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The last survivor phenomenon

by John M. Bragg

Immediately after World War II, I was an actuarial student in Canada. Like many others, I was trying my best to cope with Part IV and the subject of life contingencies. The text was *Life Contingencies* by Ernest Frank Spurgeon, a work we all believed to be of timeless authority. (I still have it on my desk and refer to it frequently).

Spurgeon's *Life Contingencies* contains seven chapters dealing with multiple life annuities and assurances, written with clarity and thoroughness. At the time, I thought, "What practical use is this?" Little did I realize that, nearly 50 years later, one of the subjects covered by Spurgeon — last survivorship insurance — would become a major phenomenon in the United States.

Ordinary life insurance thrives on phenomena. A brief review of those 50 years might help put things in perspective:

Year	Phenomenon	Instigator
1946	Pension trust policies	Tax incentive to save
1956	The family policy	Baby boom
1969	Variable life insurance	Inflation
1981	Nonsmoker rates	Lifestyles movement
1984	Universal life	Very high interest rates
1993	Last survivor insurance	Aging population

This article deals with that new phenomenon — last survivor insurance, which is life insurance payable only on the death of the last to die of several named insured persons. Usually two insureds are named, often husband and wife. "Second-to-die insurance" is an alternate name used.

Last survivor insurance is popular with older insureds and is related to the aging of the population. It is tied in with high estate tax rates in the United States, coupled with the fact that estate taxes usually are not payable until the second death of spouses. Last survivor insurance is affordable for older persons, relative to separate permanent plans. The parents of the baby-boom generation needed the family policy in 1956; now they need last survivor insurance.

In summer 1993, *Consumer Reports* magazine published a series of in-depth articles on ordinary life insurance that, in general, were critical of cash value products. However, second-to-die insurance received praise. A September 1993 article said, "Second-to-die policies represents one of few logical uses of cash-value insurance, in our view."

The Frasier Method

Recently, I reviewed some state insurance department filings of last survivor policies submitted for approval. I was intrigued to see mentioned the "Frasier Method" and reference to a paper by William M. Frasier in the April 1978 issue of *The Actuary*. The paper was cited as the authoritative source for the method.

I reviewed the April 1978 issue and determined Frasier is director of reinsurance technical and quality services with Security Life Insurance Company of Denver. He is to be congratulated for being well in front of the cutting edge on this important subject. The late editor of *The Actuary*, Andrew C. Webster, also should have been congratulated for publishing this early important work. However, I believe it should have gone in the *Transactions* for peer review and discussion.

The most important part of the Frasier paper is the description of "Method II," which treats the coverage strictly from the viewpoint of the joint last survivor status. Under this method, premiums, reserves, and cash values do not change when the first death occurs. Prior to the second death, the insurer does not even need to know whether the first death has occurred. The largest number of last survivor policies now being written in the United States are based on Method II and are often said to be "Frasierized."

The Frasier paper also describes "Method I" under which premiums, reserves, and cash values change upon the first death. Method I produces cash values that are lower than those of Method II while both are alive and higher after the first death. A few last survivor policies are being written according to Method I. Frasier points out that for a block of business, the total reserves and cash values will be equal for the two methods.

Equivalent or exact issue ages

Some companies are issuing the coverage under an "equivalent age" method, under which quasi-single-life approaches can be used. Formulas for determining equivalent age are somewhat a mystery. Frasier does not deal with any method for determining joint equivalent issue age when the two ages are different.

Other companies are using the exact method, which I believe is much better. Under the exact method, each life can be treated on its own merits as to age, sex, smoking status, select status, and substandard status (if any). Once the characteristics are fed in, computers can generate cost-of-insurance rates needed (on both current experience basis and maximum basis, usually tied to the CSO table).

It is often said that one substandard life can easily be taken, because this life will presumably be the first to die. I have even heard of substandard lives with mortality as high as 3000% being taken. I prefer the rule: over 250%, issue single life policies.

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Second-to-die (continued)

Simultaneous death

In summer 1993, the Society of Actuaries research staff surveyed companies issuing last survivorship policies. Highlights of the results are reported by Jack Luff and Bob Vose in the boxed story on this page.

It is rightly believed that last survivor policies are subject to an extra hazard, because of the possibility that both lives will die simultaneously or within 30 days of each other in a double tragedy. It is necessary to add provision for double tragedy to cost-of-insurance rates, but the extent is for the actuary involved to judge. The matter of heartbreak, or the theory that on the first death, the surviving spouse immediately becomes substandard, creates another judgment call for the actuary.

The family policy marketed by Life Insurance Company of Georgia in 1957 specifically recognized the double tragedy hazard. That policy paid the usual life insurance and double indemnity benefits on the husband and wife, but it paid triple indemnity for a double tragedy. That company is still issuing double tragedy coverage on its joint life policies. A double tragedy accidental death rider also may make sense for last survivorship policies.

Need for generator

To handle last-survivorship insurance in a satisfactory way, it is necessary to have up-to-date information about mortality of each insured, subdivided by age, sex, smoking status, select status, and substandard status (if any). It also is necessary to have a computer program to generate cost-of-insurance rates when the individual characteristics are entered. Generator results are needed in the field for illustrations to be made. This is a highly individualized product. The flexibilities of universal life handling also appear necessary to this product.

Following are results using the Bragg Associates Generator:

Life 1: Male, aged 77, nonsmoker, standard
 Life 2: Female, aged 72, smoker, standard
 Basis: Bragg Older Age Select and Ultimate Life Tables
 Loading: Net of any double tragedy, heartbreak, or other loading

The deferred nature of the second-to-die risk (as compared with the single-life risk) is evident. If funded on a level premium permanent basis, the second-to-die product can be expected to generate very high early reserves and cash values.

Duration	Net Annual Cost-of-Insurance (per \$1,000)	Female, Age 72, Smoker Single Life (for Comparison) (per \$1,000)
1	.07	7.00
5	3.18	17.32
10	21.08	36.74
15	79.87	86.41

Popularity

As of November 1993, last survivor life insurance is being issued by at least 50 companies. Average size policies are believed to be extremely large. Associated products (such as first-to-die) also are issued.

It is exciting that we finally have achieved the ability to custom-tailor a product to the specific need; each case is unique. The last survivor phenomenon is here to stay.

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Study of simultaneous deaths under second-to-die policies

by Jack Luff and Bob Vose

In light of the increasing popularity of second-to-die plans and widespread interest in the frequency of simultaneous death claims, the Committee on Individual Life Insurance Experience Studies undertook a simplified study of such deaths. Deaths were determined as both insureds dying from a common cause or within 30 days of one another.

Twenty-nine companies contributed data, resulting in an exposure of 170,000 policy years. Exposure was approximated as the mean number of policies in force.

Seven simultaneous deaths occurred, resulting in a rate of about .04 per 1,000. Causes of death included four aviation accidents and three auto accidents. The committee plans to update the study later this year to include 1993 results.

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