SOCIETY OF ACTUARIES

Article from:

Product Matters!

June 2010 – Issue 77

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.

Actuaries
Risk is Opportunity.®

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
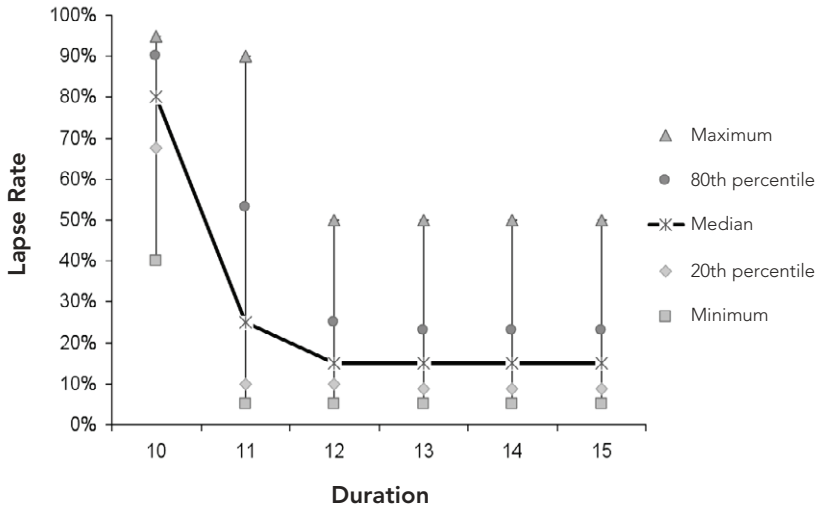
The following chart shows the cumulative lapse rate starting in duration 10 in a similar fashion. This view helps control for some of the differences in the shape of the lapse rate assumption by different companies. Some respondents used smaller than average duration 10 shock lapses but then followed 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
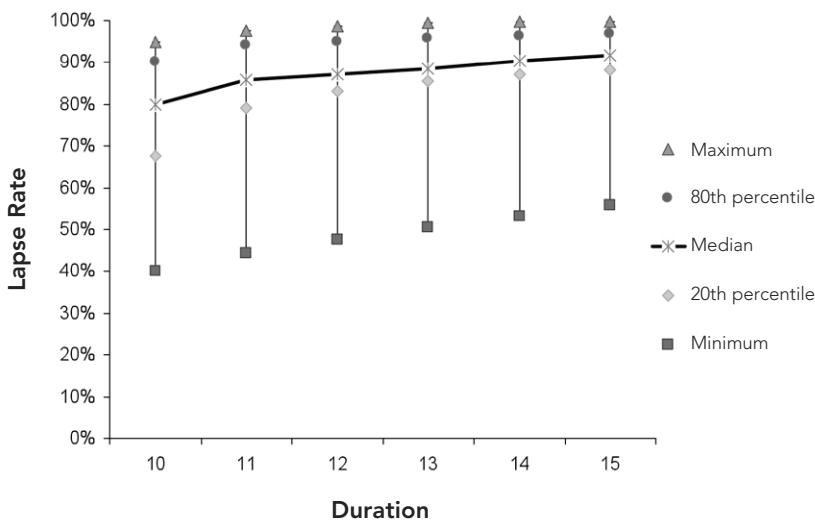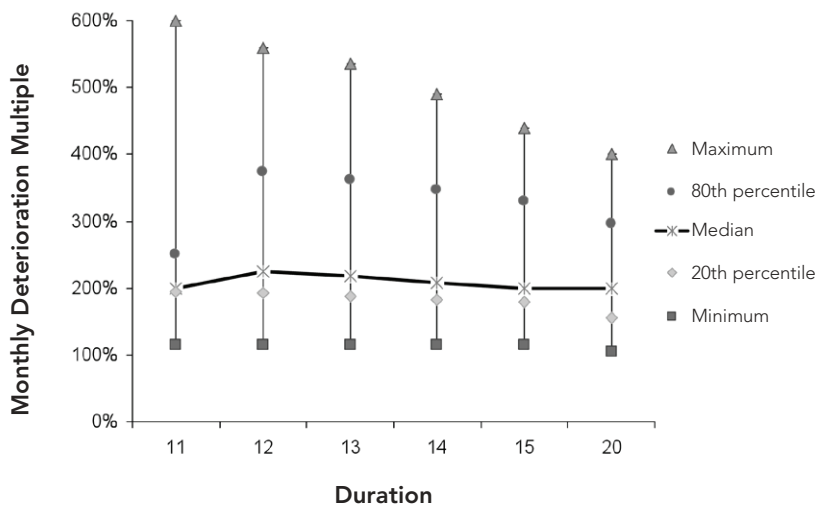
Mortality Deterioration Assumptions

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.
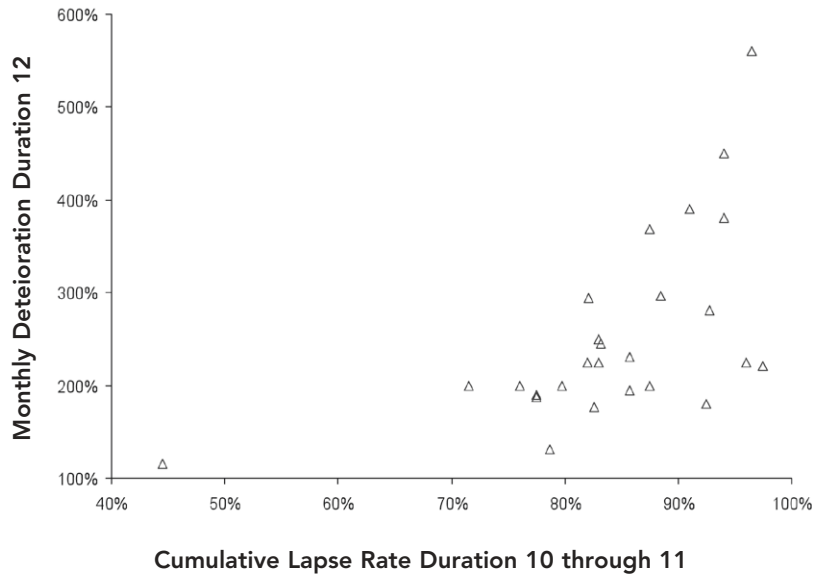
T10 Mortality Deterioration Assumption

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.
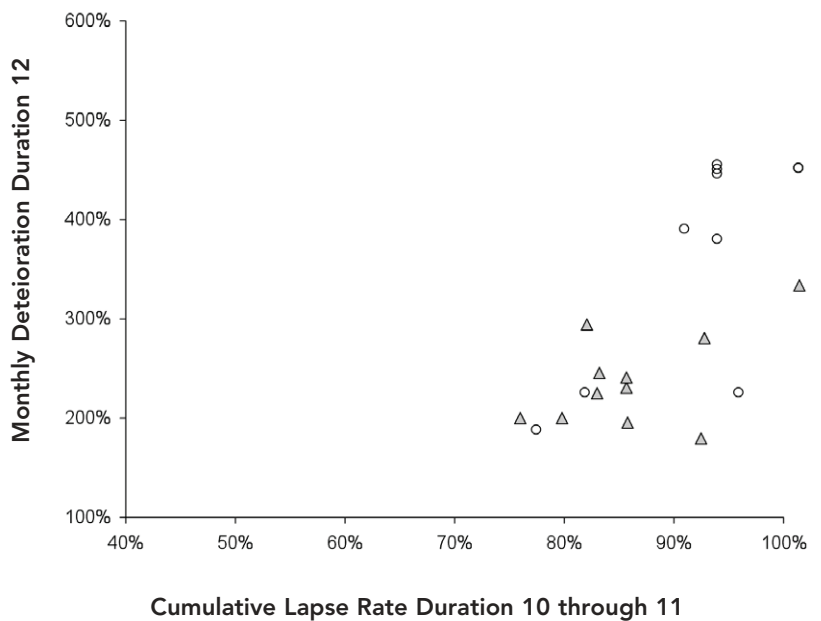
Conclusion

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

Cumulative Lapse Rate Duration 10 through 11

T10 Shock Lapse vs. Mortality Deterioration Assumption

Cumulative Lapse Rate Duration 10 through 11

○ 300% of 2001 CSO or Greater

△ Less than or Equal to 200% of 2001CSO