



# Product Matters!

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## Chairperson's Corner

by Jeffrey A. Beckley

At its March 19-20 meeting, the Society of Actuaries (SOA) Board of Governors approved the establishment of a continuing professional development (CPD) requirement for members of the SOA. These requirements are to be developed by the organization's Knowledge Management Strategic Action Team for Board review in June 2007.

The SOA press release states that this requirement is important to enhancing the profession's image and aligns closely to the organization's educational focus. The Society intends to make every effort to coordinate its requirements with those of other actuarial organizations.

From a personal standpoint, I think that continuing professional development is a mainstay of a profession and that this decision by the SOA is critical to maintaining and enhancing the value of the actuarial profession. I find it challenging to stay up to date with the important changes in the actuarial world. Product development actuaries don't just work with a few products anymore—products have expanded throughout the years to include: traditional, universal and variable life as well as fixed, indexed and variable annuities, and more. In addition, each product type may have unique ancillary topics, such as product distribution methods, reinsurance and the regulatory environment. Additionally, principles-based reserves will change the life of the product actuary as well as the valuation actuary. Making CPD mandatory should

actually facilitate the CPD process as there will be more structured opportunities for continuing education.

While the SOA provides numerous opportunities for CPD, and the American Academy of Actuaries has begun providing more CPD, the SOA sections will play an important role. The Product Development Section has always considered providing continuing professional development to be one of its prime missions. This year, we will sponsor 12 sessions at the Society's Spring Meeting and a similar number at the Annual Meeting. Additionally, the 7th Annual Product Development Seminar will be in Denver at the Grand Hyatt on June 25 and 26. The Section is also providing a seminar immediately following the symposium on June 26 and 27. The seminar is titled, "Product Development Boot Camp." Finally, we have typically sponsored one to two webcasts each year. The next webcast that we are planning will be on life settlements.

The Product Development Section Council understands that we are the primary sponsors of CPD for product development actuaries. We will be exploring additional opportunities to provide CPD. Additionally, as I mentioned in our last newsletter, we will use the capital balance that we have built up to provide special pricing on certain CPD programs to Product Development Section members.

Please take advantage of the current CPD offerings and look for more in the future. □



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## Features

# Reinventing the ROA

by Simpa A. Baiye

Statutory return on assets (ROA) is a commonly employed measure in the assessment of the return potential of annuity products. It is traditionally defined as the present value of distributable earnings divided by the present value of statutory assets. Present values are typically determined by using the weighted average cost of capital or the earned rate on assets. A key consequence of this definition is that the timing of projected product cash flows has a disproportionate impact on the ROA. In particular, products that have more statutory strain may seem less profitable than products that have little or no strain. Furthermore, the choice of the discount rate employed has a significant impact on the resultant ROA. For a given set of product cash flows, higher discount rates lower the ROA. Alternative ROA measures such as the geometric ROA and the arithmetic ROA are independent of the choice of discount rate and can eliminate distortions associated with the timing of product cash flows. The geometric ROA, in particular, is an extension of an accepted measure used to assess multi-year asset returns in the field of investment management. A comparison of ROA metrics under the traditional and alternative approaches is provided.

### Background

Insurance carriers employ several metrics in assessing the viability of potential annuity product offerings. Such metrics commonly include the statutory ROA, economic-value added (EVA), profit margin, return on investment (ROI) and return on equity (ROE).

Statutory ROA represents the distributable earnings “intensity” of the average assets underlying a product over its lifetime. The ROA is commonly defined as:

$PVP/PVA$ , where  
 $PVP$  is the sum of the present values of each



future year’s distributable earnings at discount rate  $i$ , and  $PVA$  is the sum of present values of each future year’s assets at discount rate  $i$ .

$$(PVP_1 + PVP_2 + \dots + PVP_n) / (PVA_1 + PVA_2 + \dots + PVA_n) \quad (1)$$

Expression (1) can be rewritten as

$$(PVP_1 / PVA_1) * (PVA_1 / PVA) + (PVP_2 / PVA_2) * (PVA_2 / PVA) + \dots + (PVP_n / PVA_n) * (PVA_n / PVA) \quad (2)$$

Expression (2) can be rewritten as

$$(ROA_1) * (PVA_1 / PVA) + (ROA_2) * (PVA_2 / PVA) + \dots + (ROA_n) * (PVA_n / PVA) \quad (3)$$

where  $ROA_j$  represents the statutory return on assets in year  $j$ .



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Expression (3) shows that the traditional definition of the ROA can be viewed as the weighted average of the annual returns on assets. The weight employed for a given year represents the proportion of the sum of present values of assets attributable to that year. One consequence of this definition is any product that has significant strain in its first year will have an ROA that is more reflective of the first year's ROA. This is largely due to the size of the strain and the fact that discounting does not have a significant effect on cash flows in the first year. In addition, products that have an uneven pattern of assets will have ROA results that reflect this unevenness. Contracts that build up assets over time are more likely to have their ROA dominated by returns in latter years. This dominance is partly offset by the larger discount factors for later years. The traditional ROA can thus skew the overall earnings-generating intensity of products that have an uneven asset base by year.

The choice of an appropriate discount rate significantly complicates the traditional ROA definition. Common choices include the earned rate on assets or the carrier's cost of capital. Employing the cost of capital in discounting suggests that assets earn the cost of capital. This could be difficult to achieve in practice. On the other hand, employing the earned rate on assets in discounting implies that profits are rein-

vested at a rate that is less than the carrier's cost of capital. This would represent a sub-optimal redeployment of earnings. In general, higher discount rates will reduce the weight given to higher returns that generally occur later in the life of a product. This suggests that firms with higher earned rates on invested assets will generally have a lower projected return on assets on their products. The discount rate employed is critical as it has a significant impact on the resultant ROA. For a given set of product cash flows, higher discount rates lower the ROA. However, a variety of discount rates are used by companies ranging from the earned rate on assets to the carrier's cost of capital. It is not clear what the correct discount rate should be.

### Alternative ROA Calculation Methods

Suitable alternatives to the traditional ROA should mitigate or eliminate the impact of potential unevenness in projected assets as well as obviate the need to carefully consider the impact of discount rates on the ROA.

One alternative is the geometric (or time-weighted) ROA. It is defined as

$$\left[ (1+ROA_1) \cdot (1+ROA_2) \cdot (1+ROA_3) \cdot \dots \cdot (1+ROA_n) \right]^{(1/n)} - 1 \quad (4)$$

where  $ROA_j$  is the statutory return on assets in year  $j$ ;  $n$  is the number of years in the projection period.

A key consequence of the geometric ROA is that each year's return is equally weighted. With this definition, an ROA of 50bps in the fifth contract year has the same weight as an ROA of 50bps in the first year. Furthermore, the choice of discount rate has no impact on the resultant ROA.

The geometric ROA is an accepted measure of multi-year mutual fund performance and lends itself to ready application in assessing insurance product performance. The pattern of changes in product cash flows and assets does not determine how much weight is given to the returns in any given year.

Another alternative ROA definition is the arithmetic mean of annual returns. It is defined as

$$[(ROA_1) + (ROA_2) + (ROA_3) + \dots + (ROA_n)] * (1/n) \tag{5}$$

where ROA<sub>j</sub> is the return on average assets in year j; n is the number of years in the pricing projection.

Observe that the definition in expression (5) gives equal weight to the returns by contract year. The arithmetic mean ROA can also be derived from expression (3) by setting PVA<sub>j</sub>/PVA equal to 1/n. It can be shown that the geometric ROA is always equal or less than the arithmetic ROA. The magnitude of this inequality varies directly with the variance of annual returns on assets.

The “discount-rate neutrality” of the alternative ROA measures facilitates the comparison of the potential earnings-generating power of a given product sold across different economic boundaries. With either alternative ROA definition, an insurance carrier that expects to generate equivalent cash flows for a given product sold in different countries would therefore have the same pricing ROA in every country in which its product is sold. For example, if a carrier generated equivalent cash flows in local currency terms both in the United States and Japan, the traditional approach would result in higher ROA for its Japanese cash flows. This result would be driven by a lower discount rate for Japan—a reflection of the current low interest-rate environment in that country.

**Example**

Consider the projection for a 10-year fixed accumulation annuity with total assets and distributable earnings in Table 1. Table 2 compares traditional and alternative ROA metrics with a discount rate equal to the carrier’s cost of capital of 10 percent. Observe that the geometric and arithmetic ROA results are roughly double that of the traditional ROA.

**Table 1: Assets and Earnings for Fixed Annuity**

Year	Average Assets (\$)	Distributable Earnings (\$)	ROA (bps)
1	100,165	(1,511)	-151
2	103,670	209	20
3	106,192	213	20
4	107,641	247	23
5	107,962	279	26
6	107,134	309	29
7	105,170	336	32
8	101,110	1,051	104
9	95,778	1,061	111
10	89,691	1,037	116
<b>Total</b>		<b>3,231</b>	

**Table 2: ROA Results**

ROA Type	Traditional	Geometric	Arithmetic
Result (bps)	16	32.7	32.9

A comparison of the alternative results to the traditional ROAs seems to suggest that the alternative measures are aggressive. An assessment of these metrics, relative to the profitability of the annuity block in its mature phase, should help validate their usefulness. Tables 3, 4 and 5 provide projected earnings, average assets and ROAs for 10 issue years of fixed annuity sales (10 projection years represents the length of time needed for the fixed annuity product to attain “steady state”). The ROA for 10 issue years of new business in projection year 10 is equal to 32 bps. The geometric ROA provides a far better estimate of steady-state profitability than the traditional ROA with a positive discount rate.

Given the relationship between the discount rate and the traditional ROA, it is instructive to test the result in Table 2 for different discount rates. Chart 1 shows that lowering the discount rate increases the traditional ROA of the fixed annuity. A discount rate of 0 percent provides a traditional ROA value of 32bps. This value is exactly equal to the steady-state ROA. The steady-state ROA will always equal the traditional ROA at a discount rate of 0 percent.

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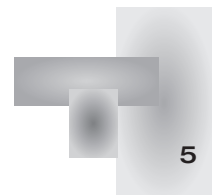


Table 3: Projected Distributable Earning

Issue Year	Projection Year									
	1	2	3	4	5	6	7	8	9	10
1	(1,511)	209	213	247	279	309	336	1,051	1,061	1,037
2		(1,511)	209	213	247	279	309	336	1,051	1,061
3			(1,511)	209	213	247	279	309	336	1,051
4				(1,511)	209	213	247	279	309	336
5					(1,511)	209	213	247	279	309
6						(1,511)	209	213	247	279
7							(1,511)	209	213	247
8								(1,511)	209	213
9									(1,511)	209
10										(1,511)
Total	(1,511)	(1,303)	(1,090)	(843)	(564)	(255)	82	1,132	2,194	3,231

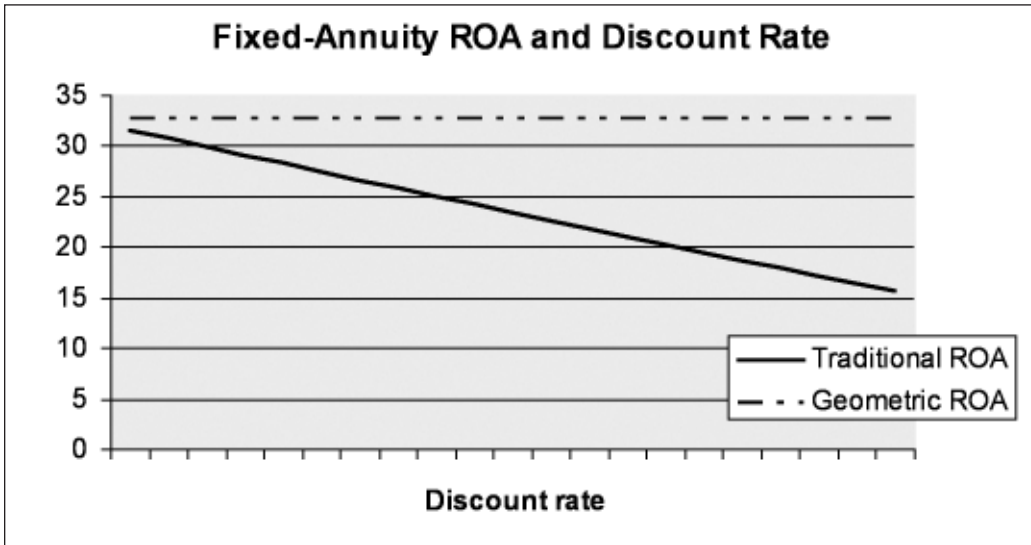
Table 4: Projected Average Assets

Issue Year	Projection Year									
	1	2	3	4	5	6	7	8	9	10
1	100,165	103,670	106,192	107,641	107,962	107,134	105,170	101,110	95,778	89,691
2		100,165	103,670	106,192	107,641	107,962	107,134	105,170	101,110	95,778
3			100,165	103,670	106,192	107,641	107,962	107,134	105,170	101,110
4				100,165	103,670	106,192	107,641	107,962	107,134	105,170
5					100,165	103,670	106,192	107,641	107,962	107,134
6						100,165	103,670	106,192	107,641	107,962
7							100,165	103,670	106,192	107,641
8								100,165	103,670	106,192
9									100,165	103,670
10										100,165
Total	100,166	203,838	310,030	417,672	525,636	632,770	737,941	839,052	934,831	1,024,523

Table 5: Statutory Returns on Assets

Issue Year	Projection Year									
	1	2	3	4	5	6	7	8	9	10
1	(151)	20	20	23	26	29	32	104	111	116
2		(151)	20	20	23	26	29	32	104	111
3			(151)	20	20	23	26	29	32	104
4				(151)	20	20	23	26	29	32
5					(151)	20	20	23	26	29
6						(151)	20	20	23	26
7							(151)	20	20	23
8								(151)	20	20
9									(151)	20
10										(151)
Total	(151)	(64)	(35)	(20)	(11)	(4)	1	13	23	32

Chart 1: Relationship between ROA and Discount Rate



**Conclusion**

The traditional definition of the ROA is very sensitive to product cash flows and the choice of discount rate. Higher discount rates lower the traditional ROA. The geometric ROA provides an alternative and useful estimate of projected earnings over the life of a product. Its independence of the discount rate and changes in product-related cash flow position it as a viable alternative to the traditional ROA. Its acceptance as a reliable measure of multi-year investment performance makes it a measure of choice relative to

the arithmetic ROA. If the ROA is viewed as a measure of the earnings intensity of a product in its steady state, then the geometric ROA provides an excellent estimate of this earnings intensity. If a discount rate of 0 percent is employed, the traditional ROA provides the most accurate measure of steady-state product profitability. □

# Secondary Guarantee Universal Life: Reserve Impact on Profitability

by Donna C. Megregian and Robert P. Stone



Secondary guarantee universal life (SGUL) products have become a major part of the U.S. life insurance market. Product design and regulations regarding these products have created product development challenges to remain competitive and keep profitability levels acceptable to management. Recent and upcoming regulations have imposed more hurdles to overcome in this ever popular yet controversial marketplace.

Most of the controversy associated with SGUL products arises from reserving issues, especially with regard to products with shadow fund designs. When the first products were introduced and UL Model Regulation was the regulatory standard for UL products, regulators were uncomfortable with the level of reserves compared to the risk, as the reserves made no provisions for the existence of a secondary guarantee. The first level of action came in 2000, with the Valuation of Life Insurance Policies Model Regulation (Regulation XXX). At this point, specified premium SGUL products were treated similarly to guaranteed level term products, but not everyone in the industry considered shadow account products subject to XXX. Those that did believe XXX applied to shadow fund products could theoretically create product designs to reduce XXX reserves.

Clarification of the applicability of XXX came in the form of Actuarial Guideline 38

(AXXX) in January 2003. AXXX attempted to track the extent to which a secondary guarantee was pre-funded. Theoretically, policies requiring less future premium to satisfy the secondary guarantee would require higher reserves than policies requiring more future premium to satisfy the same guarantee. Once again, however, creative shadow fund product design had the ability to create a wide variety of statutory reserve levels for otherwise similar secondary guarantees.

Seeking to create more uniformity in reserving (and to perhaps close a perceived loophole), the revision to Actuarial Guideline 38 (AG38) was enacted in July 2005. While this revision does not completely remove the possibility for manipulating reserve mechanics via product design, most companies are no longer opting to use product design to manage reserve levels. Companies have instead turned to a variety of structured-finance solutions to deal with redundant reserve levels (to be discussed later).

Additional reserving changes attempting to reduce some of the perceived redundancies came at the beginning of 2007 with the introduction of preferred risk versions of valuation mortality and utilization of specified lapse rates in the AG38 reserve mechanics. This is an interim solution with applicability only until 2010, presumably as principles-based reserves (PBR) become effective.

## Protection-Oriented SGUL Products under Various Reserve Regulations

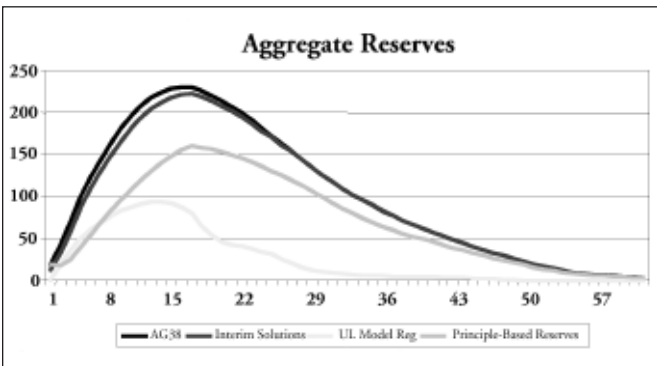
Protection-oriented SGUL products focus on a lifetime guaranteed death benefit without much, if any, cash surrender value. This article will concentrate on reserves under this product design. The reserve levels and profit results are highly dependent on product design, so the values in this



article should not be generalized across all SGUL products.

**Reserve Demonstration**

The modeled product is a shadow fund design. The design of the product made no attempt to reduce reserves under the revision of AXXX in July 2005. Lifetime secondary guarantee premiums were created to be competitive in the market for 4th quarter 2006. The designed shadow fund uses a relatively high load on paid premium in excess of target premium to ensure single-pay and quick-pay premiums derived via the shadow fund are not so aggressive as to be unprofitable. The modeled product illustrates only level-pay policies.



Reserves above are shown per unit for current AG38, the interim solution, UL Model Regulation and the current principles-based reserves proposal. (For purposes of this exercise, principles-based reserves equal the greater of the deterministic reserve and the stochastic reserve, including the 65CTE for the 100 scenarios used, using anticipated experience and prudent estimates). Keep in mind that neither the methodology nor the CTE amount for principles-based reserves have been finalized as of the date this article was written.

For perspective on the proximity of AG38 and interim solution reserve levels, some detail will clarify the closeness of the two graphs. The first-year projected interim solution is 71 percent of the AG38 reserve, which becomes 90 percent of the AG38 reserve at the fifth year, 94 percent at the 10th year, 98 percent at the 15th year and 100 percent by the 21st year.

As additional perspective, the profitability under AG38 reserve and current PBR (which shows the lowest aggregate projected reserve) is shown in the table below:

Aggregate	Break-Even Year	Profit Margin @ NIER*	Profit Margin @ 8%	IRR
AG38	22	4.70%	0.10%	8.00%
PBR	6	4.80%	3.70%	15.90%

\*NIER = net investment earned rate

The change in the profit measures due to the current PBR model above will be completely dependent upon company product design and assumptions, with important testing to be done on sensitivity to interest rates.

This exercise calculated principles-based reserves using 100 interest rate scenarios at time of issue. In theory, one should calculate the PBR with stochastic on stochastic analysis, but this will quickly create too many nested scenarios to run the model in a reasonable time frame. Because of the time crunch that is usually involved in pricing, another method to measure interest-rate risk is to include interest rate sensitivities. Traditionally, reductions in the assumed yield curve would not affect statutory reserves,

but under PBR, the reserve for SGUL products will increase with a decrease in interest rates. This has a double negative effect on the pricing of the product.

The chart below shows the IRR under PBR for three sets of scenarios:

- With principles-based reserves in current interest-rate environment
- In an interest-rate environment that is lower by 100 basis points, but the same principles-based reserves (this demonstrates just the interest-rate impact on profits similar to the current regulatory environment not changing reserves due to interest-rate changes)



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- In an interest-rate environment that is lower by 100 basis points, and the recalculated principles-based reserves (this demonstrates full PBR—the interest rate and reserve impact on profits)

Aggregate	IRR
PBR in current rate environment	15.90%
PBR in lower rate environment, no recalculation of stochastic PBR	10.40%
PBR in lower rate environment, with recalculated stochastic PBR	7.60%

The chart demonstrates the importance of interest-rate sensitivities for protection products and the effect that principles-based reserves will have on the profitability of these products in falling interest-rate scenarios.

It is important to understand the potential impact that PBR will have on products and to keep up to date with the changes in the proposed regulation. However, without PBR being effective, companies have to deal with the very real current statutory reserves and surplus issues of supporting those reserves.

### Structured Finance Solutions

Companies are choosing a variety of ways to fund the reserve strain of SGUL (and other) products. Companies with strong capital positions may decide to fund the reserve requirements internally. However, smaller to mid-size companies without access to large amounts of capital, as well as larger companies not wanting to risk their capital position, may have a harder time competing in the SGUL market without other options.

Companies can get some help through third-party reinsurance. Yearly renewable term (YRT) reinsurance does not offer a tremendous amount of relief, but the mortality fluctuation coverage is valuable. Few coinsurance options are currently available in the marketplace for SGUL products.

A range of so-called “structured finance solutions” are currently being utilized by

companies to help fund the redundant portion of the SGUL reserves. Such solutions include letters of credit, bank-financed solutions and capital market funding (securitization).

Letters of credit (LOCs) have often been used in conjunction with some form of solution often involving either on- or off-shore captive reinsurance companies. LOCs typically had been short-term in nature (one to five years). Statements by Standard & Poor’s (S&P) last year about the concern of short-term LOCs used to back long-term liabilities indicate S&P considers this a two-part risk. Fluctuations in price and availability of LOCs pushed S&P to treat LOCs as debt based on the length of the LOC versus the term of the liability. Longer term LOCs, which will receive more favorable “operating leverage” treatment, are becoming available, but at a higher cost, further reducing margins on SGUL (and other) products.

Banks are using their own balance sheets to provide solutions to insurance companies in a similar fashion to a letter of credit. A set amount and time of availability are determined under the agreement, in turn providing bank assets as collateral. Both longer term LOCs and the bank-financed solution typically include recourse back to a parent or holding company.

Another available solution is securitization. October 2006 saw the first AXXX securitization close. This has taken longer to come to market than XXX securitizations due to the complications of SGUL products.

One of the biggest challenges for all these possible solutions is defining the level of reserve redundancy. Contractual features that make this difficult include mortality rates, lapse rates, premium patterns, interest rates, non-guaranteed elements and options to change the death benefit or specified amount. Other aspects of a securitization deal or bank-financed deal that must be resolved include the level of capital within the captive, ensuring tax efficiency, extensive modeling done by many parties in the transactions and regulatory demands and risks. Another wrinkle is the time horizon for the deal. Liabilities for AXXX are often 40-50 years, whereas the capital

markets have not traditionally embraced securities with horizons beyond 30 years.

The above issues, although daunting, are surmountable, and the theoretical benefits of the transaction are worth demonstrating. Below are results of a potential AXXX securitization. The model assumes 100 percent of the no-lapse guarantee risk associated with SGUL products is ceded to a captive reinsurer, where the business will be warehoused until the captive achieves capacity to securitize (assumed to be in three years). The ceding company pays the captive a premium, and the captive will reimburse the ceding company for benefits associated with the secondary guarantee being in the money (otherwise uncollectible charges). The captive's definition of redundant reserve will be the difference between the full AXXX reserve and the sum of the UL Model Regulation and the gross premium reserve (present value of expected benefits paid and expenses incurred by the captive less the present value of expected premium the captive collected from the ceding company).

Results are shown for one year of business, resulting in \$500 million of redundant reserve at its highest point.

The model assumes the parent contributes \$100 million of additional capital to the captive at deal inception. To derive the actual amount, a company would need to run numerous scenarios and sensitivities to determine the capital amount sufficient to cover any shortfall at the captive level in a vast majority of the scenarios and sensitivities tested.

**Conclusion**

Reserving for SGUL products and dealing with the demands of those reserves continues to challenge the product development actuary. While the 2007 interim solution provides some decrease in reserves, the burden of AXXX is being dealt with in a variety of ways until the onset of principles-based reserves. Companies have to weigh the pros and cons of all available solutions, including product design, assumption setting and impact of decisions regarding structured-finance options. Balancing profitability, competitiveness and speed to market with a seemingly ever-changing regulatory environment is the job of every product development actuary, and

Aggregate	Break-Even Year	Profit Margin @ NIER*	Profit Margin @ 8%	IRR
AG38	22	4.70%	0.10%	8.00%
Securitization	15	11.60%	7.00%	11.70%

Please note that although these are deterministic results, they utilize stochastically calculated additional capital and percent of collection charges to be paid to the captive.

The above results used stochastic scenario testing to determine the average payments, benefits and excess capital that the deal structure produced. A 70-basis-point charge (similar to XXX term securitizations) on the redundancy securitized is assumed to account for expenses and excess interest between the cost of debt and the earned rate on borrowed assets. The above calculations assumed many modeling simplifications, for illustrative purposes only. In reality, all aspects of the transaction would need to be modeled and negotiated in great detail.

investigation of all possible solutions is necessary to keep insurance companies and their product lines viable. □

# NAIC March 2007: The Principles-Based Approach Is Coming!

by Donna R. Claire



The March 2007 NAIC meeting was held in my state, New York. As with the last few meetings, the major topic of the Life and Health Actuarial Task Force (LHATF) of the NAIC continues to be principles-based approaches (PBA) to reserves and capital.

### SVL2/PBA

I, as chair of the Academy's life effort on PBA, gave an update on the Academy's PBA/SVL2 groups. The technical actuarial work is likely to be completed in 2007; the regulators and the industry need to feel comfortable/make any needed changes with all the proposals before it is implemented.

### Economic Scenarios

Larry Gorski gave an update on the Economic Scenarios Working Group, which is developing the basic scenario set/calibration rules which would be used for stochastic testing under PBA. Note that this work will replace the current RBC C3 Phase 1 scenario set. Further details on the Academy PBA projects can be found on [www.actuary.org](http://www.actuary.org).

### Preferred Mortality

Larry Gorski gave an update on the Joint SOA/AAA Preferred Mortality Study. This work is proceeding. They expect to deliver a set of basic/valuation tables by September.

### Valuation Manual Team

Dave Neve, a subteam chair of the Valuation Manual Team, gave an update of the work of his Academy's Valuation Manual Team. This manual is expected to replace regulations and actuarial guidelines. An outline of what the four sub-teams (New PBA Rules, Current Rules, Experience Studies and Low-Risk Products) are working on was presented. There are over 50 volunteers working very hard, and they expect to have a draft of the manual available before the next NAIC meeting. Norm Hill also discussed the low-risk products (i.e., what can be done from day one to accommodate low risk products?).

### LRWG

Dave Neve and Tom Kalmbach, co-chairs of the American Academy of Actuaries' LRWG, gave an update on the Life Reserve Work Group work. They have revised the proposed regulation and actuarial guidelines so it can now be part of the valuation manual. The LHATF voted to expose these drafts. These documents will be available on the Academy Web site, [www.actuary.org](http://www.actuary.org).

### VACARVM

Tom Campbell reviewed the Academy comments on the proposed regulation which is currently exposed for comment. The ACLI also provided comments. There is a subgroup headed by Larry Bruning that is working on a survey that was to be sent to certain large variable annuity writers to provide more details. Because the survey

was already sent out, LHATF voted not to expose another copy of the draft comments at this time.

### **SVL2 Subgroup**

Larry Bruning gave an update on his LHATF Subgroup, which has released a draft of proposed revisions to the SVL2. They are planning a conference call before the March LHATF meeting.

### **Nonforfeiture Improvement Work Group**

John McBain gave an update on the work of the Academy's Standard Nonforfeiture Law Group. They had previously provided wording to change the current Standard Nonforfeiture Law to take care of the immediate issue of the change needed in order for PBA reserves to be implemented (i.e., de-link the nonforfeiture and reserve interest rates). This meeting discussed issues related to the long-term solution incorporating new ideas into nonforfeiture.

### **Pre-Need Mortality**

Jay Vadiveloo gave an update on the pre-need mortality study being conducted by the Society of Actuaries. Work is progressing, and may be close to a recommended table.

In addition to LHATF, other NAIC groups had discussions on the PBA. This includes the Statutory Accounting Procedures

Working Group and a commissioner-level group, called the Principles Reserve (EX) Group, which is shepherding the PBA process through the NAIC. The Life Capital Group is meeting via conference call on the PBA issues.

Major progress has been made on PBA, and the June 2007 NAIC Meeting in San Francisco should advance the PBA project even more. For more details on the PBA project, go to [www.actuary.org/risk.asp](http://www.actuary.org/risk.asp). □



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# 2006 Marketing and Distribution Section Product Implementation Survey— Summary of Results

by Jeanne M. Daharsh and Van Beach



There is an increased focus among today's insurers on creating top-line, organic growth. A key part of achieving this goal is creating new products. To better understand the product development process and practices currently used at insurance companies, the Society of Actuaries (SOA) Marketing and Distribution Section Council (MAD) initiated a Product Development Survey in the summer of 2006.

The goal of the survey was to identify company practices for product development by asking individuals with product implementation responsibilities about the process followed at their companies. For this survey, the "product development process" was viewed holistically—encompassing everything from how ideas are generated to how products are monitored post-launch. Also, all aspects of the product development process were considered—marketing, actuarial, underwriting, finance, customer service, IT, legal/compliance, etc.

The surveys were conducted verbally by a team of seven volunteers based on a series of open-ended interview questions that served as a guideline to the discussions. The surveys were conducted as free-flowing conversations to allow exploration into aspects of the company processes that might not get discovered with a traditional "multiple choice" format. By using this method, an impressive number of unique, insightful responses were captured while still allowing for rough aggregate analysis (e.g., "based on survey results 20 out of 24 companies use professional project managers") of the more common aspects of the product development process.

Over half of the top 20 life writers and over half of the top 20 annuity writers participated in the survey. Mid-size and small insurers were also represented in the survey results. There were 24 companies included in the implementation process summary, while 28 contributed to the best practices, areas for improvement and emerging issues. There were 26 distinct parent companies (i.e., there were two parent companies that had two subsidiaries that contributed individually to the results).

The interviewees were all senior professionals with high-level responsibilities for product development. It was not necessary for the participant to be an actuary; however, many were. The companies surveyed were intentionally diverse, so the survey is not product- or distribution-system specific. The surveys included companies whose products are distributed through agencies, brokers, banks, direct sales and worksite and involved life, annuity, variable, equity-indexed, long-term care, disability income and health products.

The survey gathered information about the product development process and the

specific steps and decision points involved. In addition, a key focus of the survey was the identification of what the participants felt were company best practices. Time was also spent discussing what could be done better, what the participants would like to know more about, and what they see as emerging issues affecting the process.

A compilation of the responses from all companies was provided to those who contributed to the survey. Company names were not included in the compilation. This article will provide an overview of many of the “aggregate” insights gleaned from the responses.

A list of the participating companies and the volunteers who conducted the surveys can be found in Tables 1 and 2 respectively.

**Table 1: List of Participating Companies**

- Aegon (2)
- AIG
- Allianz
- Allstate
- Ameriprise
- Amerus
- Conseco
- CUNA
- Fort Dearborn Life
- Genworth
- ING USA
- Jefferson-Pilot
- John Hancock
- Motorists Life Insurance
- Mutual of Omaha
- Nationwide
- New York Life (2)
- One America
- Pacific Life
- Physicians Mutual
- Principal
- Protective Life
- Securian
- State Farm
- The Hartford
- Thrivent
- Vantis Life

**Table 2: Product Development Survey Team**

- Van Beach
- Jeanne Daharsh
- Keith Dall
- Dom Lebel
- Nancy Manning
- Juliet Sandrowicz
- Rob Stone

**Product Development Process**

It is clear that there are elements of the product development process that are common across companies; however, it is equally as clear that every company has a unique approach. For example, there are

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**The product development process ranges from a very loose process at some companies to a very rigorous set of precise steps at other companies.**

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widely varying levels of rigor applied to the process. The product development process ranges from a very loose process at some companies to a very rigorous set of precise steps at other companies. While the degree of rigor followed by each company varies somewhat, the process generally involves six steps with varying levels of go/no-go decisions on a product before moving from one step to the next. In most cases the steps are followed linearly. There

were some examples of companies working on these steps simultaneously.

The general steps involved are:

- **Create and generate product ideas**—this includes surveying the market, identifying emerging customer needs and generating ideas for new products or product enhancements to meet these needs.
- **Determine the feasibility of the idea**—product ideas that make it to this stage then need to meet certain tests of feasibility (e.g., is there sufficient market, does the product fit within a company’s risk tolerances, does it fit within existing distribution, etc.)
- **Develop initial product design**—here the product idea starts to develop.



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Pricing, business specifications, and high-level functional specifications begin to develop.

- **Plan for the implementation**—with business specifications in hand, functional specifications and implementation plans are drawn.
- **Implement**—systems, training, operations, etc. are all put in place to support the new product.
- **Launch/Post-launch**—the product is rolled out and the emerging book of business is monitored. This information creates the foundation for new ideas and the process begins again.

Ideas are generated from a multitude of areas that can range from the field force to actuaries to senior management. The majority of the respondents mentioned the primary source as the field or marketing area.

The majority of companies utilize committees in their product development process. Some companies have multiple committees with different roles. The committee(s) generally start small and grow to include more members as the product progresses through the process. The committees generally involve multiple functional areas and usually include someone from senior management.

Ownership of the process varied widely among the surveyed companies. In some cases there was a single product sponsor who had profit/loss responsibility for the product. In other cases ownership was by committee. In addition to ownership, there are varying levels of project management. For some, project management was handled by actuaries or by IT. For the majority of companies surveyed, however, a dedicated project manager was involved in managing the process.

The sophistication of the process varies from company to company. Larger companies were more likely to have dedicated product development teams, but examples could be found where dedicated product development teams were in place at smaller companies as well. Smaller companies actually have some advantages in this regard as co-location was more feasible. Some larger companies leveraged their multiple product development teams and processes by

rigorously documenting and sharing best-practices.

Transparency was another aspect of the process that was highlighted by some companies. Multiple respondents mentioned that documents or reports are generated during different steps in the process. All agreed this was an important contributor to an efficient process.

### Best Practices

While best practices varied among the companies, there were several common themes.

Numerous respondents pointed to their use of product development teams and committees as a best practice. These teams are usually multi-disciplinary and may involve only a few individuals initially and then evolve into a larger group as the product moves through the process. Most of the companies using this approach involve individuals from the following areas: senior management, actuarial (pricing), underwriting, systems, claims, policy issue and administration, compliance, legal and marketing. Although participation is important, optimizing the process to get the right people involved at the right time created real benefits. Several respondents indicated the use of “professional” project managers at their company was beneficial and directly contributed to decreases in time-to-market.

Another common theme was communication and documentation. Several respondents mentioned their use of a disciplined, structured and documented step-by-step process, often with a common product development document and/or checklist. Transparency and reporting is also a discipline found at some of the most efficient product development companies.

While systems and the technology-related aspects of product implementation were mentioned as a common problem area, several respondents pointed to systems work as a best practice at their company. One company provides the basic product framework to its systems area early on without final rates. Another respondent mentioned its use of a common calculation engine which is coded with specifications by its actuarial department. Another mentioned its use of a



structured process to ensure that “day two” items are completed.

While a common frustration is product filing, numerous respondents indicated the filing process is working well at their company. One respondent specifically mentioned it researches and is aware of the state exceptions ahead of time. Two companies indicated they start by filing the harder states first, with one company having 35 state approvals within 60 days.

While some respondents mentioned a structured, disciplined product development process as a best practice, another respondent indicated that having an informal flexible process works well at its company.

One respondent mentioned it works in parallel rather than in a linear fashion with another indicating it has an overlap of products in the development stage.

Generating product ideas and developing keen market awareness are areas of focus for many companies. Facilitated idea sessions was mentioned as a best practice by one respondent with another indicating that an iterative process for vetting design ideas early on was a key to efficiently utilizing resources.

A couple of respondents pointed to their work with their field force as a best practice. One respondent indicated his company gathers and leverages

field input. Another respondent indicated her company gets commitments from distributors at the end of the year regarding which products they would like the next year with commitments to a certain level of sales.

### Areas for Improvement

There were several common themes in response to questions concerning areas for improvement: resources, systems, product filings, product changes and design decisions. Improvements in these areas would have a positive impact on a primary concern, speed-to-market.

Several respondents indicated resources

are stretched very thin at their companies. One respondent indicated his product actuaries are too involved in other areas of the company and another respondent indicated her product filing resources have not kept up with its company’s expansion into additional states. One person indicated there is room for improvement in experience monitoring at his company.

Information technology is clearly a bottleneck for multiple companies. Several respondents indicated their systems area should become involved earlier in the process. One respondent indicated his company wants the system to be completely functional prior to product launch, with another respondent echoing this in that his company’s products cannot be launched until there is no “day two functionality” outstanding.

Product filing is also a time-consuming challenge due to the regulatory environment and state variations in laws.

Several respondents mentioned the feasibility process as a frustration. One respondent indicated that more thought and effort should be put into the feasibility phase, with another indicating there should be justification of sales initiatives. One suggestion is to have someone in marketing responsible for filtering the types and numbers of ideas. Two respondents indicated

there should be a better understanding from the distribution system of what they will be able to sell.

The planning phase (i.e., the handoff between design and implementation) was a commonly identified weakness. Product specification changes are a frustration since tweaking occurs after the product build has begun. This is a key reason for time delays. The planning process seems to be an area which is less defined and harder to manage and measure. Creating implementation specifications is a time-consuming, trouble-area for many companies.

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**While some respondents mentioned a structured, disciplined product development process as a best practice, another respondent indicated that having an informal flexible process works well at its company.**

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## Emerging Issues

Respondents mentioned advances in information technology and database management as emerging issues with one respondent indicating that use of technology to improve speed-to-market is also an emerging issue.

Several respondents mentioned regulatory activity as an emerging issue. Principles-based reserving, conversion to the 2001 CSO mortality table and an unsettled regulatory environment were mentioned. One respondent indicated that more and more entities are becoming involved in product development; Moody's and Standard and Poor's specifically.

Another emerging issue is market aggressiveness and competition. In addition, several respondents mentioned changes in the risk management process and the involvement of a chief risk officer as having the potential to significantly lengthen and complicate the product development cycle.

## Areas of Ongoing Interest

Consistent with responses to other questions, systems, filing, resources and time-to-market were mentioned as areas of ongoing interest.

Several respondents are interested in learning more about the idea generation and design phase. Areas of interest include making the design process more efficient and structuring input and feedback received from the field.

Several responses involved issues concerning staffing and responsibilities. One respondent mentioned it is interested in receiving information on the specific roles and responsibilities of a project manager, with another respondent indicating it would like a better understanding of each function in the product development process. Another respondent is interested in knowing how many people companies have dedicated to each phase of the process.

Several responses involved information technology. One respondent was interested

in the experience others have had in using a common calculation engine for illustrations and administration. Another respondent is interested in information about administrative platforms that will result in more rapid product development.

Respondents are also interested in gathering information about how other companies handle product filings. One respondent is interested in information on how to achieve 40-plus state approvals in under 90 days. Another is interested in knowing whether some companies launch their products with only 25-30 state approvals to improve speed-to-market.

## Conclusion

There is much we can learn about the product development process by comparing company practices with the rest of the industry. There are many struggles and areas of common concern including systems, product filings and resource issues. However, how a company addresses these issues and what makes for a "successful" process varies depending upon the culture and goals of the organization.

Although this survey was initiated by an actuarial organization, it should be very clear to the reader that the scope of this survey encompassed all aspects of the product development process. It is only with this broad view that we can understand the interactions and implications of decisions made in each of the functional areas to truly improve the process. This survey has laid a foundation and begun a dialogue that we hope will continue. As can be seen by the list of areas where interviewees would like to know more, there is more to learn and share. Staffing, the filing process, dealing with principles-based approaches, managing risk and technology solutions are just a few of the areas that can be explored in greater detail. We look forward to continuing discussions and research on these issues. □

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## Features

# Two UL Products Separated by Common Chassis—Interesting Topics in Survivorship UL Pricing

by Rostislav K. Zilber

**M**any pricing actuaries and their project managers approach the development of survivorship products as minor variations to corresponding single life products. In reality, there are a number of significant differences between the two products. Those who fail to recognize these differences in the product development phase may well end up with unmarketable or unprofitable products.

Survivorship UL (SUL) is a joint life UL contract that pays the death benefit upon the second death. In this article, I will cover the following topics:

- Distribution and marketing considerations.
- Reinsurance and pricing mortality.
- Operation leverage.
- Analysis of cash flow characteristics and ALM issues.

I will focus on secondary guarantee UL. This is the product of choice for SUL and offers an opportunity to discuss operational leverage issues related to AXXX. The pricing assumptions in this article have been simplified for demonstration purposes and are outlined below:

- Since the most common sale is made to a couple in their 60s, I have assumed a 65 Male Preferred non-tobacco and a 65 Female Preferred non-tobacco.
- Mortality is 60 percent of the 2001VBT for both Male and Female Preferred. No mortality improvement is assumed. Note that there are issues with the steepness of the slope of the 2001VBT table that would invalidate this table for pricing purposes, at least without further adjusting the slope and Female rates.
- Portfolio rate of 6 percent.
- No reinsurance.



- Lapse rate equals 0 percent in all years.
- Expenses equal 0 percent DAC tax, 35 percent tax rate, 2 percent premium tax. No other expenses.
- Compensation and marketing allowances equal 150 percent of the FY premium, 0 percent renewal.
- Target surplus equals 5 percent of reserves, 2 percent of premium, \$3 per 1000 of NAR.
- Reserves basis is NAIC (AXXX), no secondary guarantee “solutions”.
- Product charges for the current account: 100 basis points spread, 50 percent of the 2001CSO, no surrender charges.

### Distribution and Marketing Considerations

The most common use of an SUL product is related to estate planning. There are many variations, but, in general, an irrevocable trust would own the policy and upon the death of the second spouse the death benefit



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would be paid to the trust. The insurance need is created by estate taxes and probate costs. With estate tax reform on the political calendar, insurance companies are actively exploring other uses of SUL such as:

- Funding a buy-sell in a family business where mom and dad are both active. The children buy out the business upon the death of the second parent.
- Gifting the policy between a grandparent and grandchild where the grandparent is the original owner and gifts the policy to the grandchild when the grandchild reaches maturity.
- Funding employee benefit plans using the policy for cash accumulation because of the low charges in the contract.

Regardless, the most common sale targets high net worth clients with estate-planning needs. It takes a niche distribution organization, a specially trained advance sales force and a highly skilled underwriting department to make the sale. A company's ratings and reputation are important as well.

Based on the LIMRA 3rd quarter 2006 report:

Product	Premium Per 1000	Average Size	Premium Per Policy
Single Life UL	20	262,979	5,292
Survivorship UL	14	2,555,142	34,499

SUL policies tend to be much larger than single life. They also have relatively low premiums, often leading to high net amounts at risk.

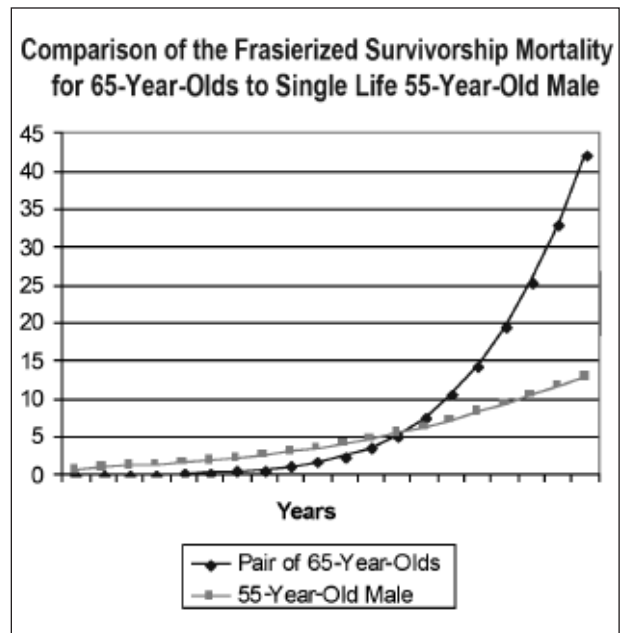
LIMRA data showed an interesting trend for growth rates in 2006 over 2005 (3rd quarter YTD):

Product	Annualized Premium	Face Amount	Policies Issued
Single Life UL	13%	9%	1%
Survivorship UL	-9%	7%	6%

Survivorship products got 15 percent cheaper this year (assuming comparable mix of business between years) and new policies are still being issued despite the estate tax uncertainty.

### Reinsurance and Mortality

Most SUL products today use W.M. Frasier's approach (March 1978 issue of *The Actuary*) for setting COIs, mortality and reinsurance rates. Using Frasier's approach, the second-to-die life expectancy for Male and Female age 65 is 30.3 years (see assumptions listed below). This is comparable to a life expectancy for single life Male age 55 (31.2 years). The chart below compares mortality rates for these cells:



This pattern is the key to the differences for SUL since in the early policy years there are practically no benefits paid. Frasier's approach assumes independence of lives. The most common concerns with the independence assumption are the broken heart factor and common disaster. The broken heart factor is based on a well documented theory that mortality of the survivor is worse after the first death. I came across a few assumptions for broken heart mortality in the actuarial literature. An example would be to increase Male mortality by 100 percent in the first year after the Female's death and increase Female mortality by 50 percent in the first year after the Male's death. However, in practice it is very difficult to isolate this assumption from any published mortality study. Most single life policies are

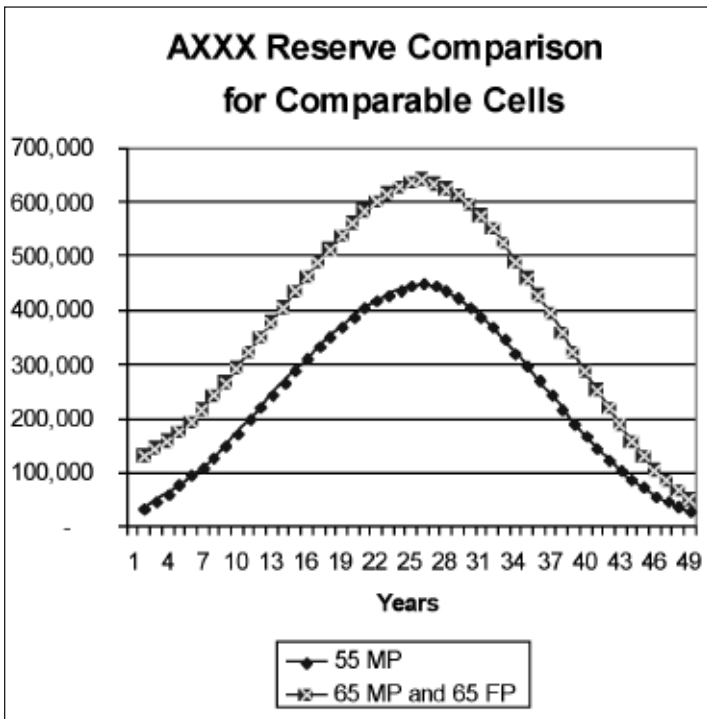
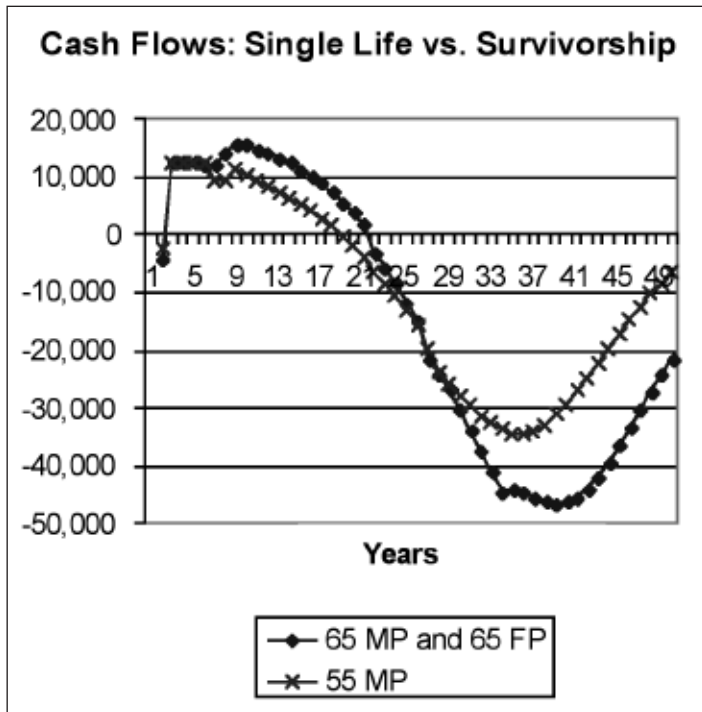
sold to married people, and the heartbreak factor is present in the single life mortality experience. For common disaster, some companies add a small load factor. Again, this is a hard assumption to isolate. From my research, no mortality study subtracts common disaster deaths from the deaths in the study.

**Operation Leverage**

The impact of AXXX reserves is different for survivorship products than it is for single life products. The chart below shows a comparison of AXXX reserves for a \$1 million (M) face amount policy between single life and survivorship UL products with a comparable set of assumptions for Male Preferred NT age 55 and a pair of Preferred NT 65-year-olds. Most companies utilize some form of financial reinsurance for secondary guarantees. SUL would be more sensitive to the cost of the solution and to the capital needs because of the higher reserves. If the company retains the secondary guarantee reserves, careful tax planning needs to take place in order to assure that future pre-tax gains from other sources are greater than the change in AXXX tax reserves.

Since most capital formulas (RBC, MCCR, S&P, etc.) are driven by factors applied to NAR and reserves, SUL would require higher capital per unit of premium.

**Analysis of cash flow characteristics**



Early cash flows for SUL are higher and later cash flows are lower. Mortality rates are higher at later durations. If our model had nonzero lapse rates this difference would have been more pronounced. Since the SUL product usually has lower lapse rates, there would be more survivors subject to high mortality rates at the later durations.

This cash flow pattern offers an opportunity to invest longer or into less liquid assets for SUL. In the early years there is mostly accumulation of cash while pay-out occurs later. This investment strategy would not only match the cash

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flow pattern better, but also provide additional yield from less liquid assets. If a policy develops high cash values, the actuary must be careful not to extend the duration of the portfolio too long due to disintermediation risk. This type of analysis would require an asset model and a good policyholder behavior formula in order to address interest-sensitive lapsation.

### Conclusion

The next time you are pricing SUL and need to explain to management why your assumptions and/or emergence of earnings are different from the most recently priced single life product, consider the following:

- Survivorship UL is sold mostly to meet estate planning needs and the policies are usually much larger than single life.
- SUL has higher NAR, higher AXXX reserves and higher required capital.
- There are some very specific mortality considerations relating to joint accident risk, higher NAR and broken heart syndrome. These might lead to higher reinsurance costs as well.

- Lower lapses and survivorship mortality lead to longer duration liabilities, which present certain yield-enhancement opportunities.

Overall, it is difficult to compare profit metrics for SUL and single life. SUL is more capital intensive and therefore requires a higher present value of earnings to produce the same IRR. □

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## Features

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### 7th Annual Product Development Actuary Symposium

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In this exciting symposium, attendees will learn:

- Mortality and longevity trends in the U.S. population as well as their impacts on the insurance industry.
- How securitization and capital-market solutions are impacting the product development process.
- About the recent SOA and LIMRA survey on product development processes.
- How companies are managing their accumulation life exposures.
- The latest developments in the indexed annuity marketplace.
- The latest trends in the life and annuity industry.
- Advanced pricing techniques.
- How principles-based reserving will impact reinsurance.
- How to compete effectively in the growing retirement marketplace.

Attendees will also have an opportunity to join SOA section sponsors—Product Development, Marketing and Distribution, Reinsurance and Taxation—as they discuss, debate and question the product strategies of experts representing a variety of companies.

### Product Development Boot Camp

June 26-27, 2007—Denver, Colo.

The Product Development Boot Camp will immediately follow the Product Development Actuary Symposium.

Product development is a process. It is a series of events, typically involving several individuals working together, that is continuously evolving. While this process varies from company to company, the basic steps required do not. The Product Development Boot Camp will familiarize participants with how this process flows.

Attendees experienced with product development will explore the following topics:

- Market forces, product mix and trends affecting product development.
- Pricing methodology.
- Product development process.
- Assumption setting.
- Tax considerations.

In addition, case studies focusing on the following three popular products will be presented to illustrate the above points: Universal Life, Return of Premium Term and Variable Annuities. □



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