



# Product Matters!

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## Universal Life With Secondary Guarantees: Stochastic Pricing Analysis

By Andrew Steenman and Rob Stone

**T**his article is based on an excerpt from a Milliman Research Report on universal life insurance with secondary guarantees (ULSG).

### Executive Summary

As part of our research of ULSG products and designs we applied a set of stochastic scenarios as an example of the type of analysis that might be performed when pricing a new product. We observed that, even with a fair mix of up and down scenarios, statutory results and profit measures can be negatively skewed if the products are very sensitive to interest rate volatility. On a GAAP basis, it is cumbersome to review the typical ROE data from the stochastic output. It may be more effective to use point estimate ROE statistics or develop alternative ways to review results.

### Introduction

Stochastic profit analysis has become a more important aspect of the pricing process. It can be applied on both statutory and GAAP bases to analyze how profit measures would be affected under adverse, optimistic, or random scenarios. An obvious practice would be to explore interest rate scenarios, but a more intense approach could utilize alternative combinations of lapse assumptions, mortality assumptions, premium payment patterns, and account value withdrawals. The opportunity exists to generate an exponentially larger stochastic set with each possible assumption and a massive amount of output data for analysis.

The discussion in this article centers around samples of two common variants of ULSGs – level specified premium and single-fund shadow account designs. Our specified premium

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To join the section, SOA members and non-members can locate a membership form on the Product Development Section Web page at [www.soa.org/product-development](http://www.soa.org/product-development).

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## Articles Needed for the Next Issue of *Product Matters!*

While all articles are welcome, we would especially like to receive articles on topics that would be of interest to Product Development Section members based outside of the United States.

Please e-mail your articles to Jim Filmore, Kurt Guske or Paul Fedchak by 3/23/12.

# Chairperson's Corner

By Donna Megregian

I am excited about entering into the chairperson position with the Product Development Section. I want to thank the members of the section that are rotating off this year as their elected terms are up—Paul Flieger, Christie Goodrich and Vera Ljucovic. We appreciate the work you have done and the experience we have benefited from. I am also thankful to Mitch Katcher for his fine year of being the chair (and that he is still around another year to help me through this coming year as the chair). We are excited that three new members have been elected—Stephanie Grass, Kurt Guske and Tim Rozar. Congratulations and welcome. And a huge thank you goes to all the candidates that were on the ballot but were not elected this term. The section will benefit from your ongoing support and consideration for running again in 2012.

Being part of the council is more to me than just a tagline on the resume, and being part of the section should be more than that to its members as well. The sections are there to increase member education and growth in specific areas of practice or interest. Just joining the section without really knowing what is going on or participating is far from the goals of the sections.

We want to involve you as much as we can and as much as you are willing to help out. The council is here not only to help with direction but to facilitate new directions that benefit the whole. We need everyone to give a little of their time to make the section the best it can be.

The section council meets on the third Thursday of every month at 9 a.m. CST. If you would like to know details of the meeting, you can become a friend of the council. This means that you are not a voting member of the council when a vote is required, but you can be a voice that the council listens to in real time as we are discussing things. It will give you a first chance to participate in section council needs such as organizing sessions at the life and annuity symposium and annual meeting, planning for webcasts, ideas for articles for the Product Matters! newsletter and hearing about research topics that the council could sponsor. If you want to get involved, we have a way for you to be. If you want a glimpse of what being on the council could be like, sitting in on the meetings is the easiest way to do that. It's that simple. Send an email to [ccook@soa.org](mailto:ccook@soa.org), and Christy Cook will let us know of your interest in sitting in on the next section council meeting.

Did you know there are forms on the section website that ask how you may be interested in volunteering? The form will ask how you may want to be involved, but maybe it would be easier to tell you about them here. Have you ever heard of a POG? The project oversight group (POG) oversees the research projects from the SOA. If you eagerly await the research generated by the SOA, you can get in on the ground level by being a part of the POG. The POG looks at the Request For Proposal responses and works with the research team to shape the scope and deliverables for a research project. If you've found yourself looking over research and wishing they would have included something else, then maybe a POG is a good fit for you. We want to try to make opportunities more apparent to you via the website and the PM newsletter. If you have an immediate interest in this, contact [rstryker@soa.org](mailto:rstryker@soa.org). Ronora Stryker can tell you when a project may become available that would be of interest to you.

Another way to get involved, consider voicing your opinion on the following topic: the Product Development Section is dedicated to developing and assisting its members in subjects related to individual life and annuity product development. This is written in our bylaws and description on the website. A recent survey conducted by the PD Section polled those people who have dropped their membership since last year. A few answers were obvious as to why membership was dropped, but there were a few responses with a similar theme that were surprising. In short, some people joined the PD Section thinking it was all product development. When they found it to be life and



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annuity focused, they dropped the section. That response led to a question—are we not being clear in our intent? Should we widen the scope of the Product Development Section to coincide with the name? What can we do to make the section more clear in its intent whatever it is determined to be? So the council has discussed a few options:

- Expand the product development scope to include more than just life and annuity;
- Expand the product development scope to include group life and annuity;
- Explore the option of a name change to clarify to potential members what the focus of this section is (One suggestion is the life and annuity product development section → LAPD); and
- Leave everything as is and don't change anything.

We are debating this within the council, but please understand that it should not have to just be a council decision. We want your feedback. You can go to the SOA website on the PD Section webpage and give your feedback or visit our new LinkedIn page at [www.Linkedin.com/group?about=&gid=4227361](http://www.Linkedin.com/group?about=&gid=4227361). You need to request joining the group before you can leave feedback on this issue.

Product development actuaries are facing a number of issues, and the section wants to provide resources to help with those issues. Some of the resources available through the section include research, networking opportunities, session content at meetings, and the Product Matters! newsletter. We strive to provide valuable information to our members and are eager to hear about other ways in which the section could provide material to help others with their daily concerns.

Product development is not only a process but an evolution. Product development actuaries are asked to stretch their thinking with ever changing regulations, economies and experience to provide value-added products to both the company and the consumer. Most actuaries crave data to assist them with their jobs, but that data is not always available. The Product Development Section is concerned about how to most effectively deliver pertinent and time sensitive materials that are useful and relevant. We face a world that is morphing the ways it communicates with others, but we are also able to reach areas of the globe that were much more difficult without social media. Challenging barely describes what we are being asked to face and grasp with every new day we are on the job.

I know that it is not about “I,” but about the “We” of the council and the members that will make the difference over this coming year, and years to come. We are excited about a new year ahead. We hope you will feel the Product Development Section is providing you the most value that it can, but we can always use people and ideas to help make those visions a reality. □

## Model Efficiency Study Results Report Now Posted

The report summarizes the findings of a stochastic modeling efficiency study.

View the report at [SOA.org](http://SOA.org)—click on research, completed research projects and life insurance.

product was designed to offer a modest accumulation of account value over its lifetime. Our shadow account design was created as a pure protection product with negligible account value growth. For an additional iteration we considered the impact of a hypothetical situation in which a company selling a ULSG product could reinsure a portion of each policy, including the secondary guarantee, to a captive. This arrangement would use a letter of credit to back the statutory reserve in excess of an economic reserve.

For our analysis we selected a single pricing cell from a larger model office. The cell was male, standard non-smoker at issue age 55 with a \$1 million average face amount. The pricing cell contained seven policies for \$7 million of total face amount.

Prior to presenting any results, it should be emphasized that work completed for the research report was based on hypothetical product designs. The pricing results were not adjusted to produce particular return levels because this research report was focused on types of analysis and not the creation of the best design. Additionally, actual pricing exercises would include a complete aggregation of business based on anticipated demographics. The single cell chosen for this project does not necessarily produce return levels that would be expected from new product pricing in today's market, but it is intended to be representative.

#### **Financial reporting basics for ULSG**

The analysis was done in a financial reporting construct in accordance with our interpretation and experience with U.S. GAAP and statutory accounting principles, including the UL model regulation, Actuarial Guideline XXXVIII, FAS97, and SOP 03-1. For the projection of the future SOP 03-1 reserve, we used a nested stochastic approach. Our application of these principles represents one of the possible approaches or interpretations.

#### **Profit measures**

We utilize two profit measures commonly applied to insurance products—internal rate of return and return on equity. The internal rate of return (IRR) is the interest rate at which the sum of the discounted future stream of profits is equal to zero. IRR provides a single statistic

with which to evaluate the product, often by comparing it to a benchmark return. For this report we have determined IRR based on statutory distributable earnings (post-tax profits, after provision for required capital).

The return on equity (ROE) is calculated as the after-tax GAAP profit in a period divided by an equity base. While IRR is a point statistic, the basic ROE calculations yield an array of values. The stream of ROE values can be used to analyze the profitability over time or can be summarized into a single statistic using a range of methods. In practice we have found that the sum of annual profits divided by the sum of equity bases and a discounted version of the same formula are common ROE point statistics. The discounted ROE statistic can be used to incorporate a hurdle rate or cost of equity into the calculation; we used an 8 percent discount rate. For our analysis, we examined the overall pattern of ROEs, but found that these point statistics allow for easier summary when comparing scenarios.

#### **Stochastic Profit Analysis**

To create a simplistic example of stochastic analysis, we applied a range of interest rate scenarios to our sample ULSG products. There could be much debate on the number, balance, and type of scenarios to use in this type of analysis, but we elected to use a set of 50 scenarios based on the Dec. 31, 2010 yield curve from a generator provided by the American Academy of Actuaries. With these scenarios, an investment portfolio of 10- and 20-year bonds was used so that interest rates progress somewhat smoothly. The bonds were assumed to be AAA- and A-rated with appropriate spreads included in the yield. Over the projection period and across the 50 scenarios, the average annual return on investment was just above 5 percent. The pattern of average returns is generally upward sloping and ranges from about 4.4 percent in the first investment year to about 6.5 percent in the final year of the projection. We believe these scenarios represented a reasonable range of variation and a reasonable long-term reversion point.

#### **ULSG Design: Specified premium**

- The IRR from the stochastic projections are summarized in Figure (pg. 6, top, left). Note that the base scenario IRR for this product was 7.2 percent.

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Figure 1: ULSG Specified Premium Design IRR From Stochastic Projections	
IRR Range	Number of Scenarios
Undefined	1
0% to 1.99%	1
2% to 3.99%	10
4% to 5.99%	18
6% to 7.99%	14
8% to 9.99%	3
10% and larger	3
Average IRR	5.50%

Figure 3: ULSG Shadow Account Design IRR From Stochastic Projections	
IRR Range	Number of Scenarios
Undefined	4
0% to 1.99%	11
2% to 3.99%	16
4% to 5.99%	12
6% to 7.99%	3
8% to 9.99%	3
10% and larger	1
Average IRR	3.61%

- The chart in Figure 2 presents stochastic results for the analysis of the GAAP profits. Note that base scenario point statistic ROEs for this product were 6.4 percent using sums and 7.3 percent with discounting.

- The chart in Figure 4 presents stochastic results for the analysis of the GAAP profits. Note that base scenario point statistic ROEs for this product were 5.4 percent using sums and 4.6 percent with discounting.

Figure 2: ULSG Specified Premium Design ROE From Stochastic Projections		
ROE Range	Number of Scenarios	
	Sum	8% Discount Rate
Negative	1	0
0% to 1.99%	3	0
2% to 3.99%	16	5
4% to 5.99%	16	23
6% to 7.99%	9	15
8% to 9.99%	3	4
10% and larger	2	3
Average ROE	4.83%	6.20%

Figure 4: ULSG Shadow Account Design ROE From Stochastic Projections		
ROE Range	Number of Scenarios	
	Sum	8% Discount Rate
Negative	4	11
0% to 1.99%	6	18
2% to 3.99%	9	10
4% to 5.99%	9	5
6% to 7.99%	6	2
8% to 9.99%	7	1
10% and larger	9	3
Average ROE	6.24%	2.21%

**ULSG Design: Shadow account**

- The IRR from the stochastic projections are summarized in Figure 3 (above, right). Note that the base scenario IRR for this product was 5.1 percent.

In these tests almost all the results of the stochastic scenarios were skewed negatively, but a handful of scenarios had positive impacts on profitability. We found that this effect was only slightly attributable to scenario bias, because almost half of the scenarios showed an average investment return larger than the average scenario. Our conclusion was that the volatility of the investment returns has a large impact on results. The impact of the investment volatility was visible primarily in the investment income lines of the statutory and GAAP income statements.

The volatility of the investment returns also impacted the projected credited rates on the base account value. In the cases where investment returns were poor, the secondary guarantee in both designs kept the policy in force despite the policy's running out of account value in earlier durations compared to higher return scenarios. However, we found that even in scenarios with generally above average returns, a few, intermittent years of poor investment returns could reduce profitability.

Additionally, the summed ROE point statistics for the shadow account product indicated a generally positive effect of the stochastic scenarios while the IRR and discounted ROE statistics showed mostly negative results. This occurred because both statutory and GAAP profits tended to be lower or negative in early years and higher and positive in later years.

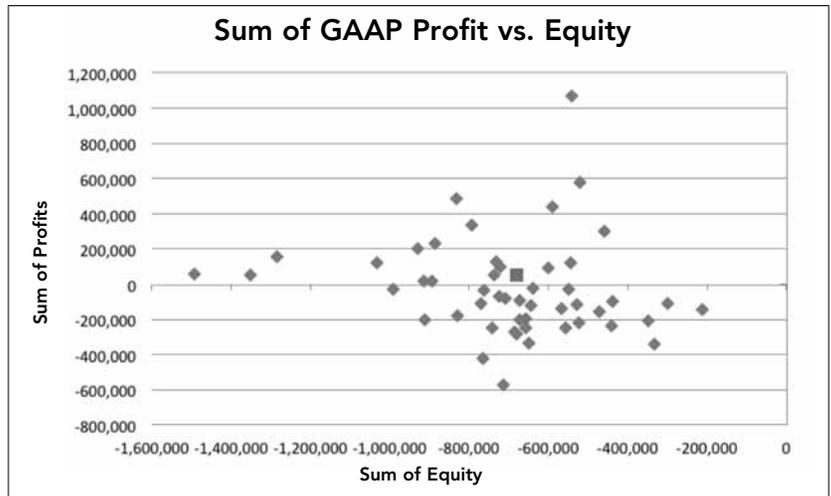
**ULSG Design: Shadow account with financing solution**

We also applied the stochastic analysis to the shadow account product after creating a hypothetical financing solution. On a statutory basis we found that the present value of profits at sample discount rates increased for almost every scenario. However, the shape of the general profit pattern changed in such a way that an IRR could not be calculated for most scenarios. It turns out that those scenarios had small positive IRRs and negative present values of profit without the financing solution, and even though the financing solution improved the profitability, the present value of profits remained negative. On scenarios where the present value of profits was already positive, the IRRs were calculable and increased compared to the results without financing.

Analyzing the stochastic GAAP profit results for the product with a financing solution, we found that the point estimate ROEs tended to be negative or large because of negative sums of equity in the denominator for the sum statistics and small positive present values of equity in the denominator for the discounted statistics. This reduced the effectiveness of the point estimates for summarizing the underlying profitability.

Because our typical analysis didn't provide much insight, we looked for alternative summaries of the data. An interesting concept is to plot a data point for each scenario with the sum of profits and equity as the

Figure 5: Plot of GAAP Profit vs. Equity



coordinates. This allowed us to get some sense of how the scenarios impacted results.

We also considered a quadrant system to categorize results:

- Quadrant I contains scenarios with positive profits and equity, which may be desirable if the ROE for the scenario is sufficient. No scenarios fell into this quadrant, and it is not shown on the chart above.
- Quadrant II contains scenarios with positive profits and negative equity. These scenarios may be considered desirable outcomes.
- The scenarios in Quadrant III can be viewed as a mix of good and bad results. The negative present value of equity means that the projected cell would generate new equity that could be applied elsewhere. For some scenarios the negative present value of profits could represent a fair cost for this equity. A company would have to decide where to draw the line on acceptable outcomes.
- Quadrant IV contains scenarios with negative profits and positive equity. These are the worst outcomes because they consume capital and do not generate a return. No scenarios fell into this quadrant, and it is not shown on the chart below.

The chart in Figure 5 (above) plots the sums of equity and profits. The point marked as a square represents the results from the base scenario. □



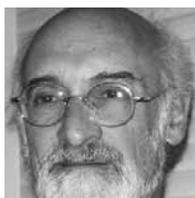
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# Retooling For Success In The **Post-Retirement Market**

By Steve Cooperstein



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**R**ecently, I authored a Product Development Section sponsored research report for the SOA entitled Implications of the Perceptions of Post Retirement Risk for the Life Insurance Industry > Marketing Opportunity But Requiring Retooling (<http://tinyurl.com/4222kg5>). The report offers a panoply of perceptions of, and implications for, “capturing” the post-retirement market. I would like to dig a little deeper into the “Product enhancements” retooling suggested in the report (starting on page 106), particularly “Reframing the power of life contingent annuities” on page 107, and encourage you to offer your thoughts and questions on the Product Development Group at LinkedIn (<http://www.linkedin.com>).

## Overview

The overall implication of the study is that there are opportunities for providing financial services for the near- and post-retirement market that go well beyond just the boomers reaching retirement.

Most particularly, there is a need for:

- Advice for the numerous individuals who are:
  - Under-funded for retirement (including even the middle affluent); and
  - Under-cognizant of the financial risks involved.
- Financial instruments that can most effectively serve their needs.

The report also suggests that the insurance industry is uniquely positioned for success in this market, especially those that are willing to retool product, market, and/or distribution aspects of their business.

## Product Enhancements

The product enhancements section highlights the need for retooling to make up for timing and marketing compromised offerings to date. This has resulted in selling less than optimal retirement solutions and limited market share (from a total retirement dollar perspective).

Consumers are getting the message about risk, but still want their cake (the potential of equity returns).

As a result, the industry has offered frosting to make it tastier (downside protection), but doesn't clearly tell them the guarantees can have ingredients that may not be that healthy (costs, limits, gaps, etc.). This has been done instead of offering harder to sell veggies more suitable to their life situations (effective longevity and long-term care insurance funding mechanisms).

## Reframing The Power Of Life Contingent Annuities

A cornerstone to success in this market is to retool the insurance industry's unique match for this market—life contingent annuities—to overcome consumer (and perhaps distributor) trepidation about it.

Behavioral studies cited suggest that presentation of life annuities need to be reframed to show how they effectively satisfy the need for an income stream in retirement. Others are revamping their investment portfolio optimization to recognize lifetime income fulfillment as a key objective, and life contingent annuities as an effective asset class in this regard. Several insurers have now set up behavioral finance departments along these lines.

While there have been many tweaks of life contingent products themselves, they remain much the same. Essentially, the policyholder pays the insurance company a lump sum and gets a lifetime income stream that contains little after-purchase recourse for the bet. The paper's contention is that this black box approach is too scary for new retirees facing the emotional and economically staggering prospects of no longer earning an income stream.

The paper introduces an unbundled/transparent view (analogous to Universal Life) to encourage retooling the product itself. A simple guaranteed form is presented as follows:

“ this retrospective view brings new light to how the product works, not only for distributors and consumers, but also for manufacturers. ”

The paper notes that this retrospective view brings new light to how the product works, not only for distributors and consumers, but also for manufacturers. This allows for development of additional features for satisfying the product's and market's demands.

This transparent presentation draws one to compare this product to other investments that do not offer living credits. Such a product with the same 5 percent guaranteed crediting rate through age 115 (if there was such a creature), allowing a guaranteed withdrawal of \$3,404. As shown, living credits resulting from foregoing account balances on death allows guaranteed withdrawals to be increased to \$9,925 a year! That is a pretty powerful statement of the leveraging of life contingent annuities. The result is significantly more income for as long as you live (regardless of how long you live) from the assets you have accumulated to fund a worry-free retirement. How many potential retirees, who are being told they don't have enough at a 4 percent "safe" withdrawal rate, would revel in that?

Another potential game changing feature that suggests itself is the possibility of offering guaranteed base interest and mortality rates, and current year declarations. For insurers this could mitigate longevity and interest reinvestment risk. For purchasers, it allows control of their investment prospects, especially key in today's low interest rate environment. It also permits a structure that offers inflation-like ladder layers of guaranteed lifetime income from the declarations.

Showing account values would also put pressure on innovation to allow access to them.

The format also paves the way for showing and explaining the differences between the deferral and payout periods, and clarifies differences between immediate life contingent annuities, deferred life contingent annuities, and lifetime income rider guarantees. Most importantly this format highlights the unique benefits that are proprietary to the life insurance industry life annuities, opening the door to their being widely adopted as a floor financial instrument for retirement.

	Begin		Living	Income	End of Year
Age	Acct Value	Interest	Credits	Payout	Acct Value
70	\$100,000	\$5,000	\$1,814	\$9,925	\$96,888
71	\$96,888	\$4,844	\$1,959	\$9,925	\$93,766
80	\$68,945	\$3,447	\$3,494	\$9,925	\$65,960
90	\$42,150	\$2,107	\$5,594	\$9,925	\$39,925
100	\$22,670	\$1,134	\$6,943	\$9,925	\$20,821
110	\$5,649	\$282	\$8,328	\$9,925	\$4,334
114	\$994	\$50	\$9,354	\$9,925	\$473
115	\$473	\$24	\$9,429	\$9,925	\$0

[The illustration is of a life only payout annuity to a male age 70, assuming for simplicity that the pricing is based on a guaranteed 5 percent interest and the 2000 Annuity Mortality Table throughout, and results in a payout of \$9,925 payable annually for a \$100,000 purchase payment.]

With familiarity, insurance products in general might come into use with less trepidation by advisors and consumers.

Please note that while the aim of this discussion is to open further exploration of retooling life contingent annuities, I need to mention that I hold a United States Patent #5893071 about the unbundled approach. A lease on the patent is available on a nominal basis, so hopefully this discussion will not be inhibited from opening the door for more exploration within and outside the realms of the patent.

### Discussion On LinkedIn

As noted above, I would love us to share thoughts and further exploration together. A Product Development Group has been set up on LinkedIn exclusively for members of the Product Development Section. I will initiate further discussion there along these lines and look forward to your thoughts and other discussion topics that you initiate there. □

# Product Development Section 2012 Council Elections

By Christy Cook and Paul Fedchak

**W**ith the commencement of the new year, it is time again to welcome our new Product Development Section council members. The section offers its sincere gratitude to the outgoing council members of Christie Goodrich, Vera Ljucovic, and Paul Pflieger.

In the fall, section members cast their votes and we are pleased to announce the results. Returning to the council for 2012 are Lisa Renetzky, Rhonda Elming, Paula Hodges, Stephen Peeples and outgoing chair Mitch Katcher. Much thanks to Mitch for his year of leadership and continued commitment to the section. Also returning for 2012 is new chairperson Donna Megregian. The newest members of the section council are Stephanie Grass, Kurt Guske, and Tim Rozar. We are excited to welcome the new members and pleased to introduce them to the section.

**Stephanie Grass** is a consulting actuary with Towers Watson in St. Louis. In her current role, she provides consulting assistance to the insurance industry with a focus on the universal life and term life insurance product markets. Stephanie has been involved in a wide range of consulting assignments, including actuarial analysis and modeling supporting securitization and excess reserve financing transactions, actuarial assumption reviews, product development and pricing, and due diligence support for buy-and-sell side appraisals. She also serves as the universal life subject matter expert, supporting the software division of Towers Watson. Stephanie has spoken at several industry meetings, and has served as a volunteer for the Product Development Section in planning the SOA Life and Annuity Symposium. Stephanie is a fellow of the Society of Actuaries (FSA), a Chartered Enterprise Risk Analyst (CERA), and a member of the American Academy of Actuaries (MAAA).

**Kurt Guske** is vice president, Life Product Manager at Protective Life Insurance Company. Kurt's specialty is life product development, and he has served 25 years in direct stock and mutual company product development, pricing, marketing and valuation areas. Kurt's Society of Actuaries experience includes serving on SOA exam committees, serving as chair for Exam 8-ILA, and vice

chair for Question Writing Committee, Exam 8-ILA and ILA-DP, and actively participating on the ILA-DP Question Writing Committee. Kurt's professional background includes working with all of the current life products on the market, and being involved in the industry's response to the many regulatory changes that have occurred over the last two decades. He has recently served on ACLI Principle Based Reserves committees and made contributions to VM-20. He also has experience designing, pricing, marketing, and valuing insurance products from participating whole life to income annuities to, most recently, secondary guarantee universal life. Kurt is a fellow of the Society of Actuaries (FSA) and a member of the American Academy of Actuaries (MAAA).

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<http://HealthSpringMeeting.soa.org>.

# SOA International Experience Survey—Embedded Value Financial Assumptions

By Charles Carroll<sup>1</sup>, William Horbatt and Dominique Lebel<sup>2</sup>

Starting in 2003, the Society of Actuaries International Experience Study Working Group has been conducting surveys of published embedded value (EV) financial assumptions.<sup>3</sup> This article updates the survey with 2010 data.

- Property return<sup>4</sup>—the total return on investments in real estate;
- Fixed return<sup>4</sup>—the yield on a corporate bond portfolio held by an insurance company;
- Risk-free return—typically the yield on a 10-year bond offered by the local government or the 10-year swap rate (swap rates are commonly used as risk-free yields for MCEV purposes);
- Inflation—the rate used to increase future expenses and, possibly, revalue policy terms that are tied to inflation; and
- Tax rates—income tax rates by jurisdiction.

These results are presented in two separate tables. Table 1 provides the number of companies contributing data as well as discount rates for TEV companies and the implied discount rates for MCEV companies. Table 2 contains the rest of the financial data.

When reading Table 1 (pg. 13), several thoughts should be kept in mind:

- The methodologies followed by the companies to determine discount rates were as follows:

Methodology	Number of Companies
MCEV	28
WACC	10

## LIMITATIONS

Readers should use judgment when interpreting the results of the survey and note that:

- When comparing one assumption to another, it should be noted that different companies might be contributing data to different assumptions, so that differences between variables may reflect differences between companies, rather than differences between the assumptions.
- Some cells include data from many companies, while others include data from as few as one company.

## COMPANIES INCLUDED IN SURVEY

Aegon	Ageas
Allianz	AMP
Aviva	AXA
Chesnara	CNP
Dai-ichi	Delta Lloyd
Eureko	Generali
Groupama	Hannover Re
Himawari	Ind. Alliance
Irish Life & Perm	KBC
Legal & Gen	Lloyds Banking Grp
ManuLife	Mediolanum
Mitusi	Munich Re
Old Mutual	Prudential UK
Royal London	SCOR
SJP	SNS Real
SONY	Standard Life
Swiss Life	T&D
Uniqa	Vienna
Vital	Zurich

The purpose of this survey is to provide international actuaries with benchmark assumption data. Since many companies make this information publicly available, no formal data request was issued. Instead, the survey was based on reports published on the Internet by 38 companies centered in Asia, Australia, Canada and Europe, many of which are active internationally. The same 38 companies were included in the 2009 survey.

Each financial assumption presented in this article is the average value of the assumption reported by all companies in their 2010 embedded value reports. If no companies reported a specific assumption in a given country, then that assumption is labeled “NA” to signify that data is not available. Some companies vary assumptions by calendar year, while other companies use a single assumption; if a company varies an assumption by calendar year, the value for the earliest period is used in this study.

## Financial Assumptions From Survey

Financial assumptions presented in this article include:

- Discount rate—for companies with traditional embedded value (TEV) calculations, the rate used to calculate the present value of future distributable earnings;
- Implied discount rate—for companies with market consistent embedded value (MCEV) calculations, the TEV discount rate that when used to discount “real world” cash flows, would produce the MCEV;
- Equity return<sup>4</sup>—the total return on common stock investments;

- A methodology is considered market consistent if conceptually each cash flow is valued consistently with traded instruments that display similar risks. Thus under the MCEV approach each cash flow is theoretically discounted using a risk discount rate (RDR) appropriate for valuing similar cash flows in the market.
- Companies following MCEV strictly speaking do not have risk discount rates that are comparable to those used by companies employing a more traditional approach. For companies employing an MCEV methodology, discount rates in Table 1 are the RDRs inferred from the MCEV calculation. That is, they are discount rates that would develop the MCEV value using TEV techniques and assumptions. Many companies that publish MCEV results do not publish implied discount rates.
- Companies that explicitly set risk discount rates are referred to as calculating traditional embedded values. A common method used by these companies is to set the risk discount rate equal to the company's own weighted average cost of capital (WACC).

When reading this and other tables, it should be noted that some companies use identical assumptions for multiple countries (on the basis that this results in immaterial differences), and this practice would tend to dampen differences between countries.

**Table 1: Average 2010 Explicit and Implicit Discount Rates**

Country	Companies	Traditional		Implied Discount Rate		
		Discount Rate		Companies	(In Force)	(New Business)
		(1)			(2)	(3)
<b>America Latin</b>						
Brazil	1	6.5%		0	NA	NA
Mexico	1	11.4%		0	NA	NA
<b>America North</b>						
Canada	3	7.3%		1	6.9%	6.5%
US	4	7.5%		2	19.2%	15.8%
<b>Asia / Pacific</b>						
Australia	1	8.6%		1	7.7%	7.1%
China	2	10.7%		0	NA	NA
Hong Kong	2	6.7%		1	6.8%	5.3%
Indonesia	1	13.0%		0	NA	NA
Japan	2	5.6%		1	4.9%	2.6%
Malaysia	1	7.1%		0	NA	NA
New Zealand	1	9.0%		1	7.7%	7.1%
Philippines	1	13.2%		0	NA	NA
Singapore	1	6.1%		0	NA	NA
South Korea	1	8.1%		0	NA	NA
Taiwan	1	5.2%		0	NA	NA
Thailand	1	10.5%		0	NA	NA
Vietnam	1	18.9%		0	NA	NA
<b>Asia / Mideast</b>						
India	1	13.1%		0	NA	NA
Turkey	1	15.0%		0	NA	NA

Europe Central							
	Czech	1	8.8%		1	6.8%	6.4%
	Greece *	1	8.3%		0	NA	NA
	Hungary	1	13.0%		0	NA	NA
	Poland	1	10.6%		1	7.3%	7.3%
	Romania	2	11.1%		0	NA	NA
	Slovakia	2	8.4%		0	NA	NA
Europe Western							
	Belgium *	1	7.8%		1	8.9%	6.8%
	France *	2	7.5%		3	6.9%	6.0%
	Germany *	1	7.8%		3	5.5%	5.1%
	Ireland *	2	7.6%		3	5.4%	5.6%
	Italy *	0	NA		3	7.5%	7.2%
	Netherlands *	5	7.3%		1	14.8%	14.8%
	Norway	1	7.0%		0	NA	NA
	Spain *	1	8.4%		2	7.8%	7.9%
	Switzerland	0	NA		1	3.8%	3.5%
	UK	4	7.4%		3	7.4%	6.9%

\* euro currency zone

A few observations can be made concerning Table 1 when compared to similar data published last year<sup>5</sup>:

- Traditional discount rates generally decreased or remained constant. Exceptions included Vietnam, Czech Republic, Hungary, Poland, France, and Ireland where they increased.
- Decreases were more than 2 percent except in Malaysia, Philippines, Taiwan, Thailand and Romania. Increases were less than 1 percent except in Vietnam.
- Implied discount rate changes were more mixed with some increasing and others decreasing. The largest change was a decrease in the average implied discount rate for the United States. However, the average implied discount rate still remains higher than for any other country. The next highest implied discount rate is that for the Netherlands.

The second table presents the balance of the financial assumptions used in embedded value calculations. Note that:

- Equity and property returns normally include both cash income (that is, stockholder dividends and rental payments) and asset value appreciation (or depreciation), and these yields may be reported net of investment expenses. Alternatively, equity returns may represent a fund appreciation prior to any fees or charges made against the fund. In all cases, equity and property returns will be influenced by company investment strategy.
- Fixed returns reflect the investments in an insurer's bond portfolio. Amortized book yields are typically used in countries where investments are accounted for on an amortized cost basis, while current market redemption yields are used when investments are accounted for on a market value basis. Companies generally do not disclose whether the fixed income returns are net of defaults or investment expenses.
- The inflation assumption may differ from general inflation (for example, the increase in a consumer price index).
- Tax rates are dependent upon individual company circumstances (for example, the existence of tax loss carry forwards) and thus these rates cannot necessarily be applied to other companies.

**Table 2: Average 2010 Financial Assumptions**

	Companies	Equity Return	Property Return	Fixed Return	Government Return	Inflation	Income Tax Rates
Country	(4)	(5)	(6)	(7)	(8)	(9)	
<b>Africa</b>							
South Africa	2	11.7%	9.7%	NA	8.2%	7.2%	35.3%
<b>America Latin</b>							
Brazil	1	12.0%	NA	13.5%	NA	5.0%	40.0%
Mexico	1	NA	NA	NA	4.9%	4.4%	40.0%
<b>America North</b>							
Canada	6	8.1%	7.1%	4.0%	3.3%	1.6%	26.2%
US	17	7.5%	6.0%	5.2%	3.8%	2.6%	34.2%
<b>Asia / Pacific</b>							
Australia	3	9.3%	7.7%	7.2%	5.6%	2.8%	30.0%
China	3	10.9%	NA	5.5%	4.0%	2.8%	25.0%
Hong Kong	5	8.0%	5.6%	6.0%	3.3%	2.4%	16.5%
Indonesia	1	NA	NA	NA	7.8%	5.0%	NA
Japan	10	4.8%	3.4%	2.1%	1.2%	0.3%	36.0%
Malaysia	2	10.0%	NA	NA	4.0%	2.5%	22.0%
New Zealand	2	9.0%	8.0%	6.5%	6.0%	3.0%	30.0%
Philippines	1	NA	NA	NA	6.4%	4.0%	NA
Singapore	2	8.7%	NA	NA	2.7%	2.0%	18.0%
South Korea	3	9.6%	5.6%	NA	4.6%	3.0%	23.1%
Taiwan	2	NA	NA	NA	1.6%	1.0%	NA
Thailand	2	NA	NA	NA	3.8%	3.0%	NA
Vietnam	1	NA	NA	NA	12.1%	5.5%	NA
<b>Asia / Mideast</b>							
India	1	NA	NA	NA	8.1%	4.0%	NA
Isreal	1	NA	NA	NA	2.2%	NA	NA
Turkey	2	15.0%	NA	NA	8.5%	5.0%	20.0%
<b>Europe Central</b>							
Croatia	1	NA	NA	NA	NA	NA	20.0%
Czech	7	6.7%	5.6%	4.6%	4.1%	2.0%	18.1%
Greece *	2	8.0%	7.0%	5.0%	NA	3.3%	22.0%
Hungary	5	13.0%	13.0%	NA	8.0%	2.5%	19.8%
Poland	6	9.9%	7.7%	NA	6.1%	2.8%	19.0%
Romania	4	10.2%	7.9%	5.9%	7.0%	4.0%	16.0%
Slovakia	3	7.8%	6.1%	4.1%	3.3%	2.7%	19.0%

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Europe Western								
	Austria *	2	NA	NA	NA	NA	2.0%	25.0%
	Belgium *	4	7.4%	6.1%	4.6%	3.4%	1.9%	34.0%
	France *	12	7.3%	5.1%	4.4%	3.3%	2.1%	34.3%
	Germany *	11	7.2%	5.0%	3.9%	3.1%	2.1%	31.5%
	Ireland *	8	6.9%	5.9%	4.7%	3.7%	2.7%	12.5%
	Italy *	9	7.2%	4.8%	4.2%	4.8%	2.1%	32.6%
	Lichtenstein	1	7.3%	5.3%	NA	NA	NA	13.0%
	Luxembourg *	2	6.8%	5.3%	NA	NA	NA	22.0%
	Netherlands *	6	7.2%	6.0%	4.0%	3.4%	1.8%	24.5%
	Norway	1	7.4%	6.2%	3.7%	NA	3.5%	28.0%
	Portugal *	2	6.2%	5.2%	NA	NA	NA	26.5%
	Spain *	6	7.2%	6.9%	4.6%	3.3%	2.1%	30.0%
	Sweden	3	6.7%	5.7%	NA	3.7%	2.8%	26.3%
	Switzerland	5	6.5%	4.6%	3.8%	NA	1.2%	21.4%
	UK	19	7.4%	6.2%	4.3%	3.8%	3.7%	25.3%

\* euro currency zone

A few observations can be made concerning Table 2 when compared to similar data published last year<sup>6</sup>:

- Average 2010 government return assumptions decreased from last year for most countries. The most significant decrease was for Taiwan where government return assumptions decreased by 3.9 percent from 5.5 percent in 2009 to 1.6 percent. Government return assumptions increased for Vietnam and Italy, while government return assumptions did not change for Hungary and Sweden. It should be noted that for each of these countries, 2010 results were only available from one company.
- Average 2010 tax rate assumptions did not change significantly overall from 2009, but it is worth noting that the average tax rate assumption for Malaysia and the United States increased by 5.6 percent (from 16.4 percent to 22.0 percent) and 4.0 percent (from about 30.1 percent to 34.2 percent) respectively. 2010 results were available from one company for Malaysia and eight companies for the United States.

It should be noted that several companies calculating MCEVs as of year-end 2010 adjusted their risk-free rates by including an illiquidity premium adjustment resulting in a higher risk-free return.

### Investment Premiums and Other Marginal Relationships

Investment premiums are the additional yield an investor is expected to receive by purchasing an asset other than a government bond.

- Equity Premium—the excess yield from investing in common stock over the risk-free return,
- Property Premium—the excess yield from investing in real estate over the risk-free return, and
- Credit spread—the excess yield from investing in a mix of corporate and government bonds over the risk-free return.

In addition the following two marginal relationships may be of interest:

- Risk premium—the excess of the traditional embedded value discount rate over the risk-free return, and
- Real return—the excess of the riskfree return over inflation.

Table 3 (pg. 17) presents the marginal relationships derived from Table 2. The column numbering continues the numbering in the prior table.

**Table 3: Investment Premiums and Other Marginal Relationships**

		Traditional Risk Premium	Equity Premium	Property Premium	Credit Spread	Real Return
	Country	(10)=(1)-(7)**	(11)=(4)-(7)**	(12)=(5)-(7)**	(13)=(6)-(7)**	(14)=(7)-(8)**
Africa						
	South Africa	NA	3.5%	1.5%	NA	1.0%
America Latin						
	Mexico	6.5%	NA	NA	NA	0.5%
America North						
	Canada	4.0%	4.7%	5.3%	1.2%	1.7%
	US	3.6%	4.3%	3.7%	1.7%	0.9%
Asia / Pacific						
	Australia	3.0%	3.0%	2.0%	0.5%	2.6%
	China	6.7%	6.8%	NA	1.4%	1.3%
	Hong Kong	3.4%	5.1%	NA	NA	1.1%
	Indonesia	5.3%	NA	NA	NA	2.8%
	Japan	4.4%	3.5%	NA	0.3%	NA
	Malaysia	3.1%	6.0%	NA	NA	1.5%
	New Zealand	3.0%	3.0%	2.0%	0.5%	3.0%
	Philippines	6.8%	NA	NA	NA	2.4%
	Singapore	3.4%	6.0%	NA	NA	0.7%
	South Korea	3.5%	NA	NA	NA	1.6%
	Taiwan	3.6%	NA	NA	NA	0.6%
	Thailand	6.7%	NA	NA	NA	0.8%
	Vietnam	6.8%	NA	NA	NA	6.6%
Asia / Mideast						
	India	5.0%	NA	NA	NA	4.1%
	Turkey	6.5%	6.5%	NA	NA	3.5%
Europe Central						
	Czech	4.9%	3.4%	2.9%	NA	1.9%
	Hungary	5.0%	5.0%	5.0%	NA	5.0%
	Poland	4.5%	4.5%	NA	NA	3.1%
	Romania	4.5%	4.5%	NA	NA	2.8%
	Russia	NA	NA	NA	NA	NA
	Slovakia	5.1%	5.1%	NA	NA	0.3%
	Romania	1.5%	1.5%	0.0%	0.0%	0.9%
	Slovakia	0.2%	0.0%	2.6%	2.6%	0.0%

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		Traditional Risk Premium	Equity Premium	Property Premium	Credit Spread	Real Return
Europe Western						
	Belgium *	4.3%	5.2%	3.7%	0.6%	1.4%
	France *	4.2%	3.8%	1.5%	0.6%	1.3%
	Germany *	4.3%	3.1%	1.7%	-1.1%	1.0%
	Ireland *	3.1%	3.0%	2.0%	3.0%	0.7%
	Italy *	NA	1.1%	-0.7%	NA	NA
	Netherlands *	4.2%	4.3%	3.0%	0.8%	1.8%
	Spain *	5.1%	5.1%	5.1%	1.3%	1.3%
	Sweden	NA	3.0%	2.0%	NA	0.5%
	UK	3.6%	3.4%	2.6%	0.4%	-0.2%

\* = euro zone

\*\* = calculated including only companies with complete data

A few observations can be made when comparing Table 3 to last year's results:

- Traditional risk premiums changed most significantly in Cyprus and Croatia (decreases of 4.8% and 4.0% respectively).
- Equity premiums changed most significantly in Japan and Spain (increases of 5.3% and 4.0%).
- Property premiums changed most significantly in Spain and Hungary (increases of 4.0% and 3.0%).
- Credit spreads changed most significantly in Romania and Ireland (increases of 2.2% and 1.5% respectively).
- Real returns generally decreased except for a few countries in Asia/Pacific and Europe.

Please note that the data is relatively sparse outside of Western Europe and North America, so observations and conclusions could be different if additional data was available.

### Stochastic Market Assumptions

A number of companies are calculating the values of options and guarantees following stochastic approaches. Thirty of the 38 companies surveyed disclosed some level of stochastic market assumptions in their 2010 embedded value reports. Averages of several of these assumptions are shown in Table 4 (volatility may also be referred to as standard deviation).

**Table 4: Sample Stochastic Assumptions<sup>7</sup>**

Country	Risk Free		Equity		Property	
	Rate	Volatility	Rate	Volatility	Rate	Volatility
Africa						
South Africa	8.0%	NA	11.7%	27.0%	9.7%	15.9%
America North						
Canada	3.5%	NA	NA	NA	5.5%	NA
US	3.7%	17.1%	7.4%	25.1%	6.5%	12.8%

Asia / Pacific							
	Australia	6.2%	NA	NA	NA	NA	NA
	Hong Kong	3.2%	22.5%	6.2%	23.8%	5.2%	28.0%
	Japan	1.1%	23.4%	4.7%	22.3%	1.7%	23.9%
	South Korea	4.6%	12.8%	NA	22.7%	NA	13.8%
	Taiwan	1.9%	NA	NA	NA	NA	NA
	Thailand	4.1%	NA	NA	NA	NA	NA
Asia / Mideast							
	Isreal	2.2%	NA	NA	NA	NA	NA
Europe Central							
	Croatia	6.1%	17.6%	NA	23.9%	NA	NA
	Czech	3.4%	17.7%	NA	25.3%	2.6%	NA
	Hungary	7.3%	17.6%	NA	24.1%	NA	NA
	Poland	5.7%	19.9%	NA	24.1%	NA	NA
	Romania	6.1%	17.6%	NA	23.9%	NA	NA
	Slovakia	3.4%	17.6%	NA	24.4%	NA	NA
Europe Western							
	Austria *	3.5%	17.6%	NA	24.1%	NA	NA
	Belgium *	3.8%	15.4%	7.4%	23.8%	6.1%	13.6%
	France *	3.5%	17.4%	7.1%	26.0%	5.5%	13.5%
	Germany *	3.4%	17.1%	7.6%	26.0%	5.5%	14.2%
	Ireland *	3.7%	14.3%	5.5%	25.6%	4.7%	18.1%
	Italy *	3.6%	18.2%	7.5%	25.8%	5.4%	14.6%
	Lichtenstein	3.3%	18.2%	7.3%	27.3%	5.3%	13.0%
	Luxembourg *	3.3%	16.1%	6.8%	23.1%	5.3%	12.6%
	Netherlands *	4.2%	6.4%	8.0%	22.9%	7.5%	15.7%
	Norway	NA	NA	7.7%	25.8%	6.2%	6.4%
	Portugal *	3.8%	16.0%	6.2%	22.4%	5.2%	13.6%
	Spain *	3.6%	18.7%	6.3%	27.4%	NA	14.8%
	Sweden	3.5%	NA	6.7%	NA	5.7%	NA
	Switzerland	2.2%	28.2%	6.1%	21.7%	5.5%	10.3%
	UK	3.7%	10.3%	6.8%	23.9%	5.8%	14.3%

\* = euro zone

\*\* = calculated including only companies with complete data

Note that some companies reported volatility without reporting yields. Some companies determined volatilities from historical market experience while others measured the implied volatility in current derivative prices, which may result in significant differences between companies.

## New Developments in 2010

It has been our practice to comment on new developments each year. Last year the article addressed provisions for nonhedgeable risks and 2010 practices were largely consistent with 2009 practices. This year comments will be made on liquidity premiums and the emergence of EV over time.

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## Liquidity Premium

In last year’s study we included data for the first time on companies’ assumptions with regard to liquidity premiums.<sup>8</sup> This year there has been some further evolution of practice in this area. A number of companies have adopted a consensus approach to quantifying the liquidity premium. This approach was recommended by the European CFO Forum and CRO Forum for use in the QIS5 study in connection with the development of Solvency II capital standards. Under this approach a simplified formula is used to estimate the liquidity premium available in a particular market. Products are classified into “buckets” based on how predictable the cash flows are, and a sliding scale of percentages (100 percent, 75 percent, 50 percent and 0 percent) is applied to the full liquidity premium to arrive at the liquidity premium for each product type. For example, immediate annuities are generally classified in the 100 percent bucket, and variable deferred annuities would be classified in the 0 percent bucket.

Thirteen companies disclosed information about the liquidity premiums they used in computing 2010 embedded values for at least some portion of their business. (Two companies made specific mention of the fact that they did not apply any liquidity premiums in their calculations.) Of these thirteen companies, seven indicated that they based their liquidity premiums on the CFO/CRO Forum recommended approach for QIS5. Five of the seven companies disclosed the liquidity premium for the 100 percent bucket by currency. The other two companies disclosed the range of weighted average liquidity premiums for the various legal entities in their group. The arithmetic average liquidity premiums disclosed by the five companies that disclosed the value for the 100 percent bucket are shown in Table 5.

**Table 5**

Liquidity Premiums	
Currency	Average
EUR	0.40%
USD	0.59%
GBP	0.89%
CHF	0.08%

Of the remaining six companies that disclosed data on their liquidity premiums, three used a liquidity premium that did not vary by product. The liquidity premiums for these three companies were relatively small, ranging from 14 to 25 basis points for the Euro currency as of 2010 year end. The three remaining companies disclosed that they applied liquidity premiums for one or two product groups only, most commonly immediate annuities. The liquidity premiums for these four companies were generally larger, ranging from 45 to 92 basis points as of 2010 year end.

The remaining companies (in total 23) made no disclosure regarding the use or non-use of liquidity premiums. Of these 23, six are on a non-market consistent EV basis and so therefore explicit liquidity premium assumptions would not be expected. That leaves 17 companies on an MCEV basis with no disclosure. Presumably these companies do not apply liquidity premiums, but it would be helpful for the users of the EV reports if these companies made a statement about whether or not liquidity premiums have been applied.

## EV Emergence

A few companies have begun disclosing either the pattern of emergence of embedded value over time or the timing of future liability cash flows. The more common disclosure was to show the portion of current embedded value that is expected to emerge over future five-year time periods. Four companies contributed data to table 6 (pg. 21).

**Table 6**

Future Years	EV Emergence
1 to 5	38%
6 to 10	26%
11 to 15	16%
16 to 20	9%
21 +	10%
Total	100%

On average for these four companies, almost 40 percent of EV will emerge in five years and almost two-thirds will emerge in 10 years. Only 10 percent of the current EV will emerge after 20 years.

## Summary

The SOA International Experience Study Working Group (IESWG) publishes this survey to enhance the knowledge of actuaries about current international market conditions and practices. Practices continue to evolve and we wish to encourage an open discussion on appropriate methodologies and further disclosure of both assumptions and the thoughts behind their formulation.

The IESWG intends to update this survey annually. We invite additional companies to provide data, on a confidential basis, to be included in this and future surveys. Please contact Ronora Stryker (rstryker@soa.org) or Jack Luff (jluff@soa.org) at the Society of Actuaries for further information. □

## ENDNOTES

- <sup>1</sup> Charles would like to thank Peter Duran for his assistance in interpreting the EV report for Mitsui Life.
- <sup>2</sup> Dominique would like to thank Pammi Yeung and Grant Fredricks for their assistance in gathering the data for this article.
- <sup>3</sup> Previous versions of this study can be found on the Society of Actuaries website.
- <sup>4</sup> Note that for companies on an MCEV basis, the expected returns on assets are those that are used to derive the implied discount rate.
- <sup>5</sup> *ibid.*
- <sup>6</sup> *ibid.*
- <sup>7</sup> Average liquidity premiums for all companies reporting them have not been shown because the liquidity premiums reported by the companies are not on a comparable basis.
- <sup>8</sup> The liquidity premium is an addition to the reference rate which represents the additional return demanded by the market to invest in illiquid fixed income investments.

The image is a promotional poster for the 2012 Retirement Industry Conference. It features a dark background with a landscape photo of a lake and mountains under a cloudy sky. The text is white and centered. At the top, it says '2012 Retirement Industry CONFERENCE' in a large, bold font. Below that, the tagline 'Rising to Today's Challenges' is written in a smaller, italicized font. The date and location are listed as 'April 25-27, 2012' and 'The Hilton in the Walt Disney World Resort Orlando, FL'. A paragraph of text describes the conference's focus on industry developments and solutions for retirement professionals. At the bottom, it says 'Register today at SOA.org.'

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# SOA Annual Meeting Summary— Product Development Focus

by Paula Hodges



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Look forward to attending the SOA Annual meeting each year as a great opportunity to reconnect with fellow actuaries. In addition to the networking opportunities, the Product Development Section sponsored a number of sessions at this year's Chicago meeting. In this space, I'll capture some of the highlights of the sessions. If you're interested in more detail, I encourage you to view the presentation materials online at <http://www.soa.org/professional-development/archive/2011-chicago-annual-mtg.aspx>. I've included the session numbers for all the Product Development sessions for easy reference on that site. For even more detail, recordings of many of the presentations are available for a fee. You can order them from the SOA through this site: <http://www.soa.org/professional-development/archive/audio-recordings.aspx>.

## Monday

### 037 - Pricing Trends – Part I

Solvency II has a 2014 effective date, and, for those companies impacted, a more complex pricing environment will result. The requirements of Solvency II will cause the Statutory, GAAP and Economic pricing regimes to converge to similar measures. Statutory and GAAP regimes continue to move further away from deterministic and formulaic methods.

The presenters gave an overview of changes in pricing using a guaranteed benefits rider on a variable annuity as an example.

Three changes are required:

- 1) Change from real-world scenarios to risk neutral pricing of the economic scenarios.
- 2) Use stochastic scenarios, rather than a deterministic approach; and
- 3) Explicit modeling of the risks inherent in the product, including both policyholder behavior risks and economic risks.

### 048 - Pricing Trends – Part II

Market Consistent Valuation of New Business (MCVNB) is a pricing method that adjusts for market risks and uses best estimate assumptions. In MCVNB, the earned rate equals the discount rate equals the risk-free rate. The swap curve is often used in MCVNB to reflect these rates.

A financial reporting practice note, published by the American Academy of Actuaries in March 2011 provides MCVNB principles. You can find practice notes on the [www.actuary.org](http://www.actuary.org) website, under Publications, in the section for "Other resources."

Using MCVNB as an informing metric during pricing can be quite helpful in determining the risk of the product being priced. It is especially helpful to a company that is determining the appropriate business mix when evaluating credit or spread risk.

## Tuesday

### 067 - The Latest on Mortality

When reviewing mortality results, it's important to know the purpose of the study. The study may be done for new business pricing or changes in underwriting methods. It is important to note the variations by line of business as well. The life settlement industry has directly impacted ultimate mortality experience in recent years.

Credibility and validation of the results are important in reviewing mortality. A good rule of thumb is to have at least 100 claims per cell to consider the results credible. When repeating earlier studies, it is important to group the data into cells only after analysis. If the data is grouped prior to analysis, proper groupings may not be identified. Groupings that may have been appropriate on prior studies may need to be revisited.

Current mortality improvement trends (medical advances, healthy lifestyles) may be offset with other trends (obesity, chemicals and hormones) that contribute to mortality deterioration.

There are several sources for mortality studies including the SOA, CDC Medicare and reinsurer's data. It is wise to review several sources when setting mortality assumptions, and use the source(s) closest to your business need.

### 078 - Standards of Practice in Product Development – Do They Apply to Me?

Actuarial Standards of Practice (ASOPs) apply to all actuaries. New ASOPs are being discussed that aim to address credibility as it relates to lapse and mortality assumptions.

ASOP 1 discusses the setting of non-guaranteed elements in life and annuity contracts. Actuaries are required to sign the annual statement interrogatory that states that this standard of practice was used in determining the non-guaranteed elements for that year. The ASOP gives guidance on the factors that can be used in setting the rates.

ASOP 12 for risk classification lists what should be considered. This can provide very practical advice in pricing.

ASOP 23 on data quality states that the actuary need not audit the data, but has certain responsibilities on validating the sources.

ASOP 24 covers the responsibilities of the illustration actuary. Another helpful source is the practice note.

Deficiency reserves are covered in ASOP 40. Although the appointed actuary is responsible for setting the X factors, the pricing actuary is responsible for clear communications with the valuation and appointed actuary throughout the process.

ASOPs in general are helpful in defining documentation for best practices.

### **106 - Regulatory Update for Product Developers**

There are several international regulatory bodies whose governance is important to insurance companies, especially to companies with overseas operations:

- The International G-20 (est. 1999) is a group of 20 Finance ministers and Central Bank Governors, whose purpose is to discuss key international economic issues.
- The Financial Stability Board (FSB, est. 2009) is another international group, whose intent is to reduce moral hazard presented by Systemically Important Financial Institutions (SIFIs).
- International Association of Insurance Supervisors (IAIS, est. 1994)

The Dodd-Frank act created the Financial Stability Oversight Council (FSOC), which includes the creation of the Federal Insurance Office (FIO). It is the charge

“The Solvency Modernization Initiative is underway within the NAIC with several possible wide-reaching impacts.”

of this office to identify when a “non-bank financial institution” could pose significant risk to the United States. If so, the FIO would submit that institution to supervision by the Federal Reserve System.

The Solvency Modernization Initiative is underway within the NAIC with several possible wide-reaching impacts. Included under this review are Principles-Based Reserves, convergence of U.S. GAAP and IFRS standards, and ORSA—Own Risk and Solvency Assessment requirements.

The Securities and Exchange Commission is encouraging convergence of US GAAP and IFRS. Possible impacts, as reflected in company interviews include increased volatility of results, changes to performance reporting, revisions to the definition of acquisition costs, and impact on relations with stakeholder and capital management.

Actuarial Guideline 38 (AG38) has been incorporated into NY Regulation 147. Currently New York actuaries and several of their domiciled insurance companies are reviewing NY’s interpretation of AG38 as it relates to the minimum gross premium and resulting reserve calculations of UL products with secondary guarantees.

The Pension Protection Act clarifies tax treatment of combination products regarding the DAC tax, 1035 Exchanges, and taxation of benefits.

The Interstate Compact, which allows single filing of insurance contracts for approval in multiple states has developed standards for Long Term Care, with Disability Income and Group Life products under development. About 125 companies have signed up with the Interstate Compact to date.

## Wednesday

### 115 - Product Development Section Hot Breakfast

Investment portfolio strategies at insurance companies have evolved during the period before, during, and after the financial crisis. Prior to the crisis (2002–2007), credit spreads were tight, which built leverage stress both on the asset and liability side. During the 2008 crisis, investing stopped suddenly. The problem was insurance companies were building large cash positions as they continued selling product. In the 2009–2010 timeframe, companies were very sensitive to inflation fears, so were too conservative to cash in on yield pick-ups. Derivatives would have been an efficient way to get this yield with less risk.

There are still concerns in 2011 about investing due to low yields (currently the 10-year treasury bond is yielding close to 2 percent). Companies need to start putting the cash to work, with the ongoing concern about locking in such low returns.

Even with the tough regulatory boundaries around insurance investing, insurance companies are employing many strategies to improve yield. Some of these are outlined in the presentation materials.

### 124 - Add Innovation to Your Product Development Process

Innovation can take two roads: 1) extend existing products to new customers; or 2) extend your product line for new or existing customers.

The planning process for innovation is something of an oxymoron. Corporate planning tends to stifle innovation, and innovation, by its nature, is hard to sustain in any setting.

Additionally, many innovative ideas will not be corporate successes. To truly grow a culture of innovation, the company needs to recognize and support ideas that become failures.

Most companies find that good ideas are plentiful. The hard part is to select the right ideas and then effectively execute on those ideas. By their nature, innovative ideas will run into barriers when implemented. Those

companies that can push through those barriers will be successfully innovative companies.

Keys to successful innovation:

- Recognize that innovation happens at the “edge” of the enterprise. It needs to be driven and informed by people who are in touch with the customer.
- The best ideas come from rebels who question the facts that the corporation accepts.
- Inventors require perfect knowledge to know what it takes to make the idea come to life. Cross-functional teams are one way of pooling skills and knowledge to create this perfect information.

Insurance innovation includes more than product ideas. Changes in self-service models, bundling of products, mass customization and identifying new and emerging markets are places to look for original ideas.

### 136 - Identifying and Managing Risk in Product Design

The evolution of the guaranteed benefits riders for variable annuities is a framework for demonstrating risk and risk management for product design. Looking at these riders through the lens of a Market Consistent Embedded Value (MCEV) pricing framework and also from the experience of the 2008–2009 crisis, it is clear that many of the options in these riders were underpriced. Competition had driven the price to unsustainable levels it seemed. The various risks that became costly are:

- Basis risk – ability to map to hedge-able indices;
- Liquidity – became a larger issue when it was needed most;
- Policyholder behavior – very limited experience in election rates of these riders when they were “in the money”; and
- Execution risk – rebalancing and trading issues.

There are numerous tools to address these risks including:

- changes in product design and pricing;
- dynamic hedging;
- static or customized hedging; and
- and even complete transfer of risk through third party reinsurance.

These tools were discussed in more detail during the session.

Insurance companies operating in the United States have various profit measures to use when assessing their business. When measuring profitability, it is important to also analyze the risk measures associated with a particular profit measure. Some items to consider are:

- Method for determining Provision for Adverse Deviation (PAD);
- Analysis of stochastic results;
- Appropriateness of the current discount factor, and determining the method for choosing that rate; and
- Reflection of interest rate risk.

The sustained low-interest rate environment is a very real risk that must be addressed in current product development.

Other Product Development Sessions that I was unable to attend:

**022 - In This for Life: Life Product Development Trends and Issues**

**093 - Annuity Product Development Trends and Issues**

**121 - Research Results on New Medical Markers**

**144 - Principles-Based Approaches for Pricing**

As mentioned in the outset, these are highlights that may direct you to further review presentation materials or recordings of certain sessions. In no way is this summary a complete recap of the information from the sessions, or can this summary capture the experience of attending a meeting. For those of you that were unable to join us in Chicago, I hope you're able to join us next year in Washington, D.C. □



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