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A Brief Look at the Phase 2 Experience Analysis Results From the SOA/RGA Post-Level Term Research Project

By Tim Rozar and Scott Rushing

Recently RGA completed an in-depth study looking at assumptions and experience for lapses and mortality at the end of the level premium period for level term business. This study was completed on the behalf of the SOA's Product Development Section Council and Committee on Life Insurance Research.

This study was divided into two phases:

1. The Phase 1 report¹ summarized mortality and lapse assumptions of 41 companies used for pricing and modeling level premium term products. A brief overview of the Phase 1 report was provided in the June 2010 edition of *Product Matters!*²
2. The Phase 2 report³ provided lapse and mortality experience between 2000 and 2008 for 26 companies with level term policies beyond the end of the level period. The focus of the studies was the "shock lapse" and the mortality deterioration that follows.

Both full reports are available in the Research section of www.soa.org. This article will summarize the Phase 2 report and will focus solely on the results of the 10-year level term product.

Phase 2 Lapse Study

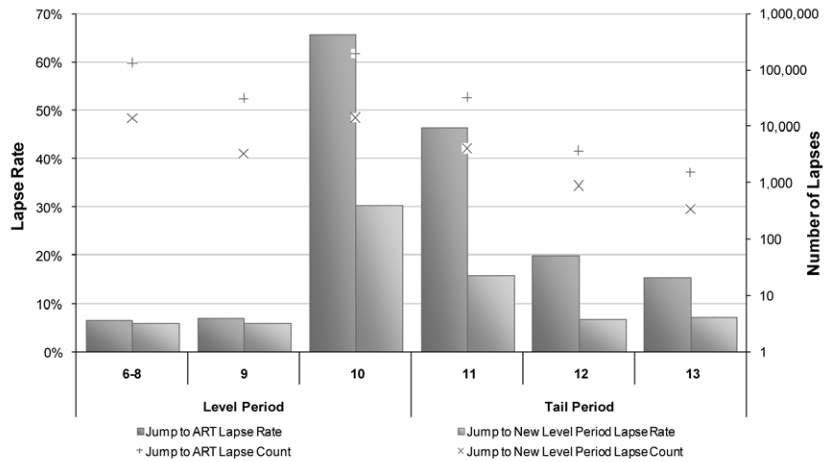
For 10-year level term business, the study included over 200,000 duration 10 lapses occurring between policy anniversaries 2000 and 2008. The goal of the lapse study was to better understand the magnitude of the shock lapse as well as key drivers involved.

The aggregate initial shock lapse at the end of duration 10 was 61 percent with a smaller secondary shock lapse in duration 11. These results varied significantly by company, product structure, and policy attributes. For the policies with premiums jumping to an ART scale (a much more common design on new products), the initial shock lapse at the end of duration 10 was 66 percent.

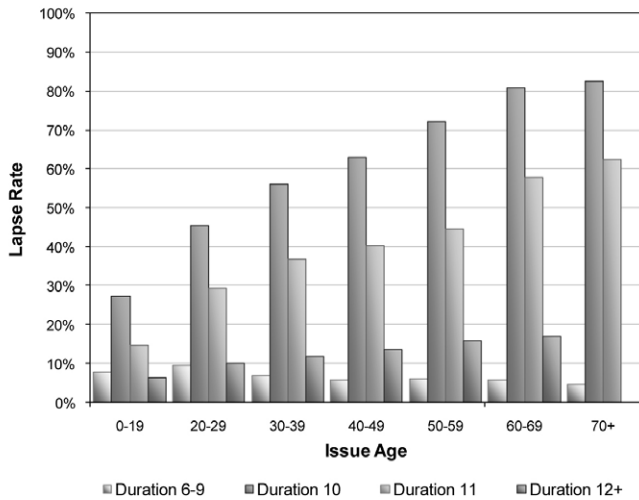
Highlights of the 10-year level term lapse study results include:

- By Issue Age—the shock lapse increased substantially as issue age increases.
- By Premium Structure—the shock lapses were much larger when the level period rates transitioned to an ART scale rather than to a new level period, although it is unclear whether this is driven by the product structure or by other company-specific dynamics.
- By Premium Jump—the larger the premium jump ratio (the duration per \$1000 premium rate divided by the level period premium per \$1000 rate), the higher the lapse rate. This factor proved to be a significant driver of shock lapses.
- By Premium Mode—the shock lapse was smaller as the frequency of premium payments increased.
- Lapse Skewness—the distribution of lapses throughout the policy year was drastically different for duration 11 than it was during the level period. The paper further points out differences by premium mode.

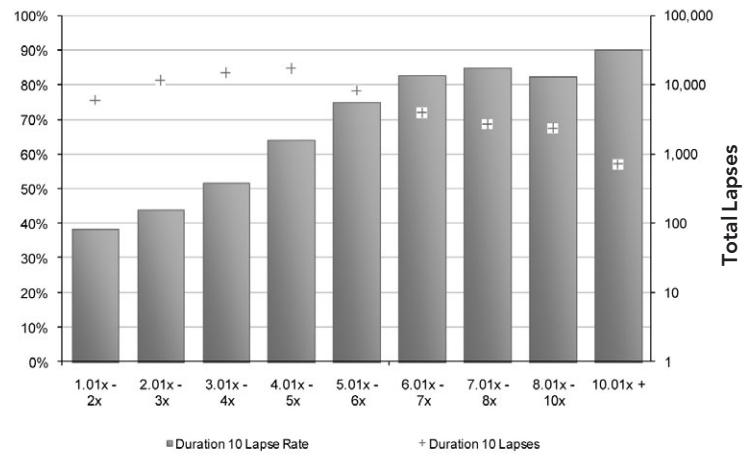
T10 Lapse Rates by Duration and Tail Period Premium Structure



T10 Lapse Rates by Issue Age

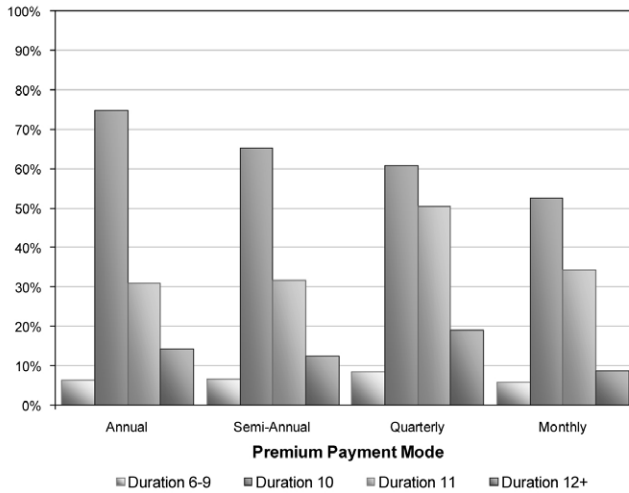


T10 Duration 10 Lapse Rate by Premium Jump Ratio

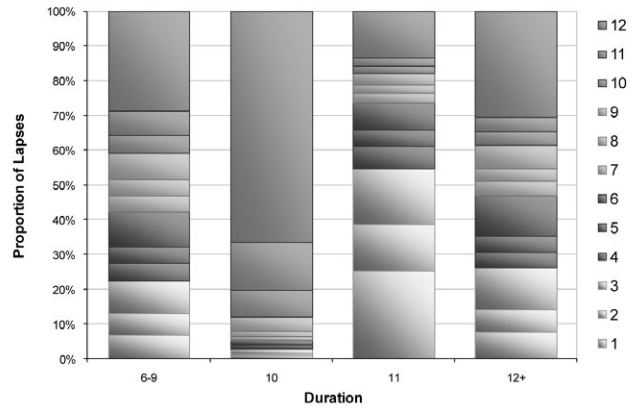


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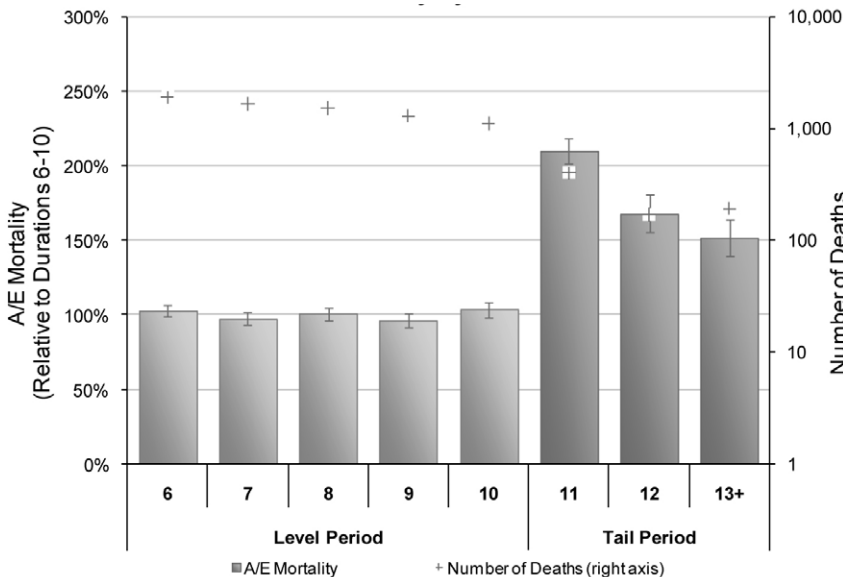
T10 Lapse Rates by Premium Payment Mode



**T10: Lapse Skewness by Month
Companies without Grace Period Adjustments**



T10 Mortality by Duration



Phase 2 Mortality Study

The mortality study results were based on seriatim calendar year experience from 2000 to 2008. The goal of this mortality study was to quantify the mortality deterioration due to the large shock lapse and to better identify a few key drivers of post-level period mortality. The results of the study were calculated on a few different industry mortality tables, but the main focus was on “relative” ratios, which expresses the post-level period mortality as a percentage of the level period results for durations six–10, using 2008 VBT as the basis for calculations. For 10-year level term business, the study included nearly 800 deaths beyond the level period.

For all 10-year level term business, the mortality beyond duration 10 was 182 percent of the level period mortality. The aggregate duration 11 results were 210 percent of the level period, but the median company result was 275 percent of the level period. For the policies with premiums jumping to an ART scale, the mortality beyond duration 10 was 230 percent of the level period and duration 11 was 257 percent of the level period. There was much less anti-selective behavior demonstrated for policies with premiums jumping to a new level period.

Highlights of the 10-year post-level period mortality study for the “jump to ART scale” products include:

- By Issue Age—while the level period mortality was a fairly level percentage of 2008 VBT, the results beyond the level period increased slightly by issue age.
- By Premium Jump—post-level period mortality increased as premium jump ratio increases.
- By Gender—mortality deterioration beyond the level period was slightly higher for males.
- By Cause of Death—the overall rate of cancer increased beyond the level period, suggesting anti-selective persistency.

Phase 2 Experience Compared to Phase 1 Assumption Survey

The experience studies covered in the Phase 2 study focus on products issued more than 10 years ago. The assumption survey from Phase 1 highlighted term products issued at the end of 2008. It is important to understand this disconnect when comparing the results of the two phases, especially as it relates to the size of the premium jump at the end of the level period.

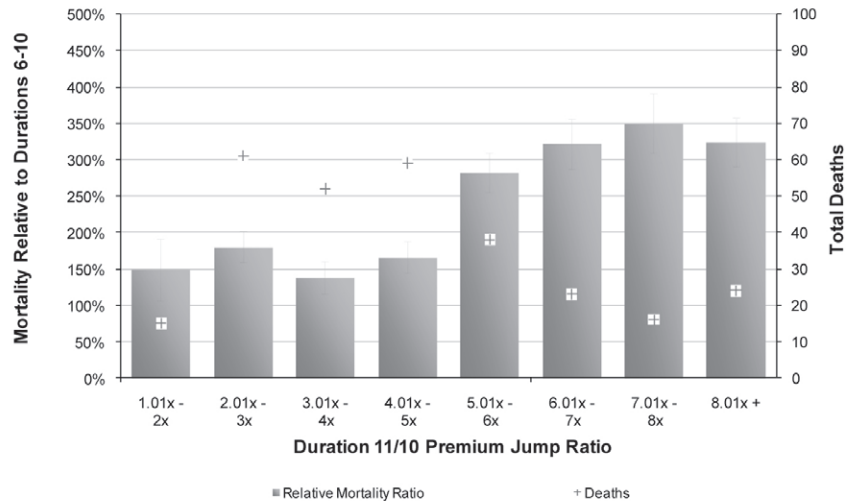
The average T10 shock lapse from the Phase 1 assumption survey was reported to be quite a bit higher than observed results in the Phase 2 experience analysis. This is consistent with the higher premium jumps on more recently issued products.

The most significant difference between the Phase 1 assumptions and the Phase 2 experience results was the shape of the shock lapse by issue age. Most company responses did not directly vary pricing assumptions by issue age, while the experience study results showed a significant increase in shock lapse rates by issue age.

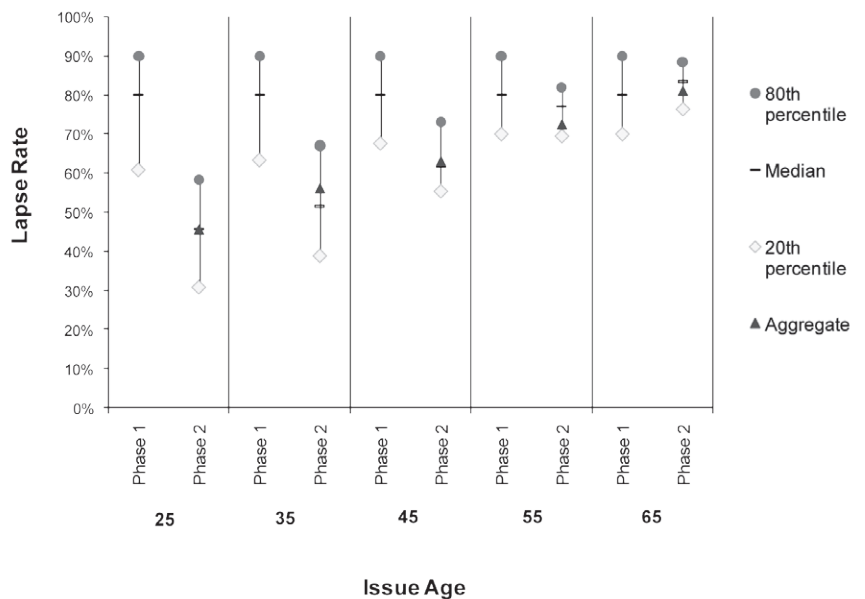
The median level of mortality deterioration was higher in the Phase 2 experience study than in the Phase 1 assumption survey, although a small number of larger companies experienced lower mortality deterioration than the median.

Both the Phase 1 assumption survey and the Phase 2 experience results showed a generally positive correlation between the size of the shock lapse and the level of mortality deterioration that followed. These relationships are

T10 Jump Art
Post-Level Mortality relative to Level Period
by Premium Jump Ratio



T10 Duration 10 Lapse By Issue Age Phase 1 vs. Phase 2



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

illustrated in the following graph which plots the duration 10 shock lapse on the x-axis and the 2008 VBT mortality ratio for durations 11+ on the y-axis. In general, it appears that for a given level of shock lapse, the average Phase 2 mortality deterioration experience is higher than the corresponding Phase 1 pricing assumptions.

Shock Lapse Model

The shock lapse at the end of the level period is influenced by several factors, many of which are correlated. For this reason, the paper concludes with a simple logistic regression model in an effort to identify the key drivers of the shock lapse. The models presented in the paper suggest that variables issue age, premium jump and premium mode are among the most important factors identified of the ones used in this study.

Conclusion

Assumptions surrounding the policyholder behavior at the end of the level period have proven very important to

the development of level term insurance products. Only recently have companies been able to support these assumptions with credible experience. The Phase 2 report provides an important industry benchmark of the experience results for term shock lapse rates and mortality rates beyond the level premium period which should support the development of future level-term products.

We'd like to express our sincere thanks to the SOA, the PD Section, volunteers on the Project Oversight Group, RGA and all participating companies for their support of this research project. □

END NOTES

- ¹ The full Phase 1 report is located at: <http://www.soa.org/files/pdf/research-2009-post-level.pdf>
- ² The June 2010 Product Matters article is located at: <http://www.soa.org/library/newsletters/product-development-news/2010/june/pro-2010-iss77.pdf>
- ³ The full Phase 2 report is located at: <http://www.soa.org/files/pdf/research-shock-lapse-report.pdf>



Scott Rushing, FSA, MAAA, is VP & actuary, RGA, Chesterfield, Mo. He can be contacted at srushing@rgare.com.

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