SOCIETY OF ACTUARIES

Article from

Risk Management

May 2019
Issue 44

Summary of Risk Management Research on Policyholder Behavior in the Tail Survey

By Jeff Hartman

Editor's Note: *The Joint Risk Management Section (JRMS) is trying to develop better estimates of policyholder behavior in the tail (PBITT). The mission of the PBITT working group is to examine and ultimately give guidance to actuaries on how to set policyholder assumptions in extreme scenarios.*

As part of its work, the PBITT working group issues two surveys each year that gather the range of assumptions actuaries use in pricing, reserving and risk management of universal life with secondary guarantees and minimum guarantees on variable annuities. This article shares some of the highlights of the most recently published surveys, and links are provided to the full reports.

VARIABLE ANNUITY SURVEY

The variable annuity survey explores assumptions in tail scenarios across five categories of benefits. Not all companies have all five types in their portfolio:

- **GMDB.** Guaranteed minimum death benefit with no living benefit
- **GMIB.** Guaranteed minimum income at annuitization; may also include death benefit
- **GMWB.** Guaranteed minimum income over specified (non-lifetime) period; may also include death benefit
- **GLWB.** Guaranteed income stream for life; may also include death benefit
- **GMAB.** Guaranteed minimum account value at a specified time; may also include death benefit

First, the survey explores the "tail" scenario, defined as the first scenario in the stochastic 90 CTE calculation that produces a negative result. For variable annuity guaranteed benefits, the tail scenario is typically associated with low or negative equity returns in the early projection years. The median of insurers' responses from 2017 Equity Tail Scenarios (Figure 1) is plotted against the 10th percentile of the equity returns from the American Academy of Actuaries (AAA) prepackaged scenario. The cumulative return is similar to that of the 10th percentile of the AAA prepackaged scenarios, especially in the first 15 years.

A key assumption that varies by scenario is lapses. The average lapse rate for the aggregate block in a tail scenario tends to be lower than that in a base scenario for most guarantee types. However, the degree of differences varies widely by type of guarantee. GMIB and GLWB lapse rates in a tail scenario are significantly less than those in a base scenario. GMDB and GMAB lapses are somewhat lower in a tail scenario. And GMWB lapse rates show little difference between the tail and base scenarios.

The source of assumptions varies between base and tail scenarios. For base scenario assumptions, company experience is the predominant source, followed by best estimate and industry experience. By contrast, for tail scenario assumptions there is a wider range of sources (Figure 2). This is not unexpected, since most actual experience is not in a tail scenario. Lapse assumptions in the tail require more judgment from the actuary.

The survey also asks about sensitivity tests performed related to assumptions that impact policyholder behavior. Sensitivity to the base lapse rate, equity scenario and utilization assumption were the most common types of analyses performed. "Other" responses included sensitivity to mortality, expenses and the dynamic lapse assumption (Figure 3).

Figure 1
2017 Median Tail Scenarios vs. AAA 10th Percentile, Equity Index (12 companies responding in 2017)

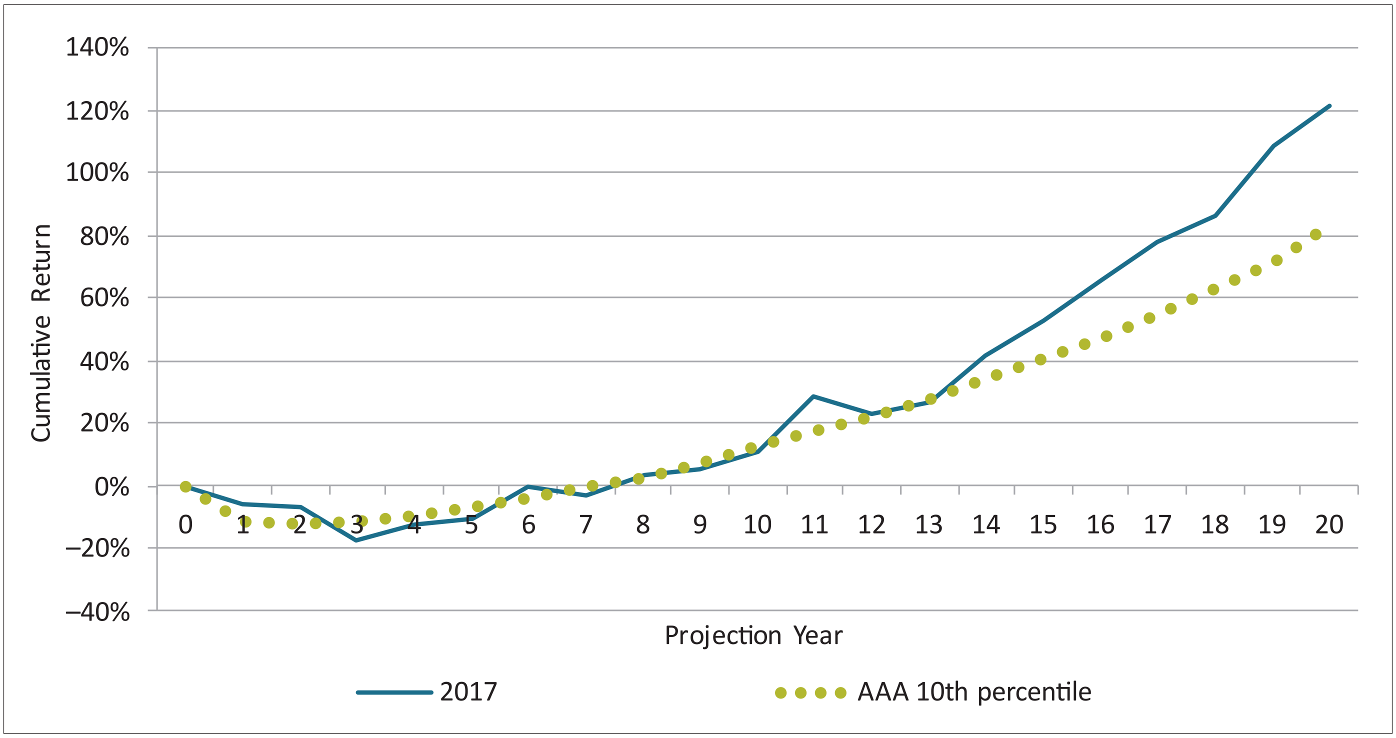


Figure 2
Expected vs. "In the Tail" Assumptions (Many companies responded with more than one answer)

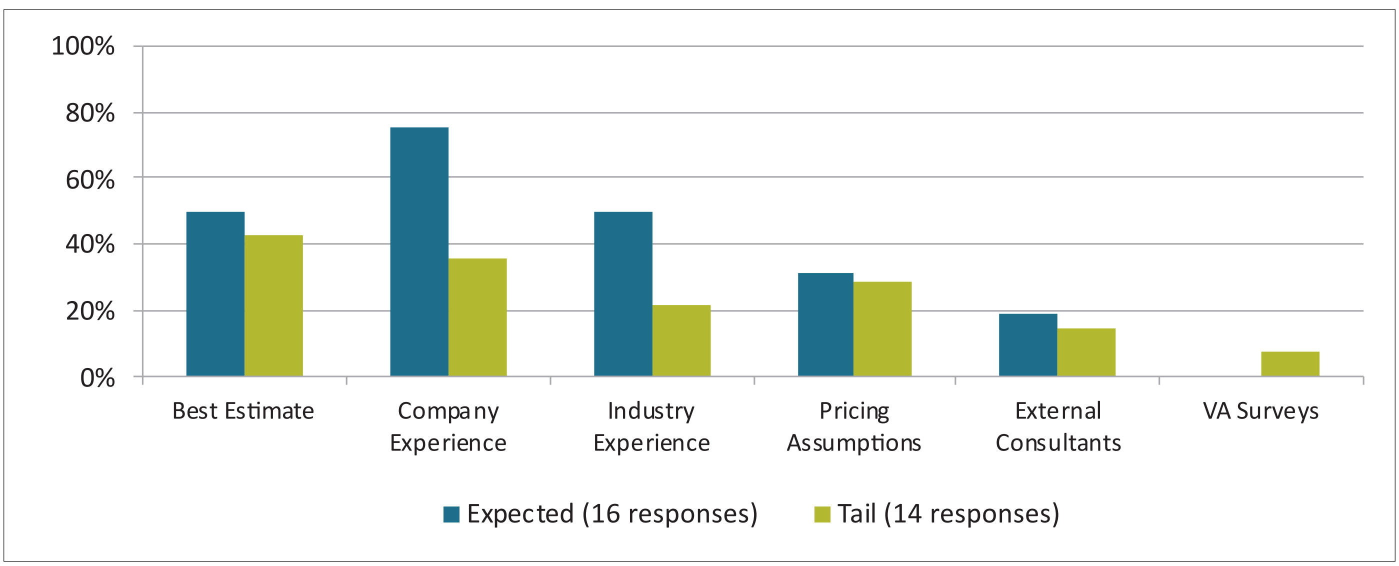
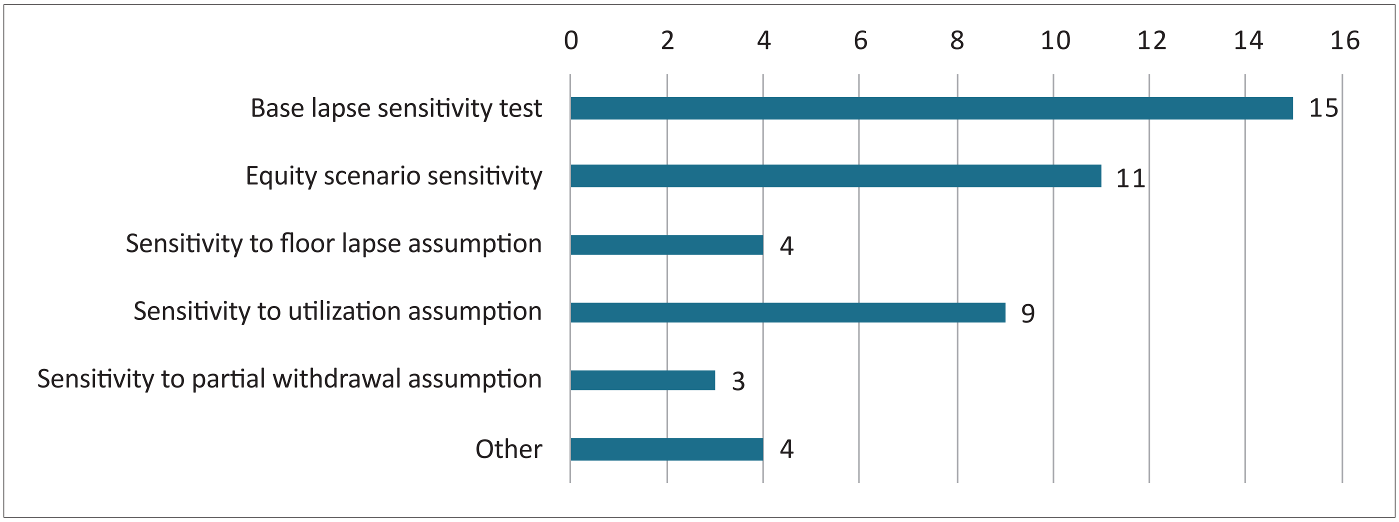


Figure 3
Sensitivity Analysis Performed (16 responses)



The result of the 2017 survey can be accessed here: *https://www.soa.org/research-reports/2018/variable-annuity-benefits-survey/*.

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UNIVERSAL LIFE SURVEY

According to the survey results, insurers increasingly use stochastic scenarios to set capital levels for universal life with secondary guarantees. In this year's survey, most companies indicated that they project for over 75 years. For universal life, the tail scenario was defined as the scenario that produces the largest present value loss.

The most critical assumptions for analyzing experience in the tail are investment returns and lapses. Each was cited by a majority of respondents. Tail scenarios vary widely. Typically, the tail scenario is one in which interest rates remain level or decrease (Figure 4). In these cases, the account value is less likely to generate enough investment return to allow the account value to maintain a positive value.

Lapses are the other critical assumption. About half of companies have a lapse rate that varies dynamically, and that percentage has been trending higher. Lapses in the tail vary widely among insurers. Lapse rates in the tail are lower than base lapse rates as the guarantees become more valuable to the policyholder. The majority of companies will vary their lapse assumption by premium pattern, with single premium policies having a lower lapse rate than level premium policies.

The survey asked companies what would happen to a block of 10,000 newly issued policies that experienced the tail scenario. The median response indicated that 40% would be kept in force by the no-lapse guarantee after 25 years.

Although not as critical as investment performance and lapses, mortality assumptions are important to the modeling of universal life with secondary guarantees. The majority of responding companies include mortality improvement in their model. Mortality improvements commonly vary by gender and age and sometimes vary by smoker status and duration. However, all companies said that their mortality assumptions do not change when the secondary guarantee is in the money and the account value is zero.

The result of the 2017 survey can be accessed here: *https://www.soa.org/Files/Research/Projects/2017-ul-second-guarantee-survey.pdf*.

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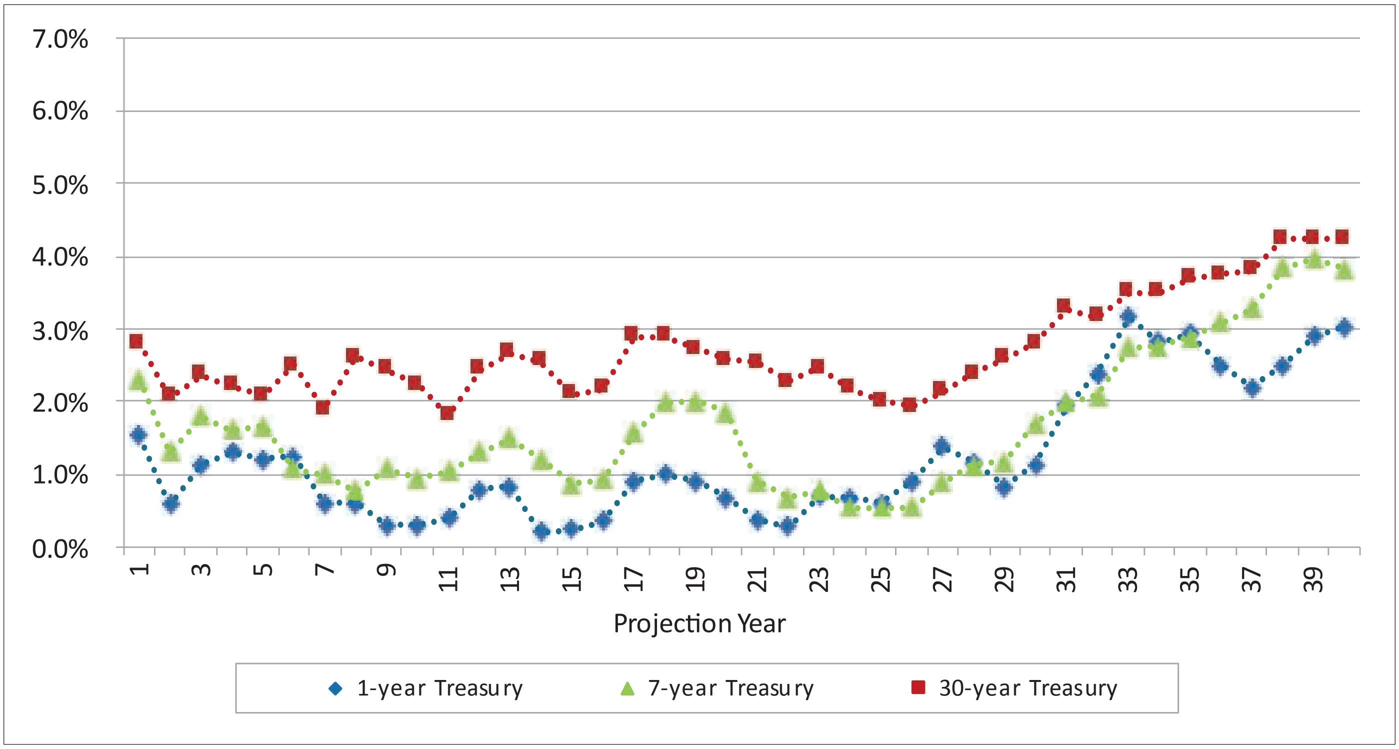
SUMMARY

All companies that sell these types of variable annuity and universal life products are encouraged to participate in the surveys. Contributions to the surveys are critical for their continued success, and the PBITT committee appreciates those companies

Figure 4
Median Tail Scenario Across Insurers (9 responses)



that have taken the time to respond. Although many companies choose to be listed as participating, the identities of individual responses are not made available to the PBITT committee.

The committee welcomes feedback and suggestions regarding the surveys and actively seeks any volunteers who may be interested in joining the committee. Please contact either Jim Reiskytl, chair of the Policyholder Behavior in the Tail committee, at *jimreiskytl@wi.rr.com* or Steve Siegel, Society of Actuaries Research Actuary, at *ssiegel@soa.org*.

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