint because it had higher cash values than Policy B.

	Policy A	*Policy B*
(1) Annual Premium	$ 90.39	$ 90.39
(2) Cash Value, end of Policy Year 5	453.37	430.70
(3) Cash Value, end of Policy Year 6	553.81	531.14
(4) Total Net Cost for Policy Year 6	— 10.05	— 10.05
(5) "Belth" Yearly Price of Protection	6.26	5.58
(6) Complementary Accrual in Savings Element, (5) − (4)	16.31	15.63
(7) "Belth" Yearly Price of Protection per $1,000 of Protection	13.97	11.84

There was general agreement that it would be difficult to defend the use of the "yearly price of protection per $1,000 of protection" as the sole criterion for comparing yearly costs between policies.

The "level price per $1,000 of protection" is a weighted average of "yearly prices per $1,000 of protection," and the discounting operation involved in calculating level prices in effect assigns relatively greater weights to the yearly prices at the early durations and lesser weights at the later durations.

Much of the discussion turned on the complexity of the problem of comparing policy costs, since these could be affected by different choices in assumed rates of interest, mortality and lapse. A "price" reflecting probabilities of survivorship and persistency could be more meaningful than a "price" based on the assumption that the policyholder will survive to the end of the policy year. □

Replacement Problem

Sir:

The National Underwriter of May 18, 1968, contained an article entitled "Regulation Will Make Replacers Compare Cost of Amount at Risk," covering the new regulation on replacement promulgated by the State of Washington. In the article, instead of the well-known actuarial formula

$$({}_tV+P)\ (1+i) = {}_{t+1}V+q_{x+t}\ (1-{}_{t+1}V),$$

a seemingly acceptable approximation was used, i.e.,

$${}_tV\ (1+i)+P = {}_{t+1}V+q_{x+t}\ (1-{}_{t+1}V).$$

However, my calculations for the article's illustration, using the exact formula with interest on annual premium considered, reveals the Washington insurance department to have approximately a 21% error for the given illustration. The insurance cost should be about $6.05 per $1,000 risk instead of $5 per $1,000 risk.

Douglas O. Sanders, Jr.