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Product Profitability: Variable Versus Interest-Sensitive

(Part One of Two Parts)

by John M. Fenton and Dennis L. Carr

Life insurers selling interest-sensitive life insurance contracts increasingly find themselves concerned over two important issues:

- Sales of interest-sensitive products have leveled in the past year. This is partially due to an overall decrease in interest rate levels, thus making these products less attractive.
- Interest-sensitive products are significantly exposed to interest rate risks because they allow policyholders to cash-out at book value.

In response to these concerns, more insurers are considering introducing a variable life insurance product, which presents the following advantages:

- Variable products offer the policyholder a choice of various funds, allowing policyholders to take advantage of current investment trends. The ability to switch funds is particularly important in light of the downturn in global stock markets in the fall of 1987.
- Interest rate risks are passed to the policyholder, as a variable policy provides for market value cash-outs.

This article examines some of the pricing-related issues insurers face in deciding whether to introduce a variable life insurance product. As a focus, let's consider a hypothetical company which is developing a Variable Universal Life (VUL) product. The company intends to determine if a typical VUL product can generate adequate profitability, as compared to its current Universal Life (UL) product. The basic UL design consists of a 6% front-end load on all premiums, 15-year surrender charge, \$3 monthly policy fee, and a 150 basis point interest spread.

Profit Test Assumptions

To conduct profit tests on the two products, a set of typical profit test assumptions was used. Initial testing was conducted using a single cell approach under a level interest rate scenario. In part two of this article, the analysis is expanded to include tests under multiple interest rate

scenarios and discussion of global pricing issues.

Assumptions for the VUL product differed from those for the UL product in the following ways:

- Maintenance expenses were assumed to be approximately 25% higher on the VUL product than the UL product, reflecting higher administrative and start-up costs associated with variable products. This 25% figure is approximate because of limited experience available on administrative costs for VUL products.
- Per policy acquisition costs were similarly increased from \$100 to \$125 on the VUL product, reflecting the higher Securities and Exchange Commission (SEC) related administrative costs involved in issuing a variable product.
- A target surplus provision was included in both sets of profit tests. Target surplus on the UL product was set equal to 3.5% of statutory reserves plus \$1.50 per \$1,000 of face amount. Due to the virtual elimination of interest rate risk on the VUL product, the percentage of reserve component on the VUL product was reduced from 3.5% to 1.0%. Note that this lower level of target surplus is based more on empirical evidence than on an analysis of the appropriate level of target surplus. It also is important to recognize the impact of external life insurance rating organizations in setting the required level of target surplus.
- Base lapse rates are somewhat lower on the VUL product as compared to the UL product, reflecting the fact that VUL policyholders need not surrender their contracts in order to respond to the current investment environment.
- No differences were assumed between the two products in the assumptions for mortality, underwriting expenses and distribution costs. In fact, paying a comparable commission on the VUL product is an important key to its sales success.

VUL Product Design Changes

Based on these differences in assumptions, the VUL product was measured against the UL product to determine the product design revisions necessary to achieve comparable profitability. In setting the VUL design, the following SEC-related constraints were observed:

- First-year sales load could not exceed 30% of first-year premiums paid up to the SEC guideline premium. This necessitated a reduction in the surrender charge as a percentage of the first-year premium from 150% on the UL product to 25% on the VUL product.
- The effective interest spread was reduced from 150 basis points on the UL product to 90 basis points on the VUL product, the latter being assessed as the mortality and expense risk charge.
- To have a comparable level of profitability, the following additional changes in VUL product design were necessary:
- The front-end load was increased from 6.0% to 7.5%, 2.5% of which represented a premium tax load.
- The monthly per policy fee was increased from \$3.00 to \$4.00 to cover the higher maintenance costs on the variable product.
- A first-year per \$1,000 charge of \$3.00 was incorporated. The addition of this load and the increased front-end load were necessary to offset the reduced back-end load and interest spread on the VUL product.

A relatively new and less typical VUL product design trend is to assess expense charges as a back-end load. This allows companies' VUL products to resemble more closely their current UL product design, while still complying with SEC limitations.

Finally, it should be noted that the VUL product design did not include a guaranteed minimum death benefit provision.

Profit Test Results

Profit testing on the two products assumed policies were issued to a male, nonsmoker, age 35, at a \$100,000 face amount. As previously noted, initial testing was conducted only under a level interest rate

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Product Profitability cont'd.

scenario, at an assumed 10% investment earnings rate. Profit results were measured in terms of the present value of statutory book profits per \$1,000 issued (discounted at 12%) and return on investment, where both were measured after provision for federal income taxes and target surplus. Profit results on the two products were as follows:

Product	PV of Profits	ROI
UL	\$0.58	15.1%
VUL	0.58	14.7

Based on the level interest rate scenario, profits after provision for taxes and target surplus were similar for the two products.

This concludes part one of this article. In part two, we will address global pricing issues and the impact of multiple interest rate scenario testing on profitability.

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A Half-Century of Membership

There are four members who will attain their 50-year mark as Fellows this year, the survivors of the twelve members of the class of 1938:

Rueben I. Jacobson
Ernest J. Moorhead
Richard E. O'Keefe
Harry Walker

The 50-year Associates who qualified for membership that year are:

William J. Burgar
Richard F. Deitz
William L. Nicholls
Maurice C. Polman
Henry B. Thiessen
John H. Thompson

At the end of 1987, there were 134 50-year members, 95 FSAs and 39 ASAs. The numbers have declined a bit in the past few years due mainly to the small graduating classes in the mid to late 1930s: 20 in 1935, 15 in 1936, 17 in 1937 and 12 in 1938. In 1987, the Society welcomed 252 new Fellows.

The Society congratulates the new 50-year members on their outstanding achievement.

Actuarial Program at Nankai University

by Harold G. Ingraham, Jr.

At its October 1987 meeting, the Society's Board of Governors unanimously passed a resolution approving a proposal for the Society to assist in establishing an actuarial science program at Nankai University in the People's Republic of China. The program would begin in the fall of 1988. The Board also authorized the Executive Director to supervise the reimbursement of incurred expenses for administering the program, up to a limit of \$5,000, to Dr. Kailin Tuan, Professor of the School of Business and Management at Temple University. Finally, the Board authorized staff resources for the program.

China has been experiencing an economic resurgence during the past decade, and as a part of that, the insurance business has also progressed rapidly. For example, in 1980 China's only insurance company, the People's Insurance Company of China (PICC), had 50 offices with a staff of about 500. In 1986, there were 2,600 offices and 60,000 staff. Also, according to the PICC, some 50 million Chinese families now have homeowners insurance, and 60 million have bought life insurance.

Even with this rapid progression, the insurance business in China has been sorely handicapped by a severe shortage of qualified personnel, especially in the actuarial field. While several major Chinese universities have introduced insurance programs at both the undergraduate and graduate levels, actuarial science has never been taught at the Chinese universities.

Nankai University, one of the leading comprehensive universities in China, with a strong base in liberal arts and sciences and particular strength in mathematics, wishes to establish a graduate program in actuarial science through its College of Economics. The program would have a two-fold purpose: (1) to train and provide qualified actuaries for the PICC and the government (particularly to address social insurance issues) and (2) to train qualified teachers of actuarial science for other Chinese universities.

Because there are currently no qualified actuaries working in China, the Chinese have requested assistance from the Society of Actuaries.

This request comes at an auspicious time for the Society since, for a while now, we have been cognizant of increasing our international ties with other learned actuarial bodies. One recent move in that direction was the formation in 1987 of a Committee on International Relations. This committee was specifically charged to take the lead in developing such ties and in encouraging and recognizing the international development of professional standards, not only in the E&E area but also with respect to standards of practice. This includes making our professional resources available to the extent that we can be helpful. The Nankai University program provides the Society with a singular opportunity to influence the development and strengthening of the actuarial profession in a most important country.

With this in mind, a Memorandum of Understanding to establish and define the Nankai University actuarial science program was negotiated and signed last November in Tianjin, China, by myself and Nankai University's president, En-Pang Fan. It specifically calls for the following:

- The actuarial science program will be organized and administered by the Department of Finance, Nankai University, in conjunction with Dr. Tuan.
- Twenty to 25 students will be enrolled in the actuarial program. Student selection will be based on performance on the Chinese National Unified Entrance Examinations for Graduate Students, administered in late February. These examinations test student proficiencies in English, political economics, calculus, linear algebra, probability, and statistics.
- The program will start in September 1988, with 12 to 14 courses taught

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