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# Post-Level Term Survey Results

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**T**erm shock lapse and mortality deterioration assumptions are more critical than ever in an increasingly competitive marketplace. In 2013 RGA investigated industry assumptions and experience regarding term products at the end of the level premium period and beyond. That effort was sponsored by the SOA and was divided into two phases:

- Phase 1 was a summary of company responses to 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.

A copy of the complete 2013 survey can be found at: <http://www.soa.org/Files/Research/Projects/research-shock-lapse-survey-report.pdf>.

RGA and the SOA teamed up to produce a similar report in 2009. Where applicable, some results from the 2009 Phase I survey are included in this discussion for comparison.

RGA received responses from 41 of the top 100 term writers in the industry by face amount sold, representing approximately 62 percent of all 2012 term sales. The survey questions asked companies to describe pricing assumptions, product design characteristics and premium structures for their term products issued at the end of 2012. This article summarizes some of the more interesting findings from Phase 1 of the 2013 survey.

## Product Design

A number of survey questions related to the structure and design of term products. Topics addressed in this section include product mix, distribution channels, post-level premium structure, premium modes and premium jumps. Some high level observations follow:

- The most prevalent product design was a jump to an annually increasing premium scale immediately following the level period. Only a few companies reported a grade-in to an ART or other premium structure.
- Premiums after the level period were typically set as 200 percent to 300 percent of 2001 CSO Ultimate. Only two respondents were pricing relative to the 1980 CSO Ultimate.

- There was no consensus among respondents regarding the difference between current premium rates and guaranteed rates at the end of the level period. Responses were very evenly distributed among three groups: products where current rates are less than guaranteed rates, products where current rates equal guaranteed rates and products with only guaranteed rates.
- Premium rates normally varied by risk class and face amount band during the level period but not during the post-level period. This leads to a more pronounced jump for the best class products at the end of the level period.
- Policyholders may maintain coverage at the end of the level period through persisting or through lapsing and re-entering. In general, the premium increase after the level period is greater for those that persist versus those that lapse and re-enter, particularly if they re-enter with the same company, face amount and underwriting class. Among those that lapse and re-enter, the premium jump is largest for those in the best class and the jump increases with age.

## Shock Lapse Assumptions

Respondents were asked to provide their lapse assumptions from the last year of the level period and the immediate five years after the level period. Some companies provided one flat assumption; others vary their assumptions based on any number of factors or combination of factors: issue age, level period, risk class, premium jump ratio, premium mode, face amount, smoker status, conversion options and gender.

Of the 38 respondents providing lapse rate assumptions for 10-year level term products, 29 (76 percent) assumed a shock lapse of less than 100 percent at the end of the level premium period. Of these 29 companies, 24 also provided a shock lapse of less than 100 percent for their 20 year products. Most companies either provided no shock assumptions or used 100 percent for their 30 year products. Here are a few items of note from the companies that varied assumptions:

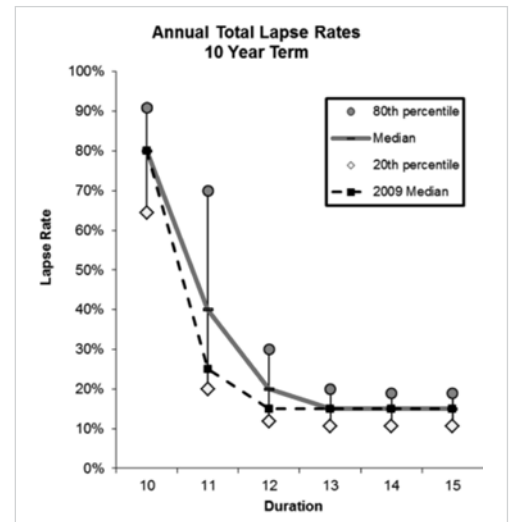


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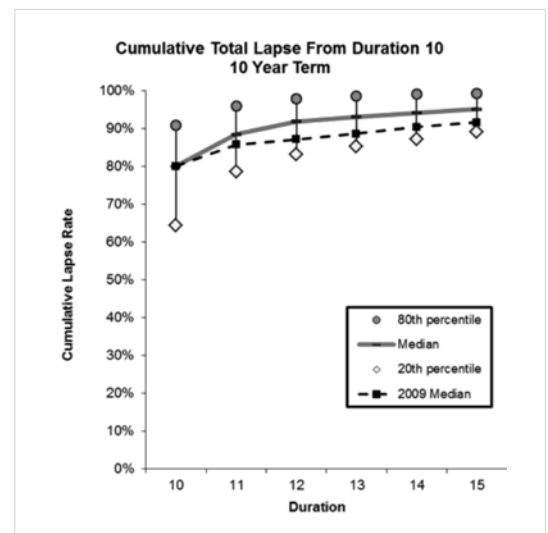
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- The median shock lapse assumption was 80 percent in duration 10 for a common T10 pricing cell, which is the same finding as 2009. In duration 20, for a common T20 pricing cell, the median shock lapse assumption was 90 percent, which is up from 82 percent in 2009.
- The median cumulative lapse rate assumption for durations 10 through 14 for T10 was 94 percent, up from 90 percent in 2009. For T20, the median cumulative lapse rate for durations 20 through 24 was 96 percent, up from 92 percent in 2009.
- Respondents gave a variety of lapse assumptions in the durations following the level period. For ten-year term, eight described an initial shock followed by a much lower level assumption, 12 described an initial shock followed by a grade down to level, and nine described multiple shocks, including some responses where the second shock was larger than the first.
- Phase 2 of the 2009 study clearly demonstrated through aggregate company experience that lapses in the last year of the level period are skewed toward the end of the year and lapses in the first year after the level period are skewed heavily to the beginning of the year. In the 2009 assumption survey, only six respondents expressly accounted for this. In the 2013 survey 29, of the 37 respondents who answered the question skew lapses toward the end of the final year of the level period and 17 of the 30 who answered the question skewed lapses toward the beginning of the first year after the level period.
- Premium jumps showed no strong relationship with assumed shock lapses for 10 and 20 year products.

As the following chart demonstrates, the median lapse assumptions for 10 Year Term plans have increased in durations 11 and 12 relative to the 2009 survey. The charts for the other level periods and pricing cells show a similar trend over time.



The following chart shows the cumulative lapse rate assumptions starting in duration 10 for a ten-year term product. Use of a cumulative lapse rate helps smooth out timing differences for companies that distribute the shock assumptions beyond the 10th duration.



“The median lapse assumptions for 10 Year Term plans have increased in durations 11 and 12 relative to the 2009 survey.”

## Mortality Deterioration Assumptions

It is common to assume that policyholders who choose to pay the significantly higher premiums in the post level period will have worse mortality experience than those that lapse. Respondents were asked to provide their mortality assumptions for the first five years after the level period. Assumptions varied by a number of factors, including length of the level term period, policy duration, issue age, risk class and gender. Additionally, some respondents varied their assumptions by policy size, premium jump ratio and the conversion options available on the product. For ten-year term, 27 respondents provided mortality deterioration assumptions:

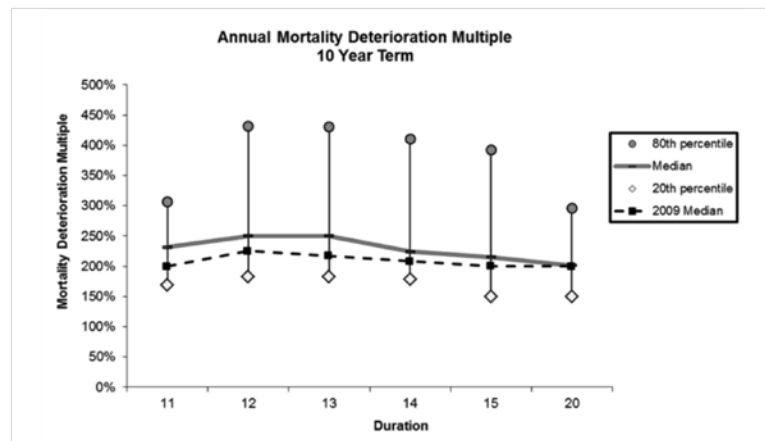
- The median mortality deterioration assumption was 232 percent for T10 in duration 11, which is higher than the 200 percent assumption in the 2009 survey. For T20, the corresponding assumption was 300 percent in duration 21, up from 250 percent in the 2009 survey.
- Among the respondents that provided mortality deterioration assumptions only four use a flat multiple after the end of the level period, compared to six responses in the 2009 survey.
- The most common method for developing mortality assumptions among respondents is Dukes-MacDonald (D-M) and its derivatives such as Becker-Kitsos (14 respondents). The next most commonly cited method was to employ a flat multiple (13 respondents). However, most companies that cited use of a flat multiple usually varied their assumption by some other parameter(s) such as duration.
- Six used other methods, including the CIA Valuation Technique Paper #2 (CIA), internally developed methods and externally developed methods.
- Mortality deterioration multiples that varied by duration generally graded down. This diminishing anti-selection assumption is likely associated with the generally decreasing pattern of lapse assumptions by duration after the initial shock lapse and the diminishing impact of the grace period.
- Companies who varied mortality multiples by issue age generally increased the multiple by decennial age from 25 to 55, then decreased the multiple for ages 65 and older. In the 2009 study all cases with that pattern were



developed using either D-M or CIA; this time there were other methods that resulted in that pattern.

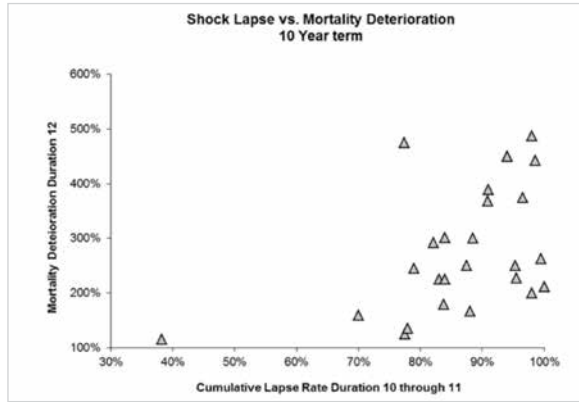
- Of the 32 respondents that offer some type of conversion option, 17 assume different mortality deterioration multiples upon conversion than for policies that persisted into the post-level period. This is up from 10 out of 33 companies in the 2009 survey.

The chart below 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 previously described, the aggregated mortality deterioration assumptions generally started to level out and grade down after duration 12, although several respondents provided flat multiples across all durations. The median assumption has increased since the 2009 survey median.



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The following scatterplot shows the relationship between each company’s shock lapse assumption and their mortality deterioration assumption. This plot shows the mortality assumption in duration 12 as a function of the cumulative lapse assumptions in durations 10 through 11 for 10-year term; other level periods show similar relationships. Companies with larger shock lapse assumptions generally have the largest assumptions for mortality deterioration multiples.



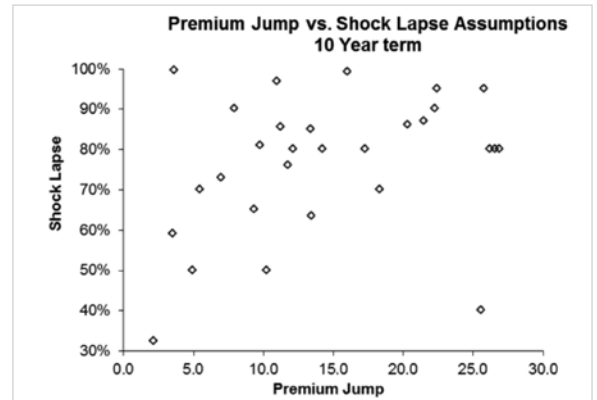
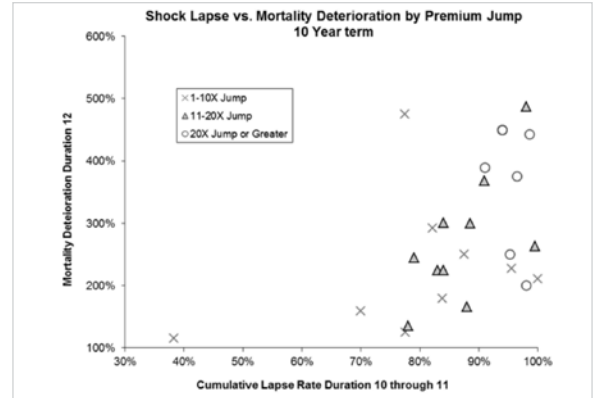
**Conclusion**

There is some correlation evident between the assumed shock lapse and the assumed mortality deterioration. However, there is almost no correlation between the actual premium jump from the level to the post level period and the assumed mortality deterioration, nor is there much correlation between the actual premium jump and the assumed shock lapse. These relationships suggest that companies may still need to better optimize the relationship between the actual premium jump and the assumed shock lapse.

As will be demonstrated in the Phase 2 experience results, the mortality deterioration assumptions are probably not optimally aligned with the premium jump. If the assumptions were closer to experience, the results for the three premium jump groups below would be more clearly stratified by group across levels of mortality deterioration.

Companies generally increase the mortality deterioration assumptions as the shock lapse increases, which usually matches experience. The issue then, appears to be the relationship between the shock lapse assumption and the actual premium jump. Based on experience data, a more

log based relationship is expected than what we see when plotting the shock lapse assumption versus the premium jump as below.



Following the 2009 survey results, companies have further refined assumptions to more closely match emerging experience. This is a constant process and product development actuaries are continually vigilant in their review of data from all sources when developing and refining assumptions. Correctly defining and implementing sound assumptions for the post-level period on a term product is essential to profitability in the post-level stage of a product’s life cycle.

The authors would like to express our thanks to the SOA and RGA for their support of this research project. We would 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 proves useful as product development actuaries consider their current assumptions, and that these results whet the appetite for the experience results in Phase 2. □