Product Matters!

A Brief Look at the Phase 1 Survey Results From the SOA/RGA Post-Level Term Research Project

By Tim Rozar and Scott Rushing

The SOA's Product Development Section Council and Committee on Life Insurance Research engaged RGA to research the magnitude and impact of the "shock lapse" at the end of the level premium period. This has become an extremely important assumption both for new business pricing and for modeling in-force business. As a result, we have tried to develop a comprehensive and highly relevant industry study of post-level term assumptions, practices and experience results.

The project was broken into two phases:
• Phase 1 was a survey of the mortality and lapse assumptions used by actuaries for pricing and modeling term products.
• Phase 2 was a study of mortality and lapse experience from companies with term policies beyond the end of the level period.

This article will summarize the results from the Phase 1 Survey. A copy of the complete survey report can be found at *http://soa.org/research/life/research-post-level.aspx*. Responses were received from 41 companies responsible for approximately 63 percent of 2008 term sales. The survey questions asked companies to describe pricing assumptions and product design characteristics for their term products issued as of the end of 2008.

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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 Christie Goodrich or Paul Fedchak by July 27, 2010.

Chairperson's Corner:"What's on Your Mind?"

By John Currier

John Currier, FSA, MAAA, is EVP, Chief Actuary for Aviva USA. He can be contacted at john.currier@avivausa.com

As you read this article some of you are trying to catch up in the office after recently returning from the first annual Life and Annuity Symposium in Tampa, some are wondering what to do with your children all summer now that school is out (or nearly so for those hit with multiple snow days this past winter), some are gearing up for second-quarter end financial reporting, some are thinking about ways to sneak in a few hours of outdoors activity now that the weather has turned, and we are all thinking about how to make the Product Development Section more relevant to us.

Hold on, I can hear you saying, I get that we are transitioning to summer and that means lots of new thoughts, but John you've lost it if you think I'm spending any time thinking about the Product Development Section.

It may seem a stretch, but the fact you are reading these words tells me that you look to the Society of Actuaries and the Product Development Section for valuable information—that you are looking for that nugget that is relevant to what you are doing in your working life.

The Product Development Section is working to provide those nuggets to you—based on what you've told us is important to do. Many of you responded to our survey of what is most important to you and your council is acting on that feedback.

• The session topics at the Life and Annuity Symposium were tested against the topics you said you were interested in.
• The post-symposium seminars were built on topics you mentioned.
• This newsletter contains an article from an author who identified their willingness to provide content in that survey.
• We are pursuing articles for future editions from others identified in the survey.
• Webinar content is being developed based on your topics.
• 2010 Annual meeting content is being developed to match the survey requests.
• Some who expressed interest in the council are now assisting in other ways or will be seeking election in the coming months.

You can see that your council is working hard to provide "mining opportunities"—opportunities for relevance. If you take the time, I know that nugget is there for you—but if we are not meeting your needs, this is your Section after all, do let us know and find a way to get involved in the life of the Section—we need each and every one of you to make us the best we can be.

Enjoy this edition of Product Matters, have a wonderful summer, and I look forward to seeing you at the Annual Meeting. Since you've read this far I know the Product Development Section is on your mind! ☐

Tim Rozar, FSA, MAAA, CERA, is VP & actuary for RGA , Chesterfield, Mo. He can be contacted at trozar@rgare.com.

Scott Rushing, FSA, MAA, is an actuary for RGA, Chesterfield, Mo. He can be contacted at srushing@rgare.com.

Product Design

A number of survey questions were asked about the structure and design of term products. The specific questions and responses can be found in the full survey report. The following high level observations can be made:

- An immediate jump to an annually increasing premium scale following the level period is by far the most common term design. A small number of respondents described products where the premiums entered a new level period or graded into an ultimate ART scale.
- Premiums after the level period were typically set between 200 percent and 300 percent of 2001 CSO Ultimate (often exactly 200 percent or 300 percent). As illustrated in the survey report, this represents a very large jump in the premium amount compared to the level period.
- We asked about the differences between current premium rates and guaranteed rates after the end of the level period. The responses were split fairly evenly between products where the currents were set below the guarantees, products where the currents were set equal to the guarantees, and products with only a guaranteed premium scale.
- Premium rates normally varied by risk class and face amount band during the level period, but not during the post-level period. For the best preferred products, this creates an even larger jump in premium after the level period.
- Conversions are commonly allowed into any permanent plan, although some respondents limited the products that were available for conversion. Conversions are also commonly allowed until the end of the level premium period prior to a specified attained age. We noted that increasingly generous conversion options create the potential for term conversions to offer policyholders the same coverage at a lower cost than paying post-level period term rates.

Shock Lapse Assumptions

Respondents were asked to provide their lapse assumptions for six durations beginning with the last year of the level premium period. There was a wide range of assumptions provided, which varied by a number of different parameters including issue age, risk class, premium payment mode, premium jump ratio, and level term period.

For 10-year level term, 33 of 41 respondents (80 percent) provided a shock lapse assumption of less than 100 percent. Of these companies, 31 also provided a shock lapse assumption of less than 100 percent for their 20-year term product. Here are a few of the highlights:

- The median shock lapse assumption was 80 percent in duration 10 for a common T10 pricing cell and 82 percent in duration 20 for a common T20 pricing cell.
- The median cumulative lapse rate assumption for durations 10 through 14 was 90 percent for T10. For T20, the median cumulative lapse rate for durations 20 through 24 was 92 percent.
- For T10, duration 11 lapse assumptions were generally lower than the duration 10 shock lapse, although a few respondents provided assumptions in duration 11 that were higher than duration 10. We expect that this could be attributable to differences in how companies are calculating termination dates with regard to the grace period. The same patterns could be seen for the assumptions provided for other level periods.
- Six respondents adjusted their assumptions for the timing of off-anniversary lapses beyond the level premium period. Preliminary findings from the Phase 2 experience study suggest that the timing of lapses in duration 11 is skewed more toward the beginning of the policy year than it is during the level period. This could have a non-trivial impact on pricing. Even if the annualized lapse assumptions are appropriate, policies may lapse sooner than expected during policy duration 11.

The chart on page 5 (top) shows the lapse rate assumptions by duration for a common 10-year term pricing cell. The median assumption is plotted with a star and is connected by a dark line across durations. The wide spread of assumptions is plotted with a vertical line connecting the maximum and minimum assumption within each policy duration. Most respondents modeled the largest portion of the shock lapse at the end of duration 10 and then either immediately dropped down to an ultimate lapse rate in duration 11 or quickly graded down to an ultimate level shortly thereafter. The charts for the other level periods and pricing cells show similar directional trends.

T10 Lapse Assumptions
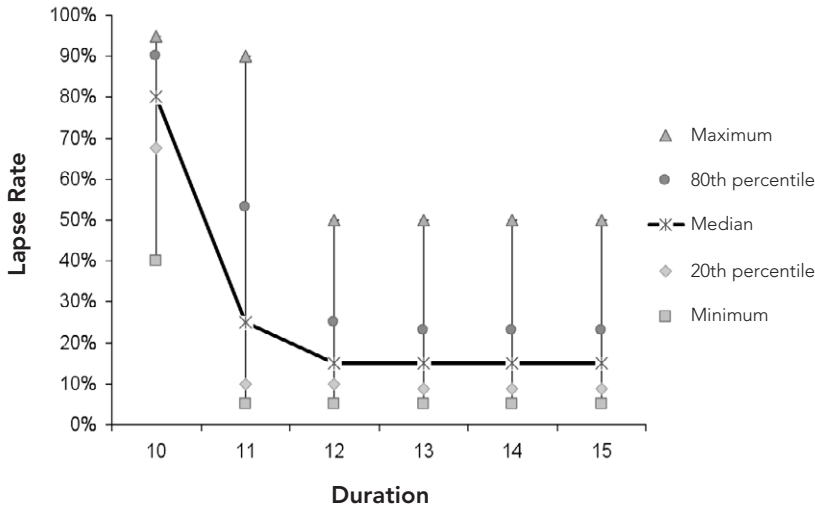
The following chart shows the cumulative lapse rate starting in duration 10 in a similar fashion. This view helps control for some of the differences in the shape of the lapse rate assumption by different companies. Some respondents used smaller than average duration 10 shock lapses but then followed it up with a higher than average duration 11 lapse rate, while others used larger than average duration 10 shock lapses followed immediately by a low ultimate lapse rate assumption for durations 11 and later.

T10 Lapse Assumptions: Cumulative
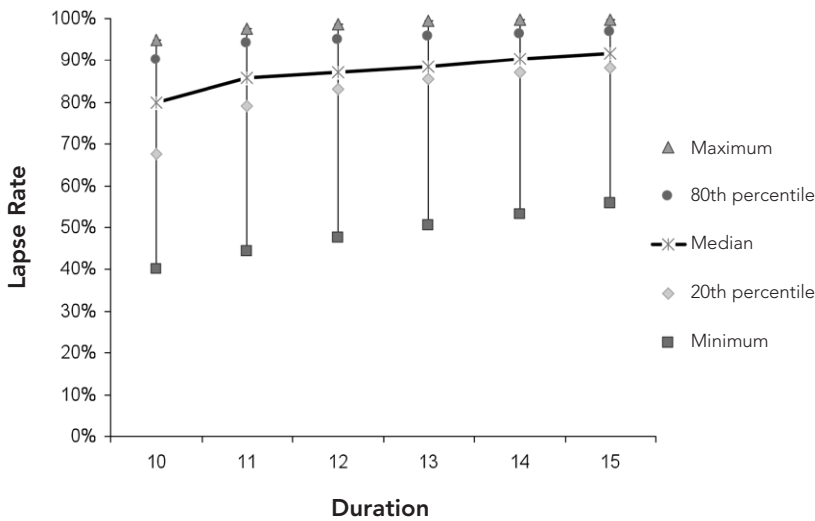
Mortality Deterioration Assumptions

As a direct consequence of anti-selective shock lapse activity, it is common practice to assume mortality deterioration among the cohort of policies choosing to pay the higher premiums after the level period. Respondents were asked to provide the mortality deterioration multiples they used to model this effect. As with shock lapses, there were a wide range of assumptions and practices provided. For 10-year term, 29 respondents provided details of their mortality deterioration assumption:

• The median mortality deterioration multiple assumption was 200 percent for T10 in duration 11. For T20, the median mortality deterioration multiple assumption was 250 percent in duration 21.

• Six respondents used a flat multiple after the end of the level period, while others varied their assumptions by a number of parameters including duration, issue age, level period, risk class, and gender.

• A variety of methods were listed for developing the deterioration assumptions including Dukes-MacDonald (11), CIA Valuation Technique Paper #2 (7), and Becker-Kitsos (1).

• Mortality deterioration multiples that varied by duration generally graded down. This wearing-off of anti-selection is likely associated with the generally decreasing pattern of lapse assumptions by duration after the initial shock lapse.

• For assumptions that varied by issue age, mortality deterioration generally increased slightly from issue age 25 through 55 with a lower multiple for duration 65. All of these companies used either the D-M or CIA VTP #2 method for developing their assumptions.

• Ten of the 33 companies that provided shock lapse assumptions assumed a different deterioration for term conversions than they did for policies that continued to persist in the term policy beyond the level premium period.

• Some correlation is evident between the size of the shock lapse that was assumed and the amount of mortality deterioration that was assumed.

The chart below (left) shows the mortality deterioration assumptions provided for a common 10-year term pricing cell. There is a wide range of assumptions at each duration. As described previously, the aggregated mortality deterioration assumptions generally started grading down slightly after duration 12, although many respondents provided multiples that were level across all durations.
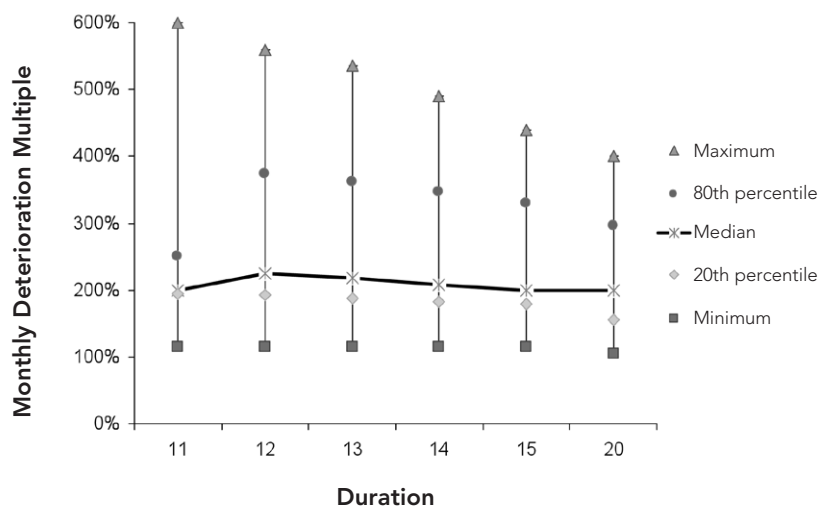
The scatter plot on pg. 7 (top) shows the relationship between each company's shock lapse assumption and their mortality deterioration assumption. Each triangle represents a different company's assumptions. In general, companies with larger shock lapse assumptions tend to also assume higher levels of mortality deterioration. This is particularly true for companies using formula-based approaches to developing their mortality deterioration assumptions. This particular plot shows the mortality deterioration assumption in duration 12 as a function of the cumulative lapse assumption in durations 10 through 11 for 10-year term, but other level periods showed similar relationships.

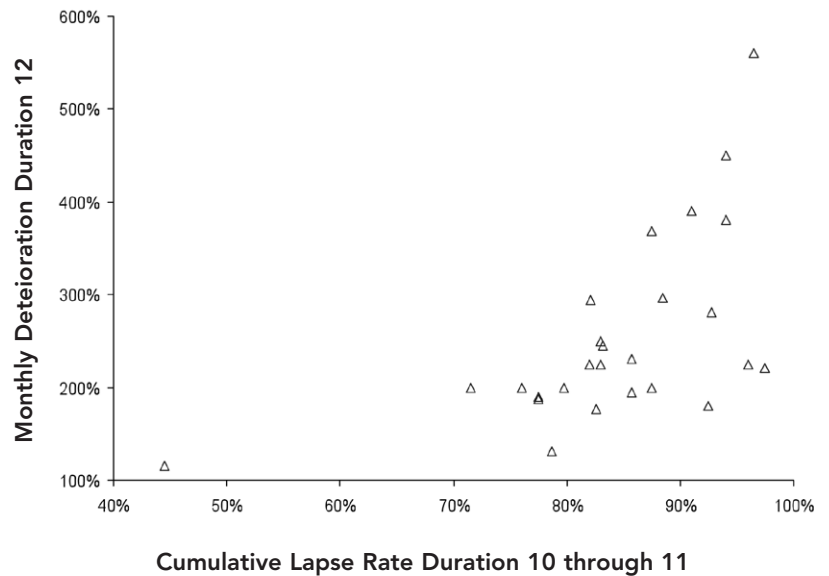## T10 Mortality Deterioration Assumption

The scatter plot below (right) shows the same data for companies that described their post-level premium rates as being 300 percent of 2001 CSO (or greater) or 200 percent of 2001 CSO (or less). This should provide a general sense for the size of the post-level period premium jump built into the product design. It seems that companies with larger post-level premiums are assuming higher levels of shock lapse and mortality deterioration, although the sample size is admittedly small. When looking at preliminary Phase 2 experience data (and RGA's own internal data), we have seen a strong correlation between the size of the premium jump and the size of the shock lapse. It seems appropriate that companies would vary their assumptions accordingly.

Conclusion

Product development actuaries continue to confront the challenges of understanding the implications of policyholder behavior. Post-level period assumptions are critical to the accurate pricing of term products, but experience is only now emerging to validate and refine assumptions. It is important to analyze this emerging experience and then make the appropriate adjustments to reflect the differences in design characteristics of products being issued today.

We'd like to express our thanks to the SOA, the PD Section, and RGA for their support of this research project. We'd also like to thank the SOA staff and the volunteers on the Project Oversight Group for their valuable contributions and guidance. We hope that Phase 1 of this research has successfully synthesized the collective thoughts of many industry leaders around post-level term pricing and modeling considerations. Stay tuned for Phase 2! □

T10 Shock Lapse vs. Mortality Deterioration Assumption

T10 Shock Lapse vs. Mortality Deterioration Assumption
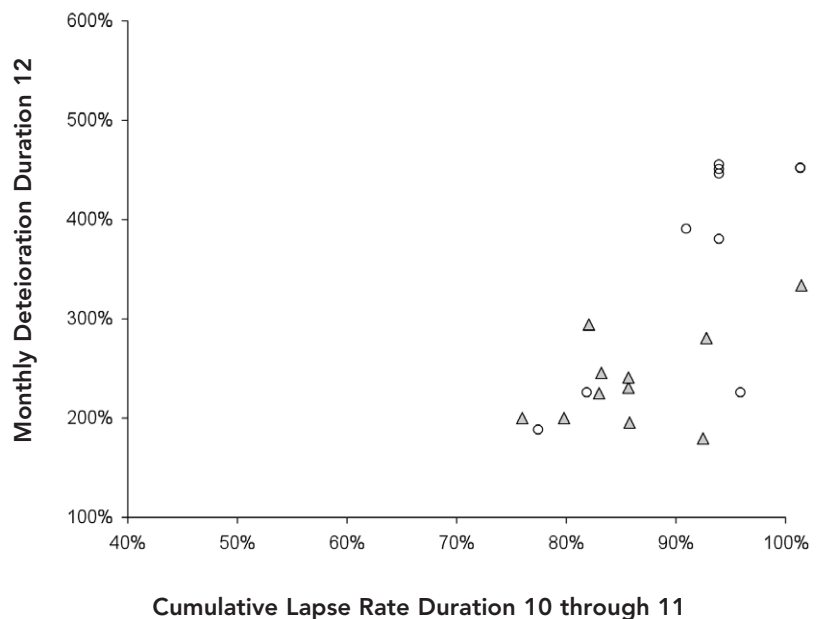
○ 300% of 2001 CSO or Greater

△ Less than or Equal to 200% of 2001CSO

Interactions Between Dynamic Lapses and
Interest Rates in Stochastic Modeling

By Yuhong Xue

Yuhong (Jason) Xue, FSA, MAA, is an officer of Retirement Solutions at the Guardian Life Insurance of America in New York, NY. He can be reached at yuhong_xue@glic.com.

The Joint Risk Management Section of the Society of Actuaries recently published the Policyholder Behavior in the Tail Variable Annuity Guaranteed Benefits Survey/C3 phase II 2009 Results. According to the survey, the goal "was to gain insight into companies' assumptions of variable annuity policyholder behavior in the tail of the C3 Phase II calculation."

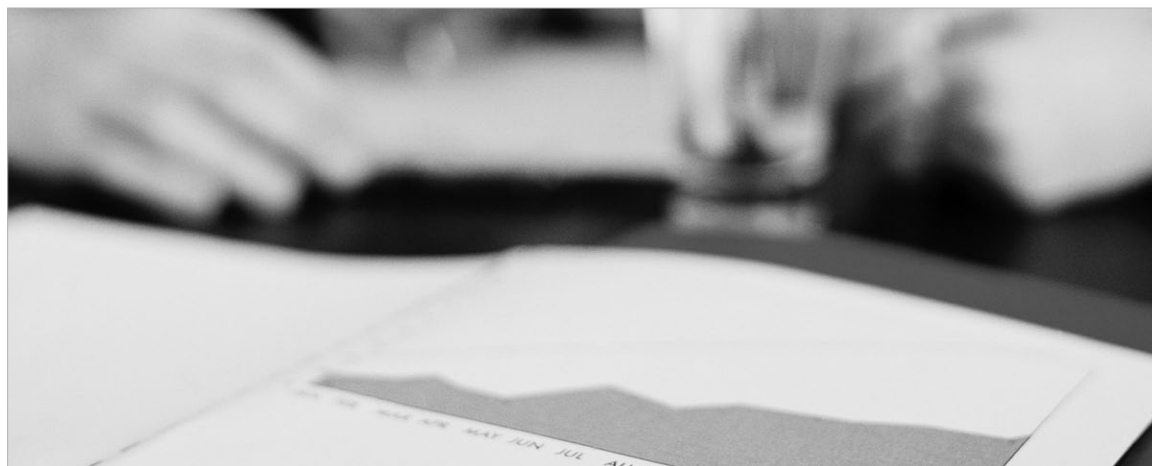The survey observed that "an overwhelming majority of insurers use dynamic lapses for living benefits. The percentage of insurers using dynamic lapses has risen from 83 percent in 2005 to 90 percent in 2009, with a peak of 95 percent in 2008." Since most companies are leveraging the expertise gained through their C3 phase II efforts in the VACARVM implementation, it is safe to assume that the same observation can be made in the VACARVM stochastic model as well.

Dynamic lapses for variable annuities reflect the phenomenon that policyholders tend not to surrender their policies when the guarantees embedded in the contracts are "in-the-money." A policy is said to be in-the-money when the guaranteed value exceeds the account value. It is "out-of-the-money" when the account value is sufficient to cover the value of the guarantees.

Reducing lapse rates when the policies are in-the-money tends to increase liabilities. Hence, it is gener-

ally reasonable to model dynamic lapses in a stochastic model to avoid understating liabilities. Consequently, it is not surprising to see that most of the companies have incorporated dynamic lapses in their stochastic models for statutory reserve and capital calculations. But does it mean that the work is done? Let's take a closer look.

The modeling is often achieved by using a dynamic lapse formula which acts to increase or decrease the base lapse rates when policies are out-of- or in-the-money. A formula that reduces the lapse rate when in-the-money and increases it when out-of-the-money is said to be two-sided. One that only decreases the lapse rate when in-the-money but does not increase it when out-of-the-money is said to be one-sided.

The extent to which the base lapse rate is increased or decreased obviously depends on the parameters chosen. It also depends on the definition of the guaranteed value which determines the level of in-the-moneyness, the factor that ultimately drives the lapse rate. Take the following formula for example:

$$\text{lapse rate} = \text{base lapse rate} \times e^{2\,[\text{MIN (account value / guaranteed value, 1)} - 1]} \quad (1)$$

This is a one-sided dynamic lapse formula. When guaranteed value exceeds account value in formula (1), the base lapse rate will be multiplied by a factor less

than one, serving to reduce the base lapse rate. In fact, when the guaranteed value is twice the account value, or 200 percent in-the-money, the base lapse rate will be reduced to just 37 percent of its original value.

But what is the guaranteed value? Take a life-time guaranteed minimum withdrawal benefit (GMWB) rider on a variable annuity contract for example: Is it the Guaranteed Withdrawal Balance (GWB) defined in the contract? Or is it the present value of the stream of future guaranteed payments? What interest rates should be used to discount the stream of payments? Should a constant rate be used throughout the model? Or should the forward rates at the point of calculation be used?

In a stochastic model, the forward rates are specific to the time step and the scenario under consideration. Naturally, how the interest rates are modeled also has significant implications on the dynamic lapse function, since the guaranteed value that determines the in-the-moneyness is influenced by the stochastically modeled discount rates. As if it is not already complicated enough, the account value, another factor in the in-the-moneyness calculation, is influenced primarily by the equity markets whose performances are often correlated with the interest rates.

All these factors: dynamic lapses, stochastic interest rates, and correlations with the equity markets, are all inter-related in a stochastic model. Needless to say, considering all of their interactions can make the model extremely complex—not to mention resource consuming. It exemplifies perfectly the balancing act between model complexity and accuracy. But can we simply ignore the impact of interest rate modeling on dynamic lapses?

In practice, we have a tendency to simply either define the guaranteed value at a constant discount rate or to assume interest rates to be independent of the equity markets. However, one can easily imagine a scenario where extremely low equity returns and low interest rates drive the account value low but the guaranteed value high, yielding high in-the-moneyness and very low lapse rates. The liabilities in this scenario can be very high because all these generate high claims due to the guarantees. Therefore, one should carefully ensure that a simple definition of the guaranteed value does not underestimate the liabilities in the tail. This is particularly important when the measure of liability is a percentile or conditional tail expectation (CTE) of the distribution such as in the case of VACARVM and C3 Phase II.

For this article, the author studied the interactions between dynamic lapses and interest rate modeling through a stochastic model built for lifetime GMWB riders. The dynamic lapse function is as described in formula (1). The guaranteed value in the formula is defined to be the present value of future payment stream. Three alternatives of the discount rate are considered: constant, stochastic interest rates independent of equity returns, and stochastic interest rates with correlations to equity returns.

The GMWB Rider

For illustration purposes only, the author modeled a life time GMWB rider which charges 80 basis points and guarantees the following withdrawal rates for life:

Age of First Withdrawal	Guaranteed Withdrawal Rate
50	4.0%
60	5.0%
70	6.0%
80	7.0%

If no withdrawals are taken for 10 years, the rider guarantees 180 percent of the initial premium as the withdrawal base at the end of the 10th year. It also has an annual ratchet feature which steps up the withdrawal base if the account value is higher than the base on anniversaries.

The Cash Flow Model

Only cash flows due to the rider, specifically rider charges and claim payments, are modeled explicitly.

The profit of the rider is defined to be the present value of the rider charges less the present value of the claims. The rider profit is often expressed either as a ratio or as basis points (bps) of the present value of the withdrawal base. For example, if the withdrawal base is $100,000 every year for the next 10 years, a profit of 10 bps means $100 each year for the next 10 years.

The cash flows are projected over 1,000 equity and interest rate scenarios. The average profit over the 1,000 scenarios is used as the measure of the value of the business. Since profit has an inverse relationship

" The profit of the rider is defined to be the present value of the rider charges less the present value of the claims. "

with the value of the liability due to the rider, it can be used as an indirect measure of the liability.

Other cash flows such as M&E fees, revenue sharing, expenses, and commissions are not part of the cash flows that go into the profit calculation, although they serve to reduce the account value in the projection.

Other modeling approaches are certainly possible. For example, we can model the base contract and the rider together and consider all cash flows. We could use a different measure of liability such as a percentile or CTE of the distribution of the rider profit, or we could measure liability through accumulated deficiency or surplus as defined in AG 43 and RBC C3 Phase II. However, for understanding the interactions of dynamic lapses and interest rate modeling, the above simplified approach serves the purpose.

Equity and Interest Rate Scenarios

Six equity indices are modeled stochastically through a lognormal process. Means, volatilities and correlations between the six indices are based on historical data. The six indices are S&P500, Russell2000, NASDAQ COMPOSITE, EAFE, BOND, and Money Market. The funds of the policy with the GMWB rider are assumed to have a 60/40 allocation between stocks and bonds.

The short rate is modeled using the Cox, Ingersoll, and Ross model, which is a one-factor equilibrium model that reverts to a long-term mean.

The formula for changes in the short-term rate is as follows:

$$dr = a(b - r_{t-1})dt + \sigma\sqrt{r_{t-1}}dz$$
$$r_t = dr + r_{t-1}$$

The parameters are chosen as below:

r_0	1.24%
a	15.0%
b	5.0% or 3.0%
σ	7.5%

" ... the guaranteed value in the formula is the present value of the future payment stream that a policyholder could receive if he or she starts the lifetime withdrawal immediately. "

The parameter r_0 is the initial short rate; **a** is referred to as the strength to mean reversion; **b** is the long-term mean target; and σ is the short rate volatility. *dz* is the sampling error of the standard normal distribution.

The short rate can be independent, or it can be correlated with equity returns, in which case the correlation is defined as:

Correlation	S&P500	Russell2000	Nasdaq Comp	Bond	EAFE	Money Market
Short Rate	(0.12)	(0.10)	(0.08)	(0.14)	(0.55)	-

Discount Rate to Determine Guaranteed Value

The dynamic lapses formula used is as described in formula (1). At any given time-step of the projection, the guaranteed value in the formula is the present value of the future payment stream that a policyholder could receive if he or she starts the lifetime withdrawal immediately. The discount rate can be a constant independent of the short rates stochastically generated in the model; or it can be a function of the short rates. Theoretically, the guaranteed value is a measure of how much the guarantee is worth to the policyholder if withdrawal is taken immediately. The discount rate to determine this value should be comparable to the rate at which the policyholder can annuitize the contract. This rate is often derived from a long-term treasury rate which is on the other end of the term structure of interest rate. For our purpose, the author approximated the annuitization rate by adding 100 bps to the short rate, and defined this rate to be the discount rate at which the guaranteed value is calculated.

Discussion of Results

The model is run with only the following variations:

As for the discount rate to determine the guaranteed value in formula (1),
• 4 percent constant discount rate, or
• Short rate + 100 bps

As for the correlation between the short rate in the above bullet point and the equity returns,
• independent short rates
• correlated short rates with equity returns

As for the long-term reversion target of the short rate model,
• 3 percent long-term target
• 5 percent long-term target

The table on pg. 12 shows the average rider profit over the 1,000 scenarios.

One immediate observation from the table below is that no matter what the long-term view of interest rates is (whether it's 3 percent or 5 percent); the linkage of the dynamic lapse formula and the interest rates has a material impact on the value of the liability. For example, if the short-term interest rate reverts to 3 percent long term and it varies independently with the equity returns, the profit is only 14 bps compared to the 23 bps if dynamic lapses are not linked to interest rates.

On closer inspection, when dynamic lapses and interest rates are linked, a higher long-term interest rate generally reduces liability and helps profitability. The higher discount rates reduce the guaranteed value of the contract, making them less in-the-money, hence lapse rates remain close to the base level.

The author has assumed a slightly inverse correlation between interest rates and equity returns. In other words, when equity returns are low, interest rates tend to be high, and vice versa. This inverse correlation helps to reduce liability since when equity returns are low, the high discount rates serve to reduce the guaranteed value of the contract. The dynamic lapse formula generates a higher lapse rate than it would have if the interest rates and the equity returns were not correlated.

Perhaps the biggest surprise is the 14 bps profit when the short-term interest rate reverts to the 3 percent level and the equity returns move independently of the interest rates. It is less than half of the 29 bps profit if the interest rates and equity returns are simply correlated, everything else being equal. This result could be even more dramatic if a percentile or a CTE measure was used.

The explanation lies in the fact that when the short rate and the equity returns are not correlated, there are some scenarios with very low interest rates and low equity returns. The low equity returns result in reduced account values. The low discount rate exacerbates the situation by increasing the guaranteed value of the contract in the dynamic lapse formula, causing the contract to be more in-the-money. The resulting lapse rates from applying the formula are the lowest, which tends to increase liability. This is a classic case of increased tail risk due to the interactions of two or more variables.

Final Words

How do we address the question in the first section: can we be satisfied after building in the dynamic lapse formula in a stochastic model? The answer is that we need to carefully study the interactions between dynamic lapses and interest rates, making sure tail risks are not overlooked. Even when a simplified approach is preferable, such as using a constant discount rate to determine the guaranteed value, we need to ensure that it is consistent with the various interest rate assumptions such as long-term mean and correlations to equity returns.

As illustrated in the previous sections, not fully understanding the interaction can result in material differences in the calculation of liabilities. For pricing applications, this could mean not fully understanding profitability. For valuation models, this could lead to understating or overstating VACARVM reserves, FAS 133 reserves, RBC, or Economic Capital. For hedging applications, this could result in under or over hedging the liability. □

Guaranteed Value Discount Rate	3% Long Term Mean Reversion Target	5% Long Term Mean Reversion Target
4% Constant Discount Rate	0.23%	0.23%
Stochastic Short Rate Independent of Equity Returns	0.14%	0.25%
Stochastic Short Rate with Correlation to Equity Returns	0.29%	0.31%

A Look Ahead to the **Fall Society of Actuaries Meeting**

By Tom Phillips and Mitchell Katcher

In only a few months, it will be time for the Fall Society of Actuaries meeting. The Product Development Section Council is putting together a timely and relevant program for the product actuaries attending the meeting. The program will provide practical information on the product market and product development process for life and annuity actuaries.

As you recall, last fall the Section Council surveyed section members, inquiring into topics that would be most beneficial for sessions at Society meetings. We received feedback from hundreds of product actuaries on that survey. In addition, the Council has reviewed the sessions from the 2009 Annual Meeting to help develop the schedule for the October, 2010, meeting.

Both the survey results and the meeting attendance show that product actuaries are interested in the latest developments in the life and annuity marketplace. For the fall meeting in 2010, there will be two product update sessions—one on life products and another on annuities. Those will update actuaries on trends and issues in the market as the industry recovers from the recession. In addition, there is always strong demand for the latest research and statistics on mortality and we'll be including a mortality update session in the meeting.

The survey results noted there is a strong interest in pricing and product implications under the upcoming principle-based approach to valuation and the fall meeting will include a session on that topic.

Issues related to VACARVM are also timely and the Council is planning a session on the challenges and lessons learned so far from its implementation. Also in the annuity area, there will be a session on Retirement Products, which will highlight the methods for providing retirement income, associated financial risks, and products for that market.

There is a considerable amount of activity on the regulatory front, including the principle-based approach, the international financial reporting standards, and Solvency II. The regulatory activity will be the subject of a fall session. Other product sessions will cover the Product Development Process and Market Consistent Pricing.

And, of course, there will be networking opportunities on a variety of topics at our usual hot breakfast. The fall meeting is always a good opportunity to renew acquaintances with product actuaries.

As of the writing of this article, most of the speakers and specific topics were still being worked out, so please check regularly with the Society of Actuaries website for the latest on the fall meeting.
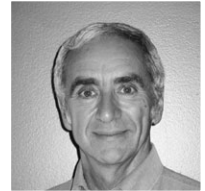
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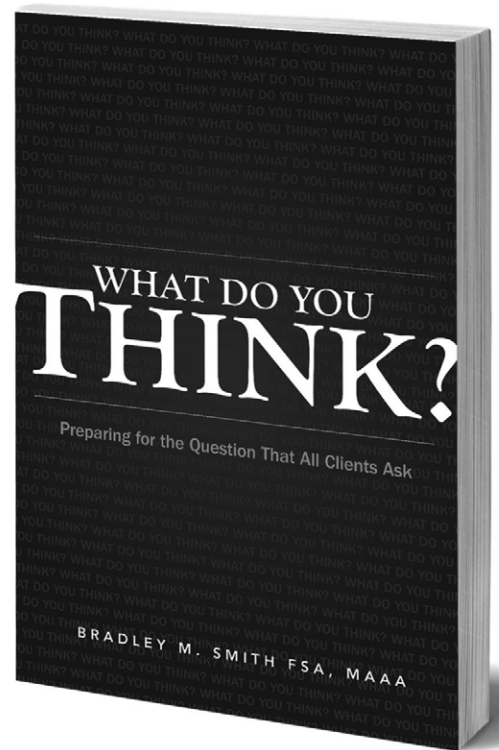
Universal Life and Indexed UL Trends

By Susan J. Saip

Milliman, Inc. recently conducted its third annual comprehensive survey of leading Universal Life (UL) insurers to discover current dynamics of the UL market. UL insurance plays a significant role in the life insurance market, accounting for about 41 percent of U.S. individual life insurance sales (based on annualized premium) for calendar year 2009.[1] The survey included the following UL product types: UL with secondary guarantees (ULSG), cash accumulation UL, current assumption UL, and indexed UL (IUL). Twenty-two carriers participated in the survey. Some of the highlights of the study are summarized in this article.
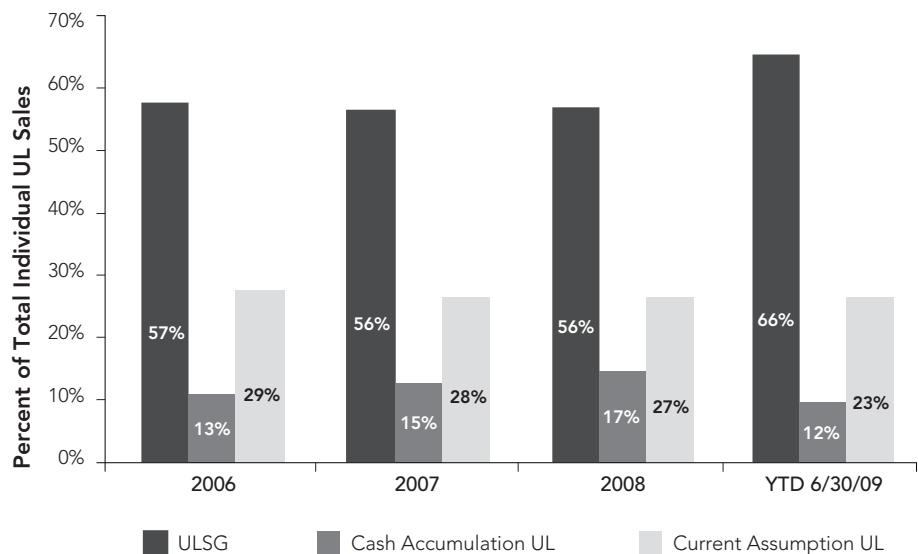
Sales

The chart on the right (top) shows the mix of sales (excluding IUL sales) reported by survey participants for calendar years 2006 through 2008 and for 2009 as of June 30 (YTD June 30, 2009). For purposes of the survey, sales were defined as the sum of recurring premiums plus 10 percent of single premiums. Overall, there was a shift from both cash accumulation UL sales and current assumption UL sales to ULSG sales.

Average amounts per policy reported by survey participants for all UL types fell from 2008 to YTD June 30, 2009, on both a premium and face amount basis. ULSG average amounts per policy (premium and face amount) and current assumption average premiums per policy had also dropped from 2007 to 2008. From 2008 to YTD June 30, 2009, the total UL average premium per policy dropped from $9,956 to $6,797 and the total average face amount per policy dropped from $339,300 to $299,000. The drop was even more significant for IUL plans. From 2008 to YTD June 30, 2009, IUL average premium per policy dropped from $20,915 to $7,812 and average face amount per policy dropped from $519,500 to $313,400. Perhaps some insurers have taken steps to limit their large face amount and old age business, which led to a drop in average premiums, average face amounts, and as noted below, average issue ages.

A weighted average issue age was determined for sales of survey participants based on the midpoint of specified issue age ranges. Average ages dropped significantly for cash accumulation UL and cur-

rent assumption UL products from 2008 to YTD June 30, 2009. The table at the bottom of this page summarizes the average ages calculated based on sales reported by issue age range and gender for 2008 and YTD June 30, 2009.

The distribution of ULSG sales by underwriting class was similar between 2008 and YTD June 30, 2009.

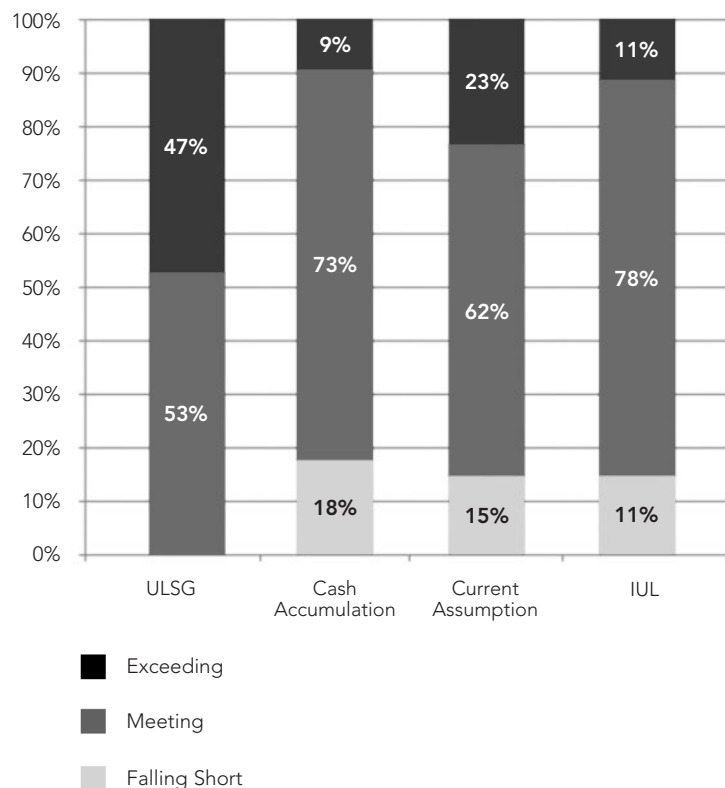| Gender	ULSG	Cash Accumulation UL	Current Assumption UL	IUL
Based on 2008 Sales – Premium				
Male	62	63	60	51
Female	65	63	57	52
Based on 2008 Sales – Face Amount				
Male	56	51	49	42
Female	57	50	45	42
Based on 6/30/09 Sales – Premium				
Male	62	55	53	51
Female	64	53	49	52
Based on 6/30/09 Sales – Face Amount				
Male	55	45	42	42
Female	55	42	39	41

[1] LIMRA International, Inc

However, there was a shift in sales to the top non-smoker/non-tobacco (NS/NT) classes from 2008 to YTD June 30, 2009 for cash accumulation UL, current assumption UL, and IUL sales. A reduction in the number of underwriting classes was also reported by some survey participants, consistent with a move to simplified issue plans.

Actual YTD June 30, 2009 Results Relative To Profit Goals

Legend:
- Exceeding (black)
- Meeting (dark gray)
- Falling Short (light gray)

> " Most respondents to the survey expect that principle-based reserves (PBR) will be in place in 2012 at the earliest. "

Profit Measures

The predominant profit measure reported by survey participants continues to be an after-tax, after-capital statutory return on investment/internal rate of return (ROI/IRR). Few participants changed their profit goals or measures due to the recent financial crisis. The median ROI/IRR profit target reported was 12 percent for all products. Seventy-three percent of survey participants also use secondary measures in pricing UL products.

Actual profit results for YTD June 30, 2009 relative to profit goals were not as favorable for survey participants as in the past. The chart on the left shows the percentage of survey participants reporting they are falling short of, meeting, or exceeding their profit goals.

Target Surplus

The majority of survey participants reported target surplus relevant to pricing new UL sales issued today on an NAIC basis. The overall NAIC risk-based capital percent of company action level ranged from 200 percent to 350 percent for ULSG and cash accumulation markets, and from 250 percent to 350 percent for current assumption markets and IUL markets. Few participants indicate they are well prepared for the changes to the C-3 component of risk-based capital.

Reserves

Most respondents to the survey expect that principle-based reserves (PBR) will be in place in 2012 at the earliest. Participants' comments regarding their outlook on the impact of PBR were nearly evenly split between those that do not expect a material impact and those that expect a reduction in reserves. The majority of participants have not examined the underwriting criteria scoring system for establishing a valuation mortality table. Also, few survey participants have modeled PBR-type reserves on existing UL products. Thirteen of the 22 participants are using or moving toward preferred mortality splits and/or lapses in reserves.

Risk Management

The cost of financing assumed in pricing ULSG products currently ranges from 100 to 300 bps. Three survey participants assume the same costs that were assumed a year ago, three assume a lower cost and two assume a higher cost than that assumed one year ago.

Nearly half of survey participants are reacting to the current marketplace by riding it out and eight of the 22 participants are repricing. The implications of the recent financial crisis on capital solutions are varied among survey participants. Nearly one-third of survey participants reported very little or no implications. Other participants reported implications that relate to limited external funding solution availability and/or costs.

Underwriting

Table-shaving programs are offered by seven of the 22 participants, and all reported their programs will be continued.

The most popular emerging underwriting tools being used by survey participants, especially at the older ages, are prescription drug databases (16), cognitive impairment testing (11), tele-underwriting/telephonic screening (11), and activities of daily living (ADL) measures (11).

A few participants (five) have special simplified underwriting products and each described a different special market where the product is used.

The majority of survey participants have created unique preferred risk parameters for the older ages. The use of such parameters has increased year-by-year based on the use reported in Milliman's previous two annual surveys.

Product Design

Twelve participants repriced their ULSG design in the last 12 months. The general level of premium rates on the new basis versus the old basis increased for six participants and decreased for four participants. Ten participants intend to modify their secondary guarantee products in the next 12 months.

Five survey participants currently offer a long-term care (LTC) accelerated benefit rider, however some address the need via chronic care benefits. Eight companies expect to develop an LTC combination product in the next 12 to 24 months, which when coupled with the five companies already offering LTC riders, implies that nearly 60 percent of survey respondents expect to

market LTC combination plans within two years and an even higher percentage expect to offer some type of LTC solution.

Eighteen survey participants currently offer a living benefit or expect to offer a living benefit in the next 12 months. In nearly all cases, participants are providing an accelerated death benefit, primarily for terminal illness.

Compensation

Compensation structures are quite varied among survey participants. About half of the companies do not vary commissions and marketing allowables by product type. Median commissions, as well as the range of commissions, were similar between ULSG and cash accumulation UL. IUL products had slightly higher first-year and renewal commissions. Current assumption UL products had the highest first-year and renewal commissions.

Rolling target premiums are becoming more common in ULSG compensation programs. Target premiums are commonly rolled for two years.

Pricing

The use of stochastic modeling to evaluate ULSG investment risk is used by nine out of 18 participants. This level of use has been constant for the past several years, but is surprisingly low given the industry's greater awareness of the risks involved in ULSG products and the movement from a formula-based framework to a principle-based approach.

Seven participants reported their mortality assumptions are strictly based on company experience. All other participants use various combinations of company experience, guidance from reinsurers, and consultants' recommendations in developing mortality assumptions. The majority of survey participants reported that the slope of their mortality assumption is more similar to the 2001 Valuation Basic Table (VBT) than the 1975-1980 Select & Ultimate Table or the 2008 VBT. Most participants vary their preferred to standard ratio by issue age and/or by duration. Nearly two-thirds of the companies assume that preferred to standard rates eventually converge and one-third assume they do not

Susan J. Saip, FSA, MAAA, is consulting actuary for Milliman, Inc. She can be contacted at: sue.saip@ milliman.com.

converge. Thirteen of the 22 participants do not assume mortality improvement in pricing UL/IUL products.

Conclusion

Universal Life is a competitive market in a constantly changing environment which requires insurers to stay current with the latest happenings. Benchmarking against other carriers enables insurers to evaluate their processes and practices relative to those prevalent in the industry. The UL/IUL survey provides carriers with a benchmark for this purpose and enables them to see how they stack up relative to the competition.

The executive summary of the March 2010 Universal Life and Indexed Universal Life Issues report may be found at http://www.milliman.com/expertise/life-financial/publications/rr. ◻

NAIC Update – March 2010 Meeting

By Donna R. Claire

The March 2010 NAIC meeting was March 24 to March 28, 2010 in Denver. (Note to meeting planners—it can still snow a lot in March in Denver! Some flights were canceled and some interstates closed as up to a foot of snow accumulated.)

The remainder of this article summarizes my notes on the meetings I attended, or reports from friends and colleagues:

Life and Health Actuarial Task Force

Larry Bruning started the meeting by stating the goals—to make further movement in the principle-based approach to reserves. The goal was to finish certain items at this meeting, and to have conference calls to potentially vote on the Valuation Manual before the next NAIC meeting, which is in August. Larry mentioned that there are four major areas where there is still work needed: these are the net premium approach being worked on by the ACLI; more work on margins; asset issues including assumed spreads on reinvestment; and mortality.

Valuation Manual

As with the last Life and Health Actuarial Task Force (LHATF) meeting, much of the meeting was spent reviewing the work of the LHATF subgroups working on various sections of the Valuation Manual:

a. **VM-00, 01, Process and Coordination:** Mike Boerner heads the LHATF team on this part of the Manual (as well as heading the Academy team on the Valuation Manual in general). One issue is determining the scope of the Manual from day one—it appears that the answer may be a simple test to determine which life insurance products shall be covered and which will be excluded from the Manual. Variable annuities are in, while fixed annuities will not make the 2009 Manual. There is still work to be done on definitions that is expected to be completed in the next couple of weeks.

b. **VM-20, Life:** Pete Weber heads the LHATF group on VM-20. Pete has had numerous conference calls on VM-20, and most of the work on this part of the manual has been completed. A number of issues were discussed at LHATF. There was a discussion on what products shall be included—the group has developed a test that determines which products would be included from day one. If the product fails the test, reserves will default to the current CRVM methodology. An updated version of VM-20 was exposed.

c. **VM-21 Variable Annuities:** This section will bring in the Variable Annuity CARVM Actuarial Guideline, which became effective at year-end 2009. This section is ready for the initial Valuation Manual.

d. **VM-25 and VM-26:** VM-25, the health section that essentially continues the current rules for health insurance, is now finished. The VM-26 section on credit insurance has been completed and was adopted for the initial Valuation Manual.

e. **VM-30, 31, PBR Reporting and Review:** Katie Campbell heads this effort. VM-30 has already been adopted for the preliminary Valuation Manual. A new version of VM-31 was exposed for comment.

f. **VM-50, 51, PBR Experience Reporting:** Fred Andersen is heading this effort. The ACLI has requested that data collection should be used to create an industry table, but individual company data should come directly from companies. Updated drafts on these documents were exposed for comments.

Related Issues

There were a number of topics discussed at LHATF, most related to SVL and the Valuation Manual. These include:

PBA Overview: I gave a brief presentation on behalf of the Academy's Life Practice Council and Life Financial Soundness/Risk Management Committee. I stated that although we continue to support PBA, we

Donna R. Claire, FSA, MAAA, is president of Claire Thinking, Inc. She can be reached at clairethinking@cs.com.

have concerns that the PBR project is deviating from its original intent, with an abundance of rules and margins being considered.

Preferred Mortality: Tom Rhodes gave a report on credibility, based on a study he had done on behalf of the SOA. Note that this report is available on the SOA website (www.soa.org). He also referred to the PricewaterhouseCoopers (PwC) study performed for the SOA, which is also available on the SOA website. The studies will be important for the determination of assumptions such as mortality under PBA. Tom stated that one needs margins because of random fluctuations, and for the misestimate of experience assumptions. Mary Bahna-Nolan provided an update on preferred mortality work performed by the Academy of Actuaries and Society of Actuaries. Mary suggested that revisions be made to the VM-20 section to remove the requirement to tie the mortality assumptions to a CSO table. Mary stated that they are working to incorporate credibility work into VM-20. One open question is how to state a margin on mortality assumptions without raising tax issues. Mary also mentioned that the group is continuing to target 2012 for a new mortality table.

Payout Annuities: Mary Bahna-Nolan provided an update on the joint SOA/Academy group. The group is looking at developing a new valuation table. The experience study portion has been completed. The SOA/Academy group is working on applying proper loads to the experience, including an improvement scale in the valuation table. Note to companies in this market: the annuitant mortality has improved dramatically, particularly at larger sizes. This should be considered in annuity product development.

Guaranteed/Simplified Issue: Mary Bahna-Nolan gave an update on a new SOA/Academy group that is

" … the annuitant mortality has improved dramatically, particularly at larger sizes. "

looking to develop new valuation tables for guaranteed and simplified issues. A survey on these products has been sent to companies to determine how to best approach this project.

Net Premium Approach: John Bruins continued discussing the net premium approach to PBA reserving, which the ACLI states is needed for federal income tax deductibility of reserves. The ACLI has submitted some proposed changes to VM-20 to handle the net premium approach. Note that this is the biggest open issue on the life insurance PBA reserves.

RBC C3 Phase 2, and Actuarial Guideline 43: The consulting firm Oliver Wyman provided a presentation on its observations regarding VA statutory accounting results. One observation was that companies with established hedging programs were seeing an impact on statutory results that was not intuitive. As a result some companies may have modified some of their hedging strategies to provide better statutory results, even though such modifications may have not been optimal with respect to hedging for the underlying risks. Other observations were that the AG43 standard scenario was the dominant reserve for a majority of companies (as of 12/31/09), that the AG43 standard scenario has opposing and decreased interest rate sensitivity as compared to the stochastic results, and that aggregate reinsurance produced strange reserve patterns in the standard scenario. Oliver Wyman stated that it was premature to make any recommendations until further study was undertaken. The firm expects to publish a paper next month on its findings and to follow that with educational seminars. *(Editor's Note: This article was written at the time of the March NAIC meetings. The aforementioned paper may be published before this issue's publication date.)*

Economic Scenarios: Fred Anderson heads a group examining economic scenarios. The group has changed the ultimate mean rate compared to the Academy's work. (Note that Nancy Bennett heads the Academy's Economic Scenarios Implementation Work Group, and has an updated scenario model that is on the Academy's website.)

Prescribed Default Costs to be used on Existing Fixed Income Investments: Gary Falde and Alan Routhenstein gave an update on the work on prescribed spreads. They provided an amendment to VM-20 to cover these changes.

Margins: LHATF reversed an earlier decision, and determined that specified margins are not needed for any assumptions other than mortality. For other assumptions, guidance already exists in the Manual that conservatism should be considered, particularly for uncertainty.

Updates to the Standard Nonforfeiture Law: John MacBain gave a brief update on this group. A draft report has been sent to the Academy's tax working group. A report will likely be made available to LHATF in the next few months.

Actuarial Guideline 25: John MacBain gave an update on the Academy's work on Actuarial Guideline 25. This guideline discusses nonforfeiture for pre-need contracts, making some exceptions to rules for these small policies. They recommended the limit for these exemptions be increased to CPI—increasing the $10,000 threshold for the exemption up to $16,875 for this year. LHATF voted to expose the Academy's version of the changes to Actuarial Guideline 25 for 30 days.

Federal Health Bill Update: There was a presentation on the Federal Health Bill by Brian Webb, from the NAIC. He stated that:
- The NAIC is to develop a report in 2010 to create a uniform definition of items that go into the calculation of the Medical Loss Ratio (MLR) and to create a standardized methodology for the calculation.
- Rebates will be required if the MLR is not met.
- The Treasury was not given the authority to approve rates, but it will monitor rates.
- The Secretary must come up with a National Reinsurance plan for early retirees. There will be a requirement for payments into a fund, and each state is to determine how it will collect funds. The NAIC is to help develop risk corridors and profiles.

- Grandfathering: the new rules will not apply to existing plans.
- Rates must be based on the entire book of business and cannot be based on each plan separately.
- The NAIC expects that LHATF, and particularly the Accident & Health Working Group, will play a major role in helping the NAIC develop models and reports.

Life Risk Based Capital Working Group

Philip Barlow ran the RBC meeting held on March 25, 2010. The RBC C3 Phase 3 implementation was delayed until 12/31/11.

The ACLI is addressing basic and intermediate hedges in the work it is doing regarding a Derivatives Risk Mitigation Proposal.

The ACLI sent out an update on March 24 with respect to commercial mortgage loans. It expects to complete a study and produce a final report by the end of the third quarter of 2010.

Fred Andersen presented the report from the Casualty Actuarial Task Force (CATF) C3 Phase II Results Subgroup. Fred reported the subgroup's five main observations, and suggested that conference calls be

scheduled to discuss them in detail. The five observations include: results were lower than expected; documentation did not provide enough information to assess the quality of the numbers; companies were inconsistent with respect to the setting of key assumptions; the TAR calculation is very volatile; and companies that did not choose to take credit for risk mitigation programs did not provide any documentation regarding such programs.

Solvency Modernization Initiative

The Solvency Modernization Initiative (SMI) group is a new Commissioner level group based on an NAIC initiative to examine reserves and solvency on a broad basis, also considering what is happening globally. The PBR (EX) group, which is charged with shep-

herding the PBA project through the various NAIC Committees, is a subgroup of this group. The SMI had a number of meetings in Denver. Unfortunately they coincided with the LHATF meetings, so I was unable to attend. However, these meetings have promoted good discussions on some fundamental issues, e.g., what is the purpose of regulatory capital? The work of the solvency modernization initiative group may have a significant impact on companies in the future, so it will be an interesting group to monitor.

Summary

In summary, PBA has made significant progress over the past couple of years—we are hoping the finish line will be reached soon! ☐

NEW REPORT:

COST OF IMPLEMENTING A PRINCIPLE-BASED FRAMEWORK FOR DETERMINING RESERVES AND CAPITAL SURVEY RESULTS

Review the results of a survey on life insurer perspectives and preparedness levels for implementing a principle-based framework for determining reserves and capital. Forty-eight companies participated in the study and offered insight into the stages of their planning, expected cost levels and concerns for implementing the new approach. The report also details additional observations Towers Watson obtained through follow-up interviews with some of the study participants.

View the report today at *http://www.soa.org/pbasurvey.*

SOA International Experience Survey—
Embedded Value Financial Assumptions

By Charles Carroll, William Horbatt, and Dominique Lebel[1]

Editor's Note: This article was originally published in the December 2009 issue of International News.

Starting in 2003, the Society of Actuaries International Experience Study Working Group has been conducting surveys of published embedded value (EV) financial assumptions.[2] This article updates the survey with 2008 data.

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 23 companies centered in Asia, Australia, Canada and Europe, many of which are active internationally.

Each financial assumption presented in this article is the average value of the assumption reported by all companies in their 2008 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 the Survey

Financial assumptions presented in this article include:

1. Discount rate—the rate used to calculate the present value of future distributable earnings.
2. Implied discount rate—for companies with market consistent embedded value (MCEV) calculations, the traditional embedded value (TEV) discount rate that when used to discount "real world" cash flows, would produce the MCEV.
3. Equity return[3]—the total return on common stock investments.
4. Property return[3]—the total return on investments in real estate.
5. Fixed return[3]—the yield on corporate bonds portfolio held by an insurance company.
6. 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).
7. Inflation—the rate used to increase future expenses

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.

"Traditional discount rates generally increased from last year as did implied discount rates. "

and, possibly, revalue policy terms that are tied to inflation.

8. 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, 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	16
CAPM	4
WACC	2
Other/Unknown	1

- A methodology is considered market consistent if each cash flow is valued consistently with traded instruments that display similar risks. Thus under the MCEV approach each cash flow is 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 the table above are the RDR inferred from the MCEV calculation. That is, they are discount rates that would develop the MCEV value using TEV techniques and assumptions.

- Companies that explicitly set risk discount rates are referred to as calculating traditional embedded values (TEV). Two common methods used by them to set the risk discount rate are the capital asset pricing model (CAPM) and the company's own weighted average cost of capital (WACC).
- Under CAPM many companies assume a level of volatility that matches the broad market (i.e., Beta is equal to 1), which results in a discount rate that is equal to the risk free rate plus an average equity risk premium. Other companies employing CAPM methodology may vary discount rates by product line and/or territory to reflect the higher Beta associated with riskier business.

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.

Several observations can be made concerning Table 1 when compared to similar data published last year[4]:

- Traditional discount rates generally increased from last year as did implied discount rates.
- The number of companies reporting traditional discount rates decreased from last year, which is consistent with the fact that several companies moved from a TEV to an MCEV basis.

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[4] ibid

Table 1: Average 2008 Explicit and Implicit Discount Rates (cont.)

Country	Companies	Traditional Discount Rate (1)	Companies	(In Force) (2)	(New Business) (3)
America Latin					
Argentina	1	27.8%	0	NA	NA
Chile	1	10.6%	0	NA	NA
Colombia	1	16.6%	0	NA	NA
Mexico	2	13.1%	0	NA	NA
Peru	1	14.2%	0	NA	NA
Uruguay	1	16.7%	0	NA	NA
America North					
Canada	3	6.9%	1	6.6%	6.6%
US	6	6.4%	1	17.1%	11.0%
Asia / Pacific					
Australia	2	7.6%	2	7.3%	6.7%
China	3	9.7%	0	NA	NA
Hong Kong	3	5.7%	1	9.1%	6.9%
Indonesia	1	15.3%	0	NA	NA
Japan	4	5.4%	1	6.7%	3.1%
Malaysia	2	8.9%	0	NA	NA
New Zealand	2	8.9%	1	6.8%	5.6%
Philippines	1	15.8%	0	NA	NA
Singapore	1	6.9%	0	NA	NA
South Korea	3	8.6%	0	NA	NA
Taiwan	4	6.9%	0	NA	NA
Turkey	1	22.9%	0	NA	NA
Europe Central					
Bulgaria	1	11.0%	0	NA	NA
Czech	3	7.9%	0	NA	NA
Greece *	1	7.3%	0	NA	NA
Hungary	3	12.0%	0	NA	NA
Poland	3	9.0%	1	6.0%	6.0%
Romania	2	12.9%	0	NA	NA
Russia	1	15.9%	0	NA	NA
Slovakia	3	8.3%	0	NA	NA

Table 1: Average 2008 Explicit and Implicit Discount Rates (cont.)

Country	Companies	Traditional Discount Rate (1)	Companies	(In Force) (2)	(New Business) (3)
Europe Western					
Austria *	1	7.4%	0	NA	NA
Belgium *	2	7.3%	1	9.4%	9.6%
France *	3	7.8%	3	8.1%	7.0%
Germany *	1	7.4%	3	6.6%	5.5%
Ireland *	2	7.2%	2	5.3%	5.3%
Italy *	1	7.4%	2	6.8%	6.4%
Luxembourg *	1	7.3%	1	6.7%	6.2%
Netherlands *	4	7.4%	0	NA	NA
Portugal *	1	7.4%	0	NA	NA
Spain *	3	7.6%	1	9.7%	9.7%
Switzerland	1	6.3%	1	7.1%	6.0%
UK	3	7.7%	4	7.9%	7.0%

* euro currency zone

- However, not all of the companies on an MCEV basis disclosed their implied discount rates.
- Implied discount rates for new business are generally lower than those for the in force portfolios, due to the lowering of interest rate and other guarantees for new business.

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 book profits are based on amortized cost while current market redemption yields are used when profits are calculated using market values. 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 2008 Financial Assumptions

Country	Companies	Equity Return (4)	Property Return (5)	Fixed Return (6)	Government Return (7)	Inflation (8)	Income Tax Rates (9)
America Latin							
Argentina	1	26.2%	NA	21.7%	21.7%	NA	NA
Brazil	1	NA	NA	NA	NA	NA	40.0%
Chile	1	11.0%	NA	7.2%	6.5%	NA	NA
Colombia	1	15.0%	NA	10.5%	10.5%	NA	NA
Mexico	2	12.6%	NA	9.2%	8.3%	4.0%	40.0%
Peru	1	12.6%	NA	8.3%	8.1%	NA	NA
Uruguay	1	15.1%	NA	10.6%	10.6%	NA	NA
America North							
Canada	5	7.6%	8.6%	5.2%	2.9%	1.6%	29.3%
US	13	7.1%	5.0%	7.0%	2.5%	1.4%	34.9%
Asia / Pacific							
Australia	5	8.8%	6.9%	4.7%	4.9%	2.8%	30.0%
China	3	8.8%	NA	3.7%	4.8%	3.5%	25.0%
Hong Kong	6	6.9%	NA	4.7%	1.9%	2.3%	16.5%
Indonesia	1	NA	NA	NA	10.3%	6.0%	NA
Japan	5	5.8%	1.5%	2.8%	1.5%	0.6%	36.0%
Malaysia	3	10.6%	5.5%	4.5%	5.4%	NA	26.0%
New Zealand	3	9.2%	6.7%	5.6%	5.4%	3.0%	NA
Philippines	1	NA	NA	NA	9.3%	5.0%	NA
Singapore	1	10.2%	NA	NA	4.3%	1.8%	NA
South Korea	3	9.1%	5.5%	6.0%	4.7%	2.8%	22.0%
Taiwan	4	6.2%	1.8%	3.6%	2.6%	2.1%	25.0%
Thailand	3	7.6%	2.9%	4.5%	4.5%	3.0%	NA
Vietnam	1	NA	NA	NA	10.3%	6.0%	NA
Asia / Mid East							
India	2	12.3%	NA	8.8%	8.5%	5.0%	NA
Turkey	1	21.3%	NA	16.8%	16.8%	NA	NA
Europe Central							
Bulgaria	1	11.4%	NA	7.3%	6.9%	NA	NA
Croatia	1	NA	0.0%	NA	NA	NA	NA
Czech	4	8.2%	6.3%	4.3%	4.1%	3.0%	19.0%
Greece *	1	6.8%	NA	3.2%	3.2%	NA	NA
Hungary	3	12.3%	9.8%	8.8%	8.1%	3.0%	20.0%
Poland	4	8.9%	5.8%	5.3%	4.9%	3.0%	19.0%
Romania	2	13.1%	NA	8.7%	8.6%	5.0%	16.0%
Russia	1	15.8%	NA	11.3%	11.3%	NA	NA
Slovakia	3	8.6%	5.6%	4.6%	4.2%	3.0%	19.0%

Table 2: Average 2008 Financial Assumptions (cont.)							
Country	Companies	Equity Return (4)	Property Return (5)	Fixed Return (6)	Government Return (7)	Inflation (8)	Income Tax Rates (9)
Europe Western							
Austria *	2	7.8%	4.5%	NA	3.8%	NA	NA
Belgium *	6	7.3%	5.6%	4.3%	3.7%	1.4%	34.0%
France *	10	7.1%	5.6%	5.2%	3.7%	1.7%	34.3%
Germany *	8	6.9%	5.0%	5.6%	3.6%	1.7%	30.3%
Ireland *	5	6.7%	5.0%	NA	3.7%	2.4%	12.5%
Italy *	7	6.5%	4.4%	NA	3.9%	2.6%	32.3%
Luxembourg *	5	6.9%	5.7%	4.3%	3.7%	2.0%	25.8%
Netherlands *	8	6.9%	5.5%	6.0%	3.6%	1.7%	25.5%
Portugal *	2	7.8%	4.5%	NA	3.8%	NA	NA
Spain *	7	7.1%	5.7%	4.2%	3.6%	2.4%	30.0%
Sweden	2	6.2%	5.2%	NA	3.5%	1.8%	28.0%
Switzerland	5	6.6%	4.1%	3.0%	2.6%	1.4%	22.1%
UK	13	7.1%	5.9%	5.8%	3.6%	3.0%	28.1%

* euro currency zone

Several observations can be made concerning Table 2 when compared to similar data published last year[5]:

- Investment yields generally decreased across all investment classes as did inflation.
- Investment yield increases were found in some South American and Eastern European countries.
- Most of the decreases are attributable to decreases in swap or government bond yields.

It should be noted that several companies calculating MCEVs as of year-end 2008 adjusted their risk free rates by including an illiquidity premium adjustment resulting in a higher risk free return. These illiquidity premiums were not included in any of the analyses contained in this article.

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.
- 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 embedded value discount rate over the risk free return
- Real return—the excess of the risk free return over inflation

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

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[5] ibid

Table 3: Investment Premiums and Other Marginal Relationships

Country	Traditional Risk Premium (10)=(1)-(7)**	Equity Premium (11)=(4)-(7)**	Property Premium (12)=(5)-(7)**	Credit Spread (13)=(6)-(7)**	Real Return (14)=(7)-(8)**
America Latin					
Argentina	6.1%	4.5%	NA	0.0%	NA
Chile	4.1%	4.5%	NA	0.7%	NA
Colombia	6.1%	4.5%	NA	0.0%	NA
Mexico	4.8%	4.5%	NA	1.1%	4.5%
Peru	6.1%	4.5%	NA	0.2%	NA
Uruguay	6.1%	4.5%	NA	0.0%	NA
America North					
Canada	3.9%	4.8%	5.5%	2.6%	1.4%
US	3.6%	4.6%	2.8%	5.1%	-0.1%
Asia / Pacific					
Australia	3.6%	3.8%	1.8%	-0.4%	2.9%
China	4.9%	5.8%	NA	0.7%	2.1%
Hong Kong	3.6%	5.0%	NA	3.0%	-0.4%
Indonesia	5.0%	NA	NA	NA	4.3%
Japan	4.0%	4.3%	0.2%	1.1%	0.8%
Malaysia	3.6%	5.3%	1.3%	0.3%	NA
New Zealand	3.6%	3.8%	2.0%	0.3%	1.7%
Philippines	6.5%	NA	NA	NA	4.3%
Singapore	2.6%	6.0%	NA	NA	2.5%
South Korea	3.9%	4.3%	0.9%	0.8%	1.6%
Taiwan	4.3%	4.5%	0.3%	1.8%	1.5%
Thailand	5.0%	4.3%	0.5%	0.2%	3.8%
Vietnam	6.5%	NA	NA	NA	4.3%
Asia / Mid East					
India	5.1%	4.5%	NA	1.0%	4.3%

Table 3: Investment Premiums and Other Marginal Relationships (cont.)

Country	Traditional Risk Premium (10)=(1)-(7)**	Equity Premium (11)=(4)-(7)**	Property Premium (12)=(5)-(7)**	Credit Spread (13)=(6)-(7)**	Real Return (14)=(7)-(8)**
Europe Central					
Bulgaria	4.1%	4.5%	NA	0.4%	NA
Czech	3.9%	4.2%	2.3%	0.0%	1.5%
Greece *	4.1%	3.6%	NA	0.0%	NA
Hungary	3.9%	4.2%	2.7%	0.2%	4.0%
Poland	3.9%	4.1%	1.5%	0.0%	1.9%
Romania	4.3%	4.5%	NA	0.0%	3.5%
Russia	4.6%	4.5%	NA	0.0%	NA
Slovakia	4.1%	4.4%	0.9%	0.0%	0.4%
Europe Western					
Austria *	3.6%	4.0%	0.8%	NA	NA
Belgium *	3.9%	3.7%	1.8%	0.8%	2.4%
France *	4.2%	3.4%	1.9%	1.6%	2.0%
Germany *	3.6%	3.5%	1.6%	1.8%	1.8%
Ireland *	3.3%	3.1%	1.4%	NA	1.2%
Italy *	3.6%	2.5%	0.4%	NA	1.3%
Luxembourg *	4.1%	3.2%	2.0%	0.6%	2.0%
Netherlands *	4.0%	3.3%	1.9%	2.7%	1.9%
Portugal *	3.6%	4.0%	0.8%	NA	NA
Spain *	4.1%	3.5%	2.0%	0.9%	1.3%
Sweden	NA	3.0%	2.0%	NA	1.4%
Switzerland	3.6%	3.9%	1.4%	0.4%	1.2%
UK	4.0%	3.5%	2.4%	2.2%	0.6%

* = euro zone
** = calculated including only companies with complete data

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

• Credit spreads between non risk-free asset classes and risk-free yields generally increased, reflecting the turmoil in the financial markets.
• Some of the largest spread increases occurred in North America where risk free yields decreased the most.
• Spread decreases were scattered and primarily occurred in Europe and Asia.

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 European companies are calculating the values of options and guarantees following stochastic approaches in order to comply with European CFO

Forum guidelines[6] for embedded value calculations. Fourteen of the 23 companies surveyed disclosed fairly detailed stochastic market assumptions in their 2008 European embedded value (EEV) reports. Averages of several of these assumptions are shown in Table 4 (Note that some companies refer to volatility as standard deviation).

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.

Some observations can be made regarding stochastic and other elements of EV calculations this year:
• More companies are disclosing stochastic assumptions as they deal with calculating the value of options.
• Prior to year end 2008, most companies calculating MCEVs used implied volatilities as of the valuation date. At year end 2008 however, due to the high implied volatilities observed, a wide range of implied volatility assumptions were used including using implied volatilities as of end of June, August or September of 2008 or using average volatilities during 2008.

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. ☐

[6] See *http://www.cfoforum.nl/* for more information on the European CFO Embedded Value and Market Consistent Embedded Value Guidelines

Charles Carroll, FSA, MAAA, FCA is consultant to New York Life Insurance Company in New York, N.Y. He can be reached at charles_carroll@nyl.com.

William R. Horbatt, FSA, MAAA, is a consulting actuary with Actuarial Consortium in Short Hills, N.J. He can be reached at Horbatt@ActuarialConsortium.com.

Dominique Lebel, FSA, MAAA, FCIA, is a senior consultant at Towers Perrin in San Francisco, Calif. He can be reached at Dominique.Lebel@towersperrin.com.

Table 4: Sample Stochastic Assumptions

		Stock		Property		Bonds		
	Companies	Yield	Volatility	Yield	Volatility	Yield	Volatility	Type
Australia	2					4.4%		Swap
Czech	2		24.6%			3.7%	11.6%	Swap/Government
Europe	12	6.7%	27.8%	5.7%	13.9%	3.9%	11.6%	Swap/Government
Hong Kong	1		39.7%		21.9.%			
Japan	4	4.9%	30.4%			1.7%	8.5%	Swap/Government
So. Africa	2		29.2%		15.6%	7.7%	25.9%	Swap
So. Korea	2		36.4%			4.6%	11.8%	Government
Switzerland	5		26.7%		16.4%	2.6%	13.7%	Swap
UK	9	5.8%	30.0%	5.8%	15.6%	3.5%	9.6%	Swap/Government
US	11	7.1%	27.0%		16.9%	3.0%	17.2%	Swap/Government

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