

# 2019 Variable Annuity Guaranteed Benefits Survey

Survey of Assumptions for Policyholder Behavior  
in the Tail





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## Survey of Assumptions for Policyholder Behavior in the Tail

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# 2019 Variable Annuity Guaranteed Benefits Survey

## Survey of Assumptions for Policyholder Behavior in the Tail

### Overview

- Lapses and income utilization rates are critical assumptions for pricing, reserving, and the risk management of variable annuity guarantees. This survey explores the range of assumptions used and drivers of those assumptions. Individual responses vary significantly among companies throughout this report. Comparing assumptions in the tail with others may be enlightening and useful since actual data are very limited or unavailable for extreme situations.

### Specific Highlights<sup>1</sup>

#### Tail Scenario

- The median equity tail scenario tracked the 10<sup>th</sup> percentile return of the AAA equity index (Figure 7).
- However, the cumulative equity return in the tail scenario for individual companies varies widely (Figure 4).

#### Dynamic Lapses

- Dynamic lapse functions are used by most companies for most benefit types, where they had those benefit types in force (Figure 9).
- Practices for setting floor lapse rates vary considerably. Some companies use a floor lapse rate as a percentage of the base, others use a constant floor, and a few use some other method to establish a floor (Figure 10, Figure 12, Figure 14, Figure 16, and Figure 18).

#### Lapse Assumptions for a Newly Issued Policy

- The median base lapse assumptions are similar across benefit types (Figure 20) for a newly issued policy, with the GLWB assumption being somewhat lower.
- The median tail lapse assumptions are also similar across benefit types. The GLWB and GMIB<sup>2</sup> assumptions are somewhat lower (Figure 26).

#### Lapse Assumptions for an Aggregate Block

- Median base lapse assumptions for the aggregate block are somewhat lower for the GMWB and GLWB benefit types (Figure 32).
- Except for GMWB, median tail lapse rates are generally lower than median base lapse assumptions, especially after the early projection years (Figure 44 through Figure 48).

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<sup>1</sup> Significant changes from prior year survey report are highlighted.

<sup>2</sup> These and other guarantee benefit types are defined on page 6.

### Utilization Rates

- GMIB utilization rates increase as the policy becomes more in-the-money, which occurs in a tail scenario.
- However, many companies do not vary their GMWB and GLWB utilization rates by scenario.
- Income and withdrawal utilization rates vary by multiple drivers, but duration was the most commonly cited driver (Figure 49).

### Distribution System

- Most responding companies sell through multiple distribution systems.
- Of those that sell through multiple distribution systems, only about 40% measure their lapse experience by distribution system, and about 20% vary their lapse assumptions by distribution system.

### Source of Assumptions

- There is a general trend toward a higher percentage of companies using 10+ years of experience in lapse studies (Figure 53).
- Company experience is relied on much more heavily for base assumptions than for tail assumptions (Figure 55).

### Changes in Assumptions

- Slightly more than half of the responding companies changed assumptions since the prior year (Figure 57), typically to update experience, but sometimes to also update dynamic lapse function.

### Sensitivity Analysis

- Most companies do sensitivity analysis/testing of critical assumptions. The most common sensitivity tests performed are relative to base lapse assumptions, equity returns, and utilization assumptions (Figure 58).

### General

- The PBITT committee appreciates the 14 participating companies. However, this participation level is lower than in past years, and additional participation is important to enhance the quality of information presented and improve continuity from year to year.
- Some charts were omitted if there were fewer than 5 responding companies, consistent with SOA research standards.

## Acknowledgements

Special thanks to all the companies that responded to the survey and provided helpful information. Without their efforts, this survey would not be possible.

The Society of Actuaries' PBITT working group gratefully acknowledges Dale Hagstrom and Mienaloshyani Viruthasalam for all their efforts in analyzing the survey data and drafting this report.

The PBITT working group is interested in comments on the survey and results. Please e-mail comments to either Jim Reiskytl, Chair of the Policyholder Behavior in the Tail working group, at [jimreiskytl@wi.rr.com](mailto:jimreiskytl@wi.rr.com) or Barbara Scott, Society of Actuaries Sr. Research Administrator at [bscott@soa.org](mailto:bscott@soa.org).

## Background

In 2005, the Society of Actuaries' PBITT working group distributed a survey to insurers. The goal of the survey was to gain insight into companies' assumptions of variable annuity policyholder behavior in the tail of the C3 Phase II Risk Based Capital calculation. Each edition of the survey has had approximately 14-30 responses; however, not every company answered every question. The following sections highlight responses from the 2019 survey and, where applicable, illustrate how answers compare to previous years' results. To judge the credibility of results, some charts indicate how many companies responded to the question for the five most recent survey years.

It is our hope that this study's report on assumptions will enable actuaries to improve and compare their expectations with those assumed by others. Actuaries may use this study to aid in both (a) setting their assumptions, and (b) setting up experience studies to parameterize such dynamic functions, especially from experience gained in tail historical periods.

The latest survey reflects a different response group from that in the prior survey. As a result, some of the changes described below reflect different respondents, not necessarily a change by any given company. While the exact relationships of new versus prior respondents vary by individual question, the Society of Actuaries' staff was able to verify that 9 respondents also participated in the 2018 survey, while 5 did not.

Please note that when percentages of responding companies are shown, the percentages are based on the number of respondents and not their size.

When providing responses, companies were asked to consider five different benefit types:

- 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

## Respondents Profile

Figure 1 indicates the relative size of companies responding to the survey as measured by Total Account Value. This year there was only one company with small blocks of variable annuities with guarantees (less than \$1B).

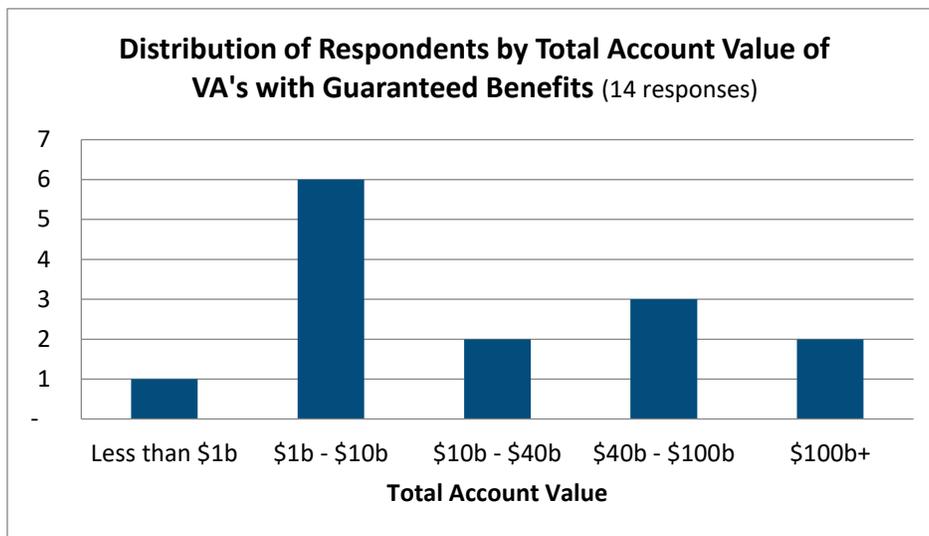


Figure 1

## Tail Scenario

As in past years, the vast majority of respondents indicated that they used stochastic modeling to set capital levels. In the 2019 survey 14 out of 14 (100%) indicated that they used stochastic scenarios to set capital levels.

Most of these respondents provided additional details regarding their calculation. In 2019, as in past years, 1,000 scenarios was the predominant response to the number of scenarios modeled (Figure 2).

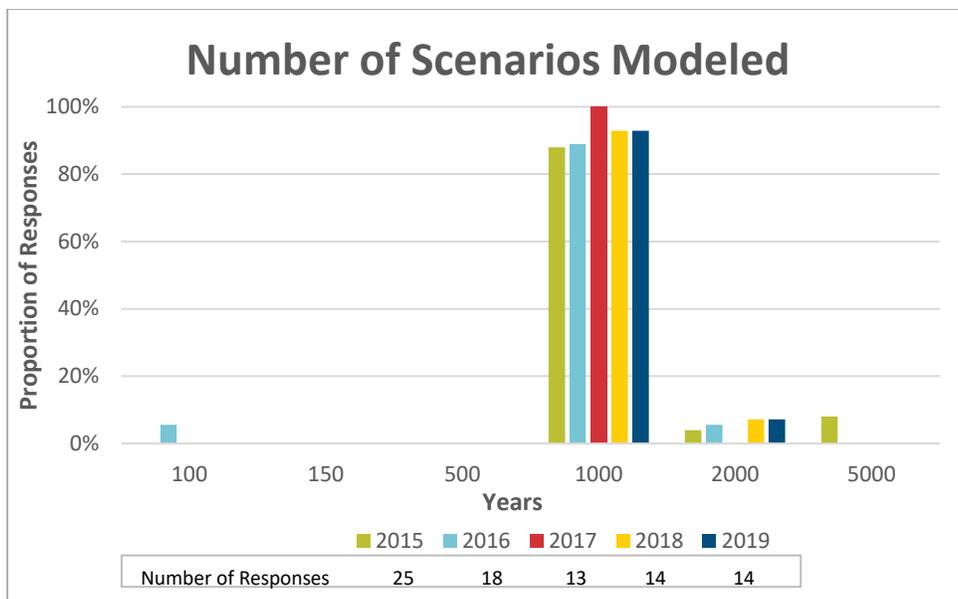


Figure 2

In terms of projection horizon, 30 years was cited most frequently as has been the case in past surveys (Figure 3), with a slight trend toward longer horizons.

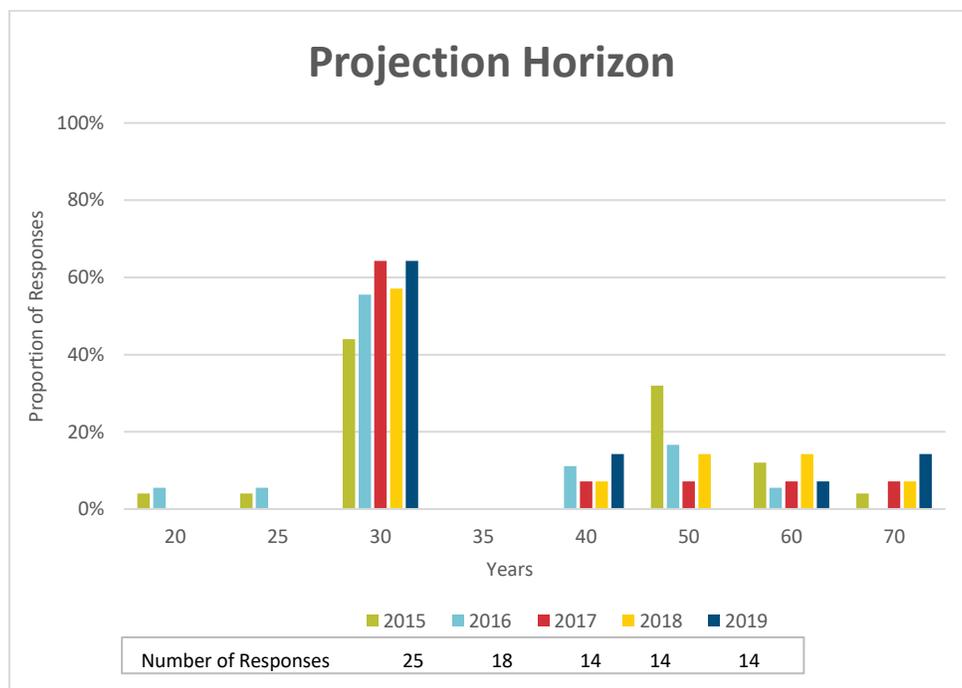


Figure 3

A new question in 2017 asked whether companies' projections used hedges in accordance with a Clearly Defined Hedging Strategy (CDHS). In 2019, a positive response was given by 8 of the 14 companies that responded to that question (57%) which is slightly lower than the 10 of 15 (67%) in 2018 or the 10 of 14 (71%) in 2017.

Insurers were asked to describe the tail scenario that determines the first negative result of their modified 90 CTE calculation (that is, the least negative result of all scenarios with a negative present value). If no scenario produced a negative result, the scenario with the smallest positive was provided.

Responses varied widely among insurers regarding the equity returns of their tail scenario. Figure 4 shows the equity performance in their tail scenario on a cumulative basis for each of the 14 insurers that provided data. There is a wide disparity of equity return results. While many companies reported tail scenarios with negative equity returns, a few showed positive returns. We specifically asked about positive returns as a tail scenario. Two (2) companies responded that hedging costs led to a negative outcome and one mentioned the step-up feature of their guarantee that prevented the reserve from dropping in high equity scenarios.

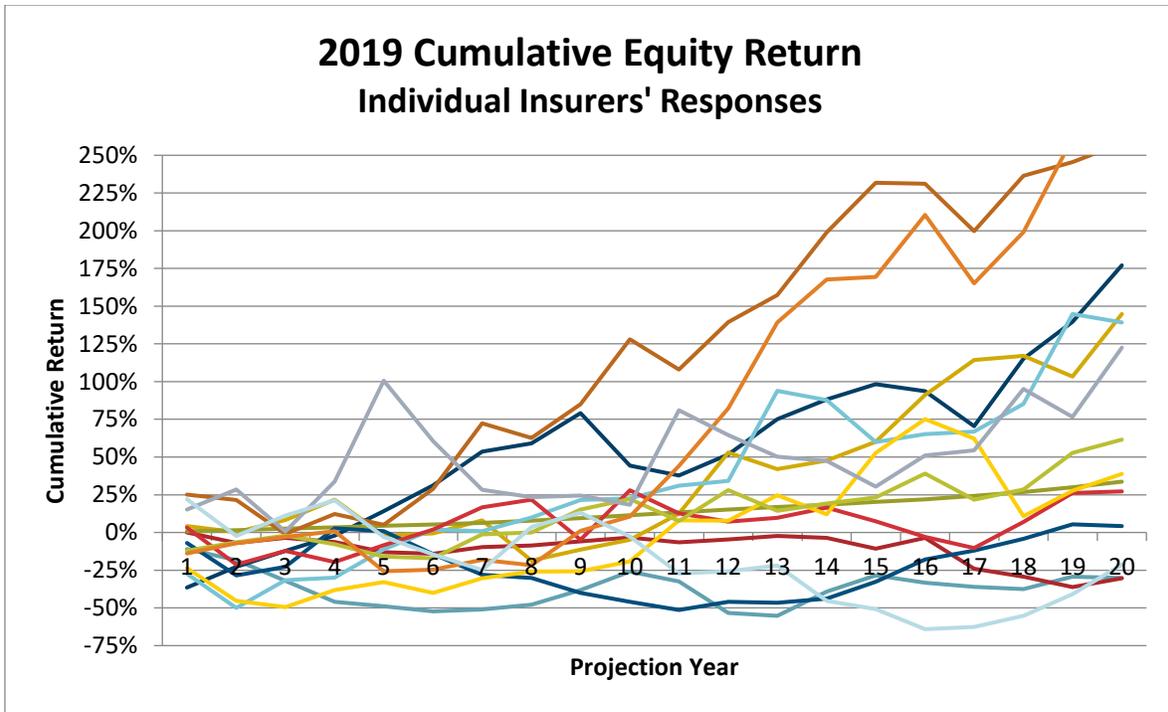


Figure 4

Figure 5 shows the cumulative returns of the bond funds in the tail scenario.

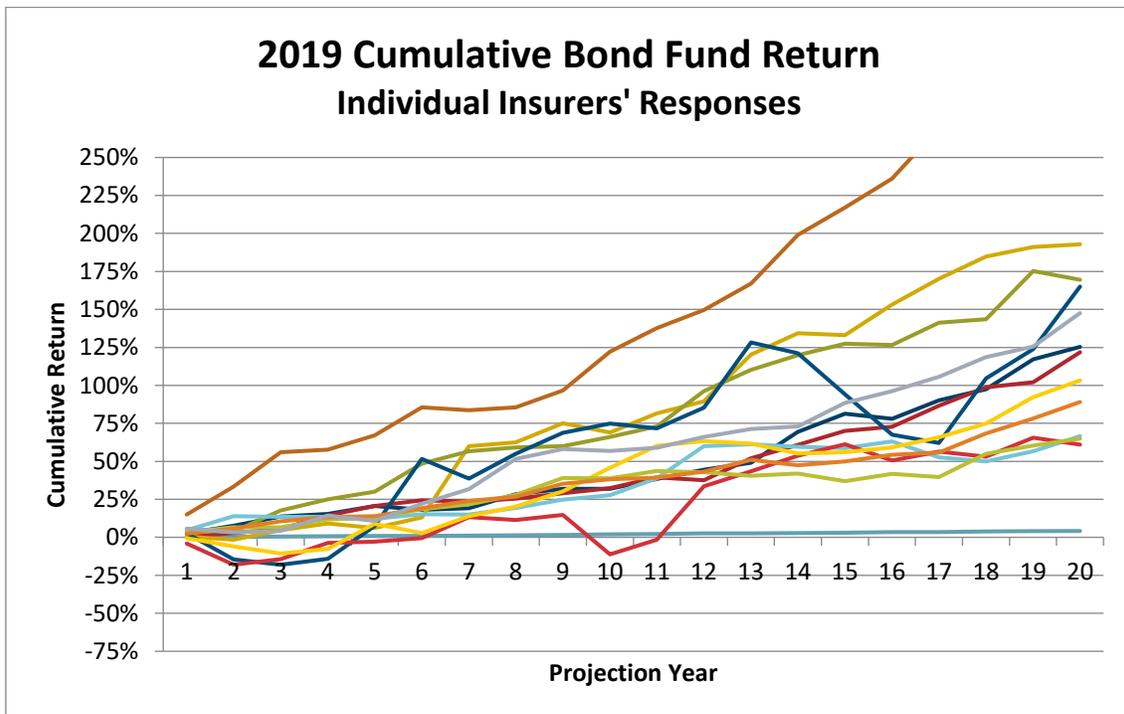


Figure 5

Figure 6 shows the 5-year Treasury interest rate in the tail scenario.

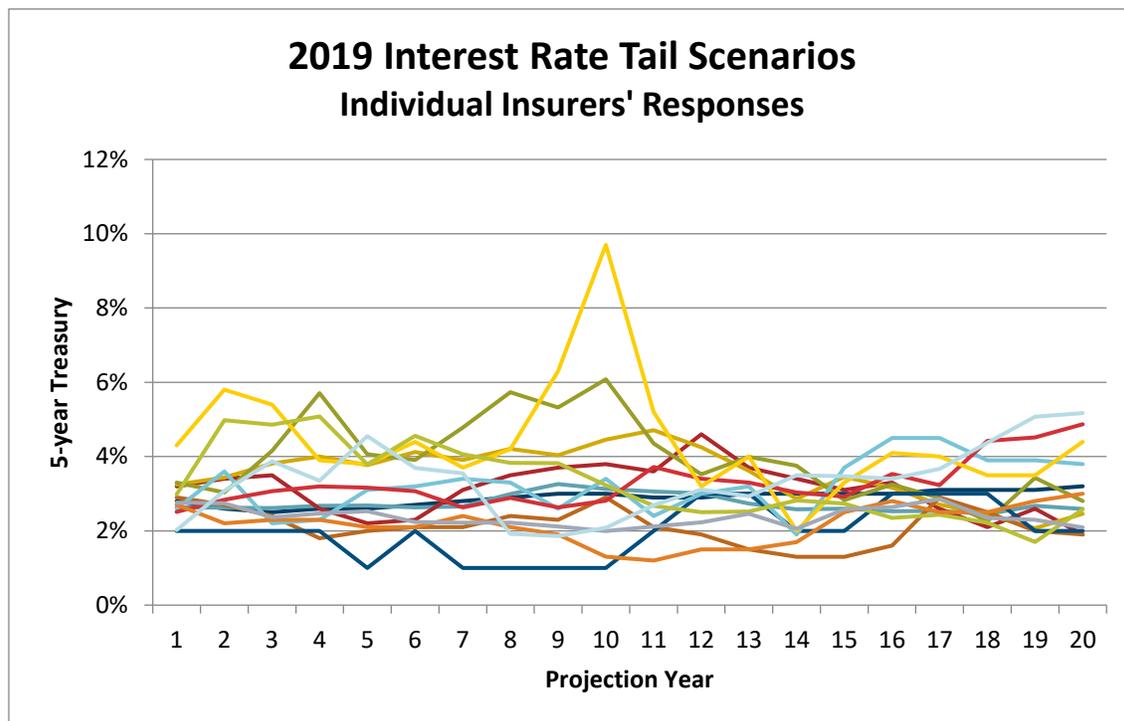


Figure 6

In Figure 7, the median of the 2019 Equity Return Tail Scenarios (from Figure 4) is plotted against the 10<sup>th</sup> percentile of the equity returns from the American Academy of Actuaries (AAA) pre-packaged scenario set “Diversified large cap US equity” based on 2005 data (<https://www.actuary.org/content/c3-phase-ii-pre-packaged-asset-scenarios>). The median of insurers’ responses from 2019 had a cumulative return that is similar to that of the 10<sup>th</sup> percentile of the AAA pre-packaged scenarios, especially in the first 16 years.

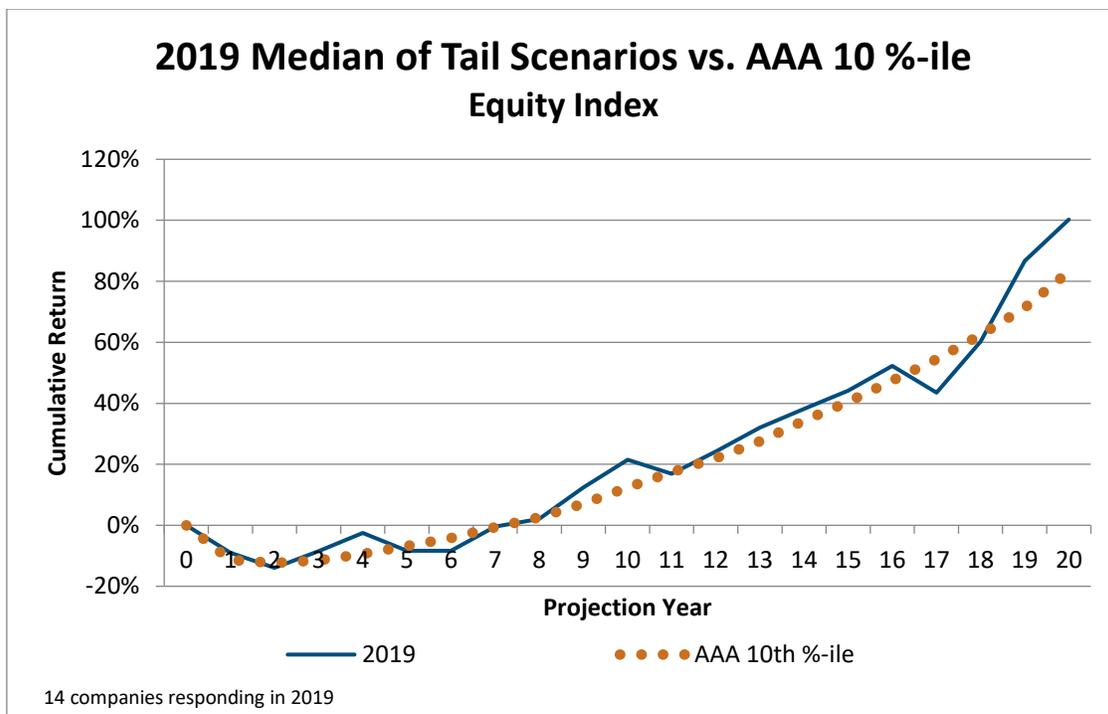


Figure 7

The median equity tail scenario response to the 2019 survey was in the middle compared to prior surveys (Figure 8). Responses may vary from year to year due to changes in products, assumptions or the participating respondents.

Note that the lines in Figure 7 and Figure 8 reference the median (of each survey year) and 10<sup>th</sup> percentile (of the AAA scenarios) with respect to the cumulative gains at a given duration, rather than representing a particular scenario over all durations.

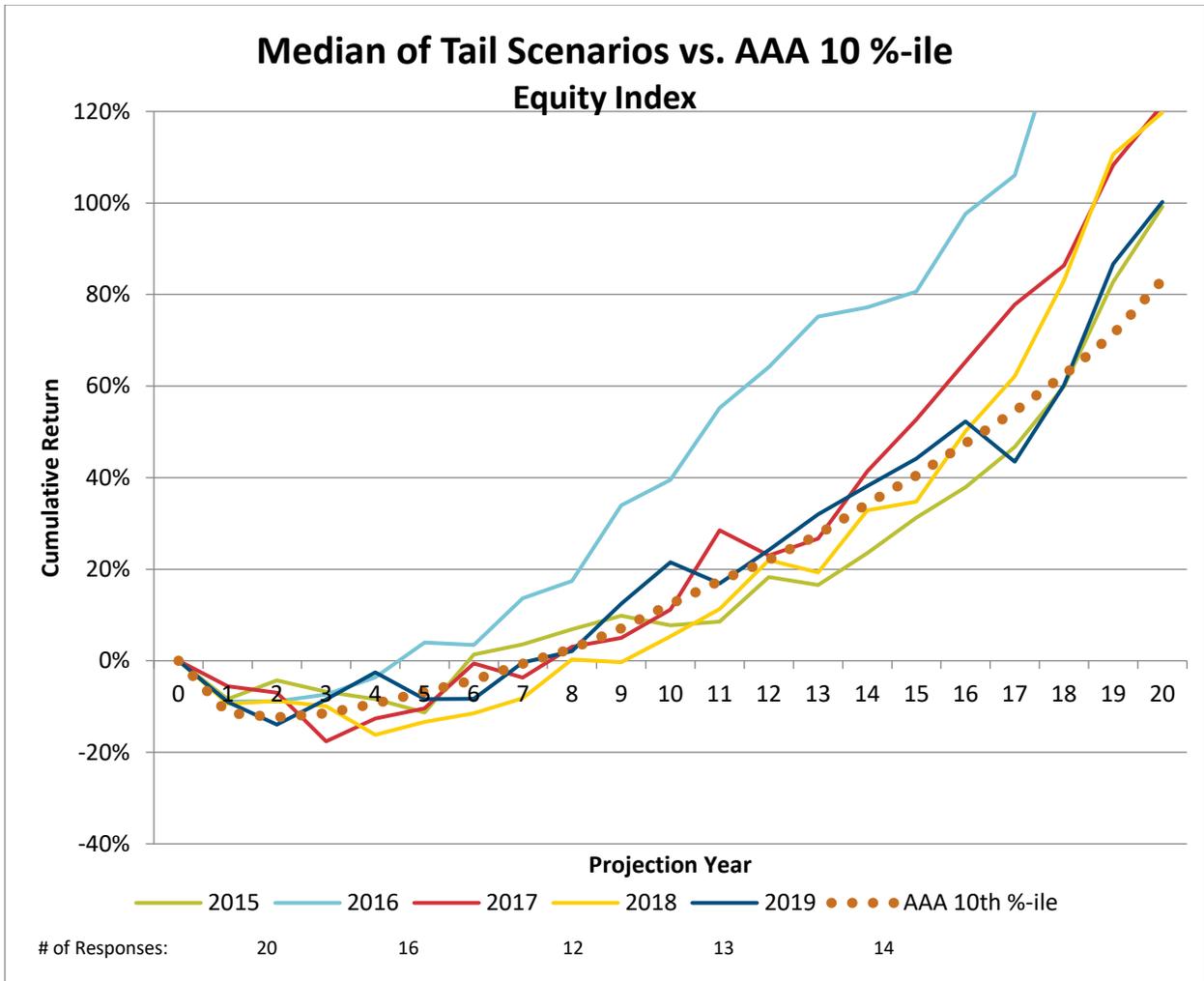


Figure 8

## Dynamic Lapses

Companies were asked whether their dynamic lapse functions varied for each of the five benefit types. If a company had business in force with a particular benefit type, usually it used a dynamic lapse function for variable annuities with that benefit type. There were few exceptions, represented by the red portions of the following bar graphs, and the exceptions were scattered among various companies. In only one responding company were non-dynamic lapse functions used for more than one benefit type; in this case dynamic lapse rates were not used for GMDB and GMAB, even though they were used for GMIB and GLWB. See Figure 9.

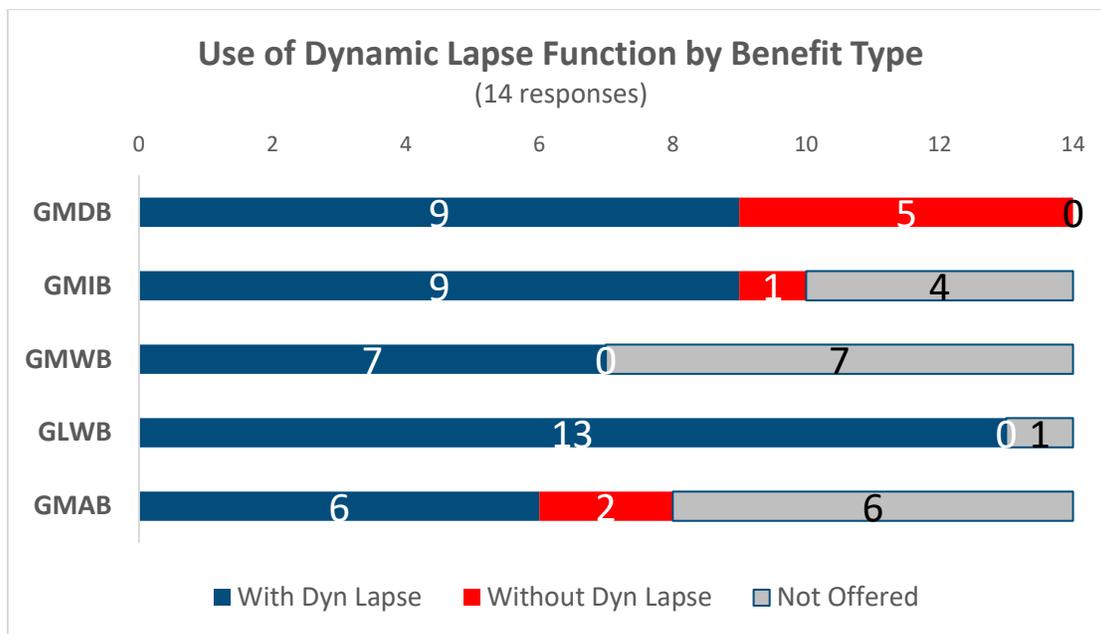


Figure 9

For each benefit type, companies were asked specific follow-up questions.

1. Is your formula one-sided or two-sided?
2. Is the floor lapse rate zero, a percentage of the base lapse rate, a non-zero constant, or other?
3. Is the dynamic aspect of your lapse function related to “in-the-moneyness”?
4. What factors influence the level of dynamic lapses for this benefit?

**GMDB**

For dynamic lapse functions related to death benefits, 78% of companies (7 of 9) use a one-sided dynamic formula, while the others use a two-sided formula.

Figure 10 shows the distribution of responses regarding the floor lapse rate. Of the 9 responses, 5 use a constant non-zero floor rate and 3 use a percent of the base lapse rate.

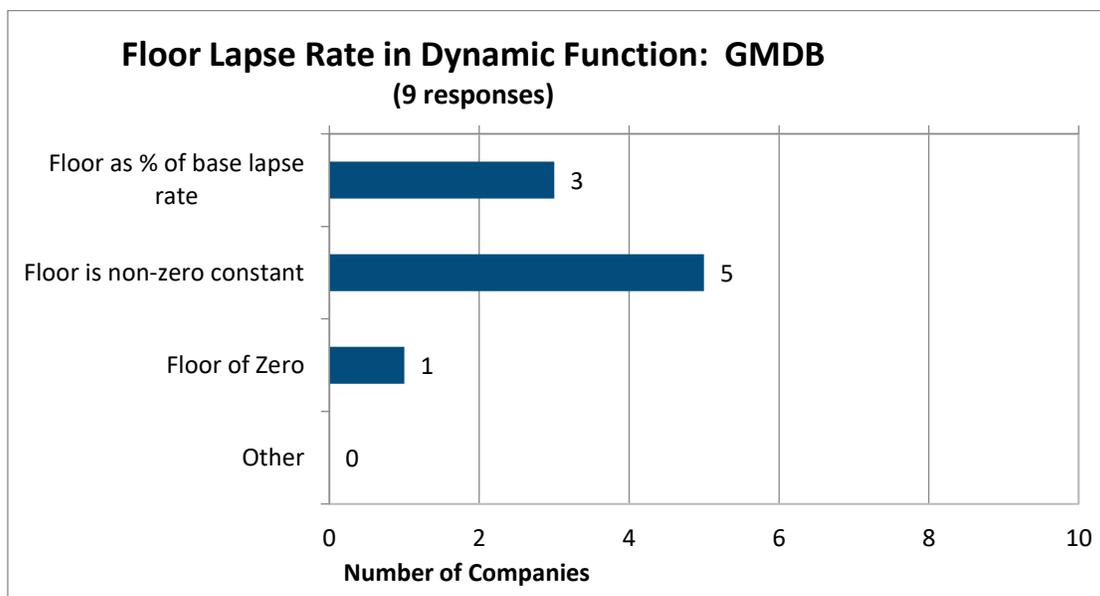


Figure 10

All 9 companies that responded to a follow up question agreed that in-the-moneyness was a factor that influences the dynamic lapse assumption.

Further, a variety of additional factors were cited as influencing the GMDB dynamic lapse formulas, as seen in Figure 11. The “Other factor” responses were further described as varying by the base rate, benefit type, or comparison of general account credited rate to market rates.

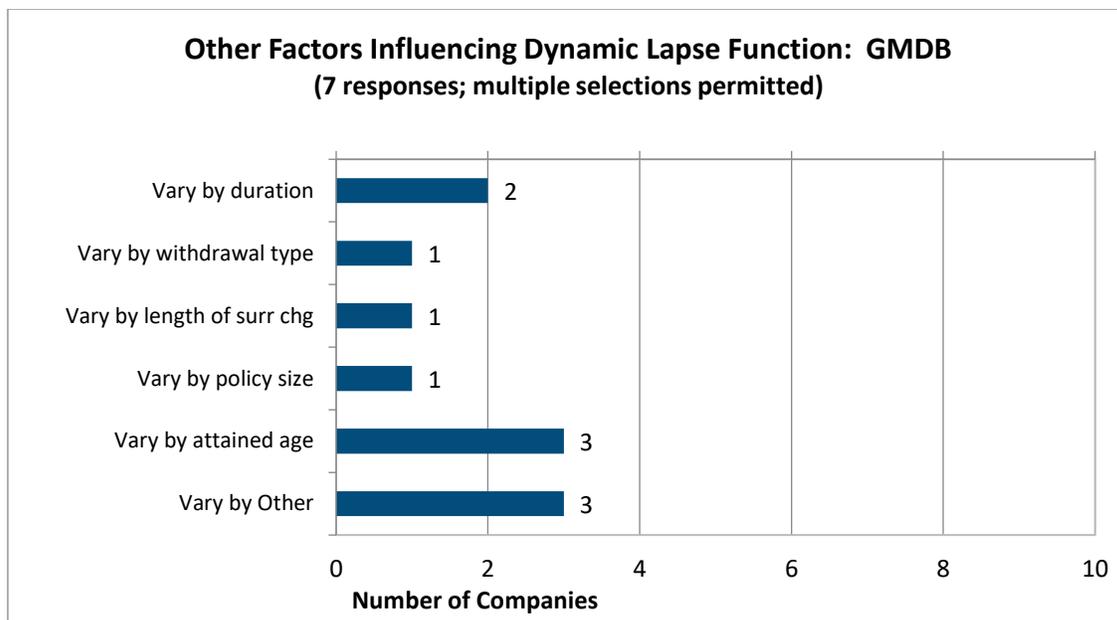


Figure 11

**GMIB**

For dynamic lapse functions related to guaranteed minimum income benefits, 75% of companies (6 of 8) use a one-sided dynamic formula, while the others use a two-sided formula.

Figure 12 shows the distribution of responses regarding the floor lapse rate. Of the 8 responses, 4 use a non-zero constant floor rate and 3 use a percent of the base lapse rate.

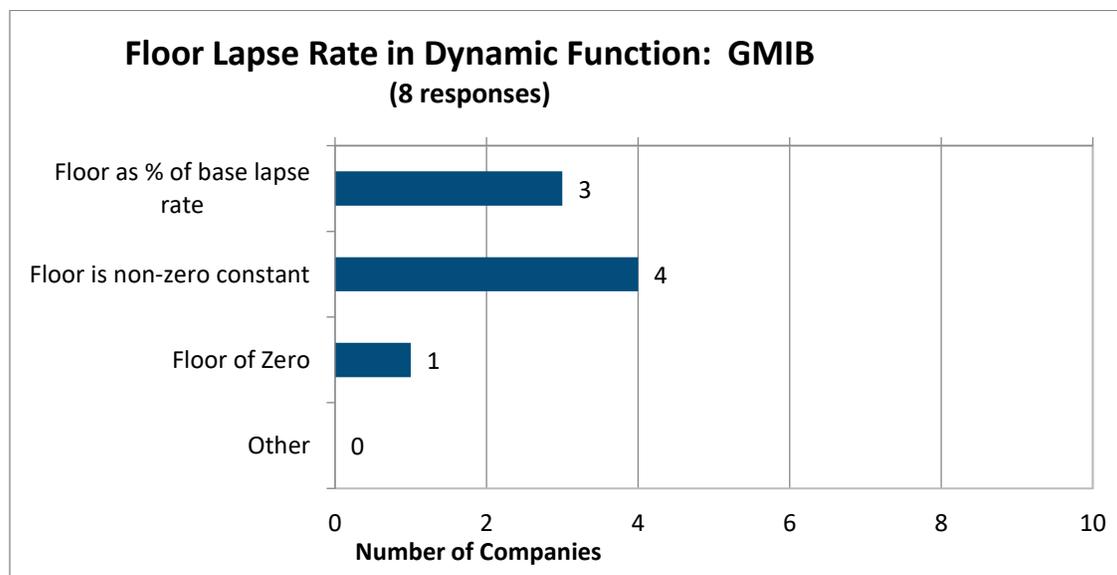


Figure 12

All 8 companies cited in-the-moneyness as a factor that influences the dynamic lapse assumption.

Multiple other factors are cited as influencing the dynamic lapse function for GMIB's. The "other factor" responses were further described as varying by the base lapse rate and the interest rate environment.

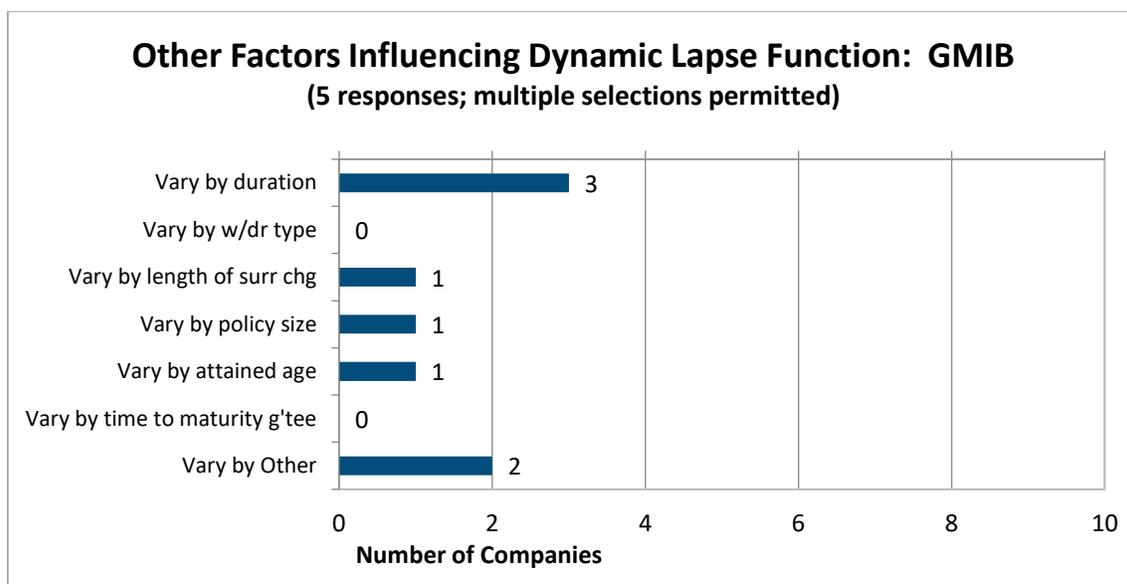


Figure 13

**GMWB**

For dynamic lapse functions related to guaranteed minimum withdrawal benefits, 43% of companies (3 of 7) use a one-sided dynamic formula, while the others use a two-sided formula.

Figure 14 shows the distribution of responses regarding the floor lapse rate. The "other" response further described its floor rate being either zero or a non-zero constant, depending on whether it was during the surrender charge period, in the spike year, or thereafter.

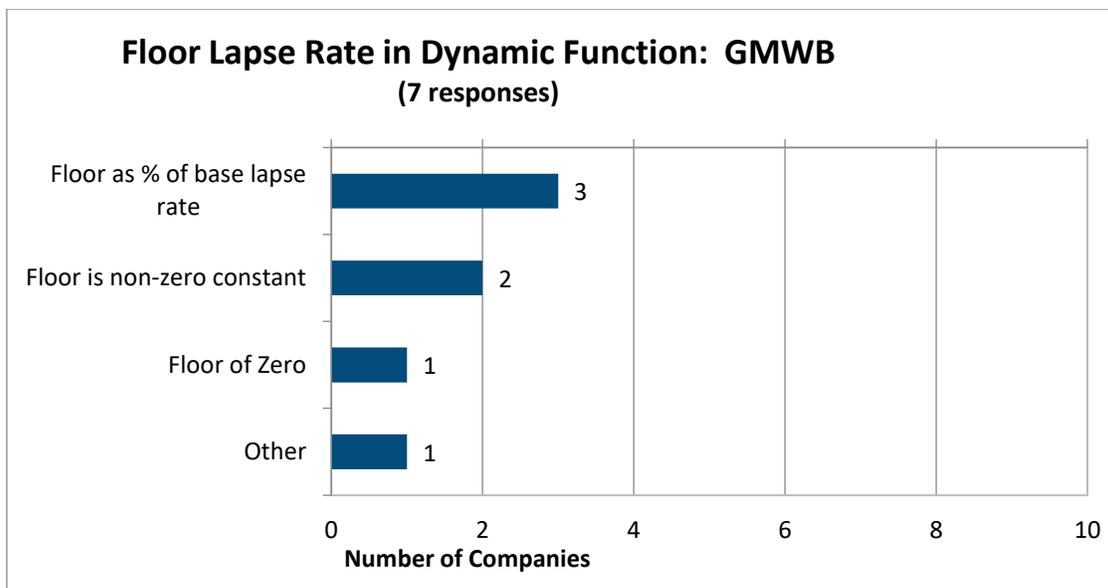


Figure 14

All 7 companies cited in-the-money as a factor that influences the dynamic lapse assumption.

Multiple other factors are cited as influencing the dynamic lapse function for GMWB's. Varying by duration was cited more frequently than the other choices, as seen in Figure 15. The "other factor" responses included interest rate levels, the base lapse rate, and whether the contract holder is taking withdrawals.

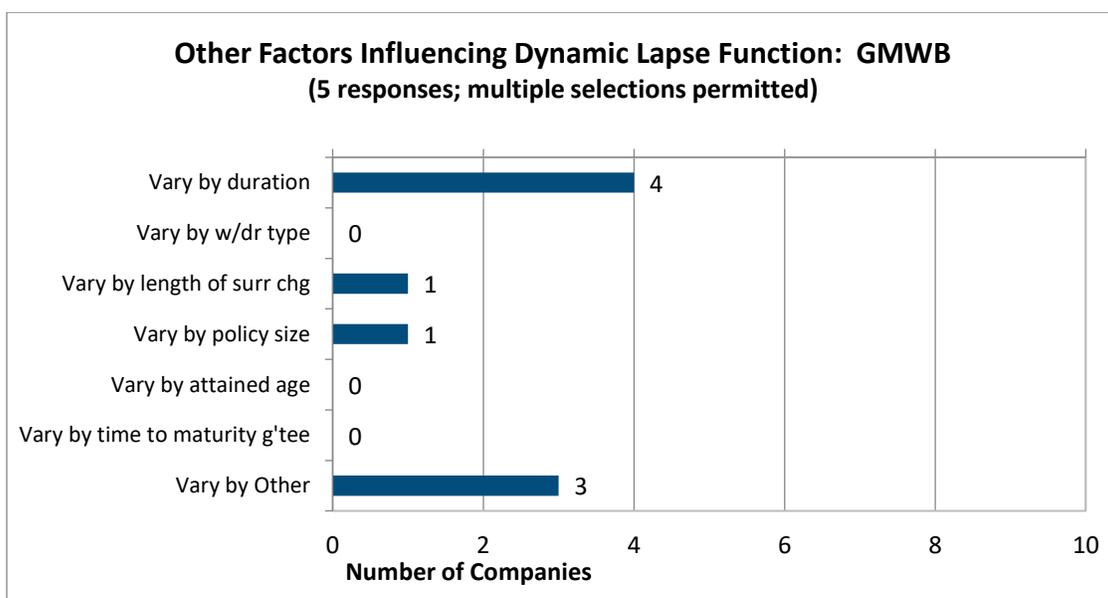


Figure 15

**GLWB**

For dynamic lapse functions related to guaranteed living withdrawal benefits, 62% of companies (8 of 13) use a one-sided dynamic formula.

Figure 16 shows the distribution of responses regarding the floor lapse rate. Of the 13 responses, 6 use a non-zero constant floor rate and 5 use a percent of the base lapse rate. The “other” response further described its floor rate as either a zero or a non-zero constant depending on whether it was during the surrender charge period, in the spike year, or thereafter.

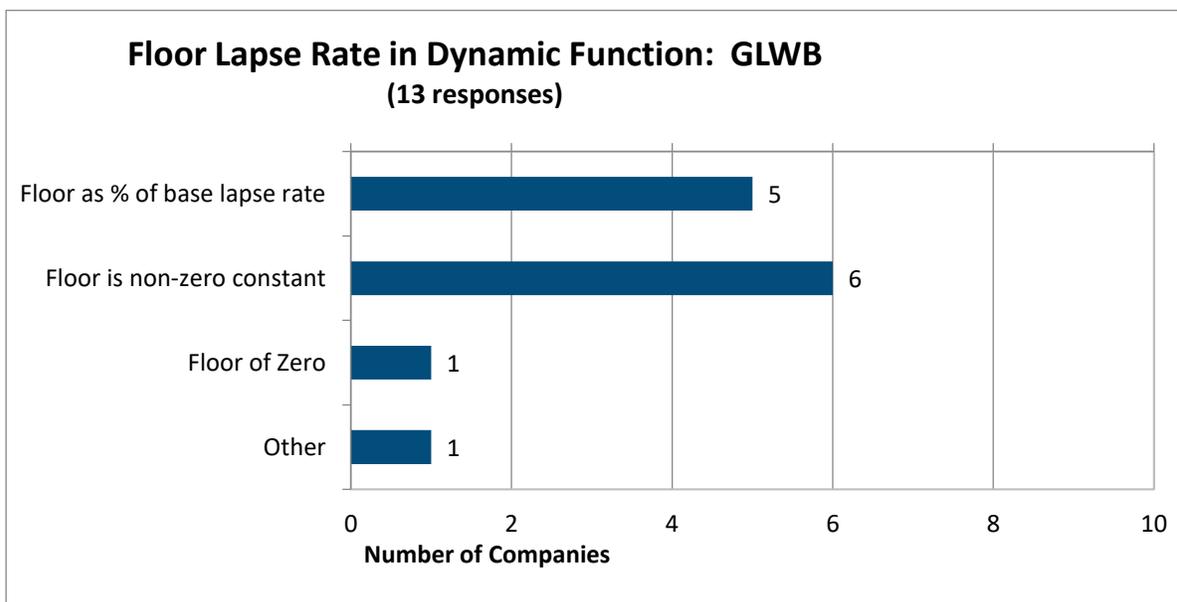


Figure 16

All 13 companies cited in-the-moneyness as a factor that influences the dynamic lapse assumption.

The length of surrender charge and duration were the most frequently cited other factors that influenced GLWB dynamic lapse formulas, as seen in Figure 17. “Other factor” responses included base lapse rate, whether the policyholder was taking withdrawals, and interest rate levels.

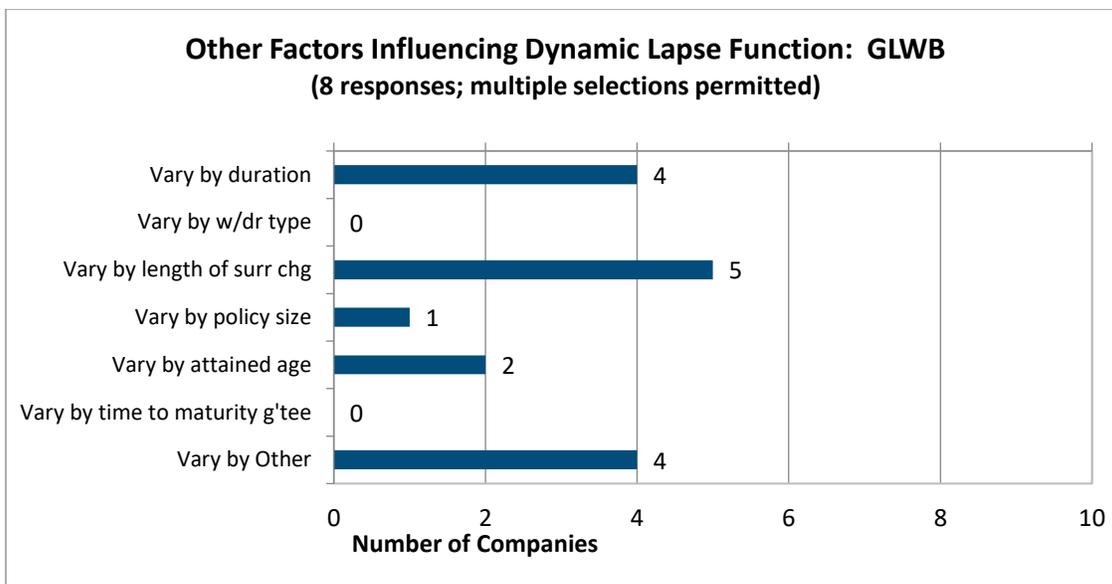


Figure 17

### GMAB

For dynamic lapse functions related to guaranteed accumulation benefits, 67% of companies (4 of 6) use a one-sided dynamic formula, while the others use a two-sided formula.

Figure 18 shows the distribution of responses regarding the floor lapse rate. Of the 6 responses, 3 use a percent of the base lapse rate and 2 use a floor of zero.

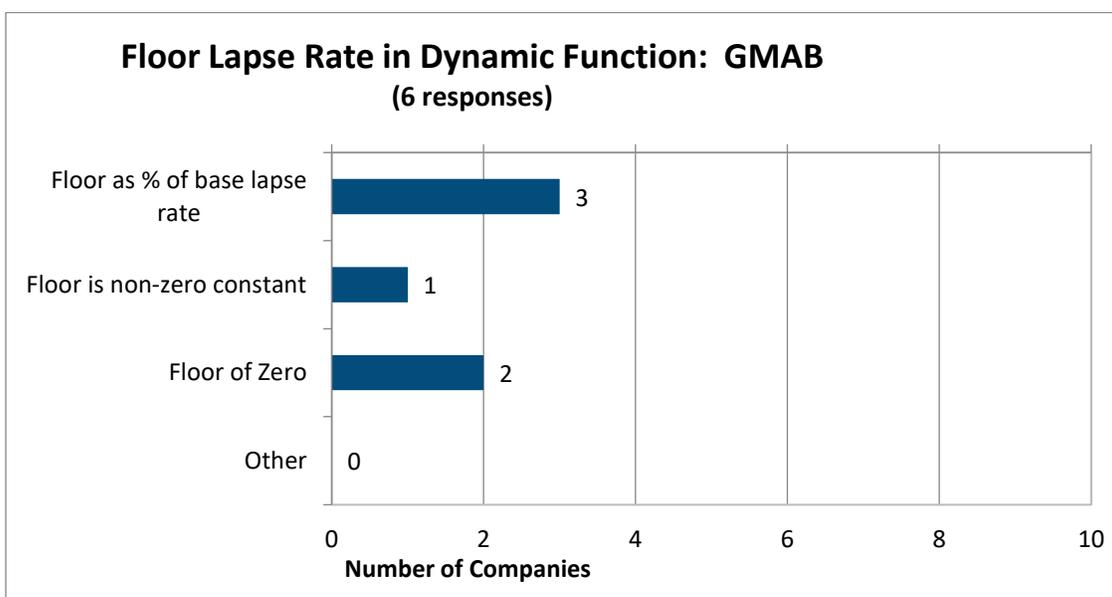


Figure 18

All 6 companies cited in-the-moneyness as a factor that influences the dynamic lapse assumption.

Multiple other factors are cited as influencing the dynamic lapse function for GMAB's. The most common response was to vary by time to maturity guarantee which was cited 2 times, as seen in Figure 19. The "other factor" responses were further described as a function of the base lapse rate or interest rate level.

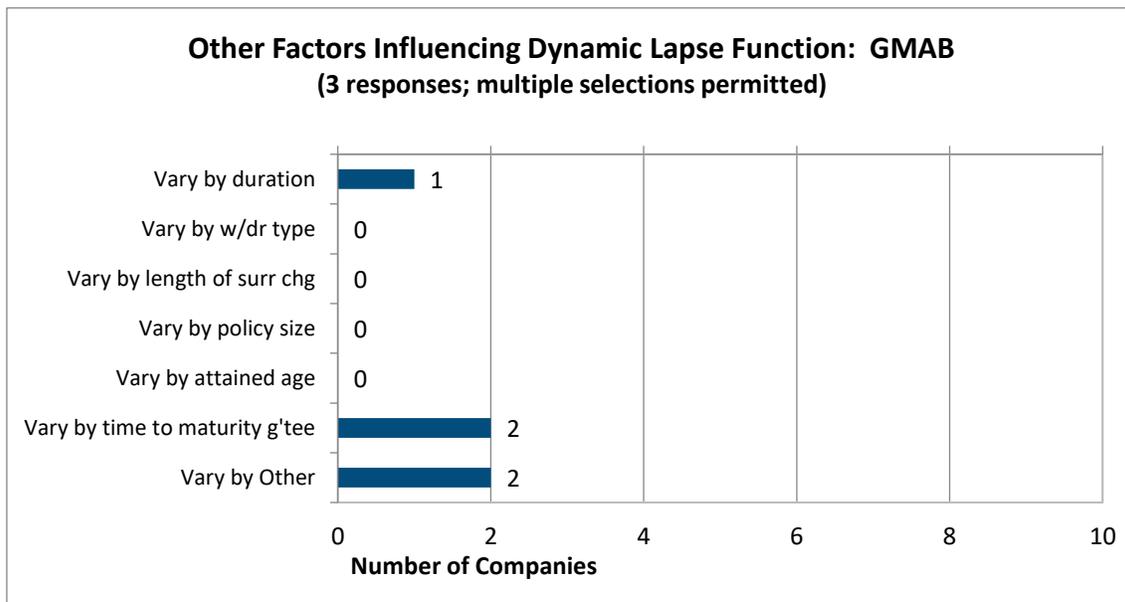


Figure 19

## Base Lapse Assumptions – Newly Issued Policy

Insurers were asked to provide their base lapse assumption (non-dynamic) for a newly issued policy for each of the five benefit types. The majority of responses indicated that year 8 was the first year without surrender charge. Other responses indicated that years 5, 6 and 11 were the first without surrender charge (one response each). One company noted that surrender charge schedules vary by product.

Figure 20 compares the median response<sup>3</sup> for each of the benefit types. The pattern of base lapse rates is very similar across benefit types, especially in the last 8 years except that GLWB has a somewhat lower median base lapse rate.

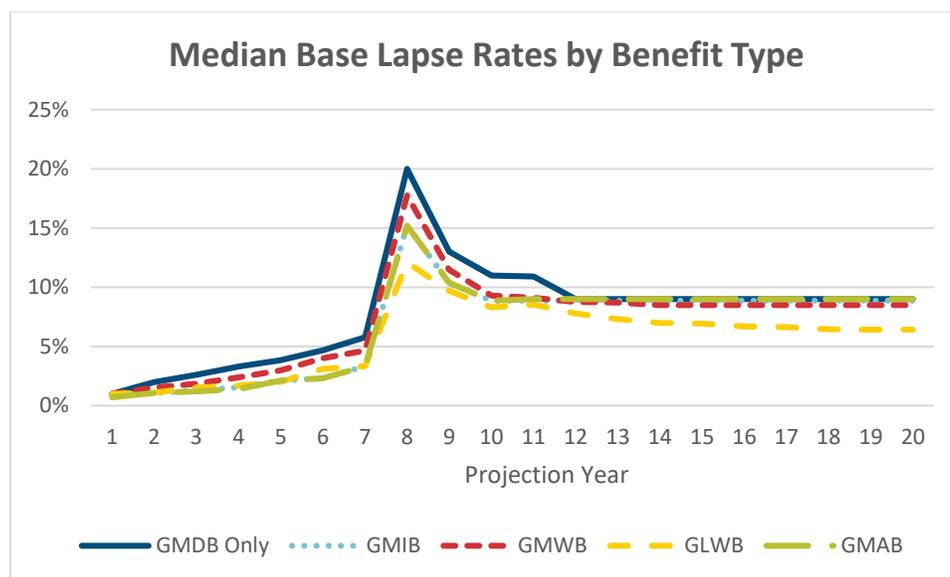


Figure 20

Figure 21 through Figure 25 show the distribution of individual company responses for base lapses for each benefit type, but only if there are at least five responses for a given benefit, consistent with SOA research standards. Most, but not all, companies showed an increase in base lapse rates after surrender charge expiration.

<sup>3</sup> Note that the lines in Figures 20, 26, 32, 38 and 44-48 reference the median lapse rate at a given duration, rather than representing a particular scenario over all durations.

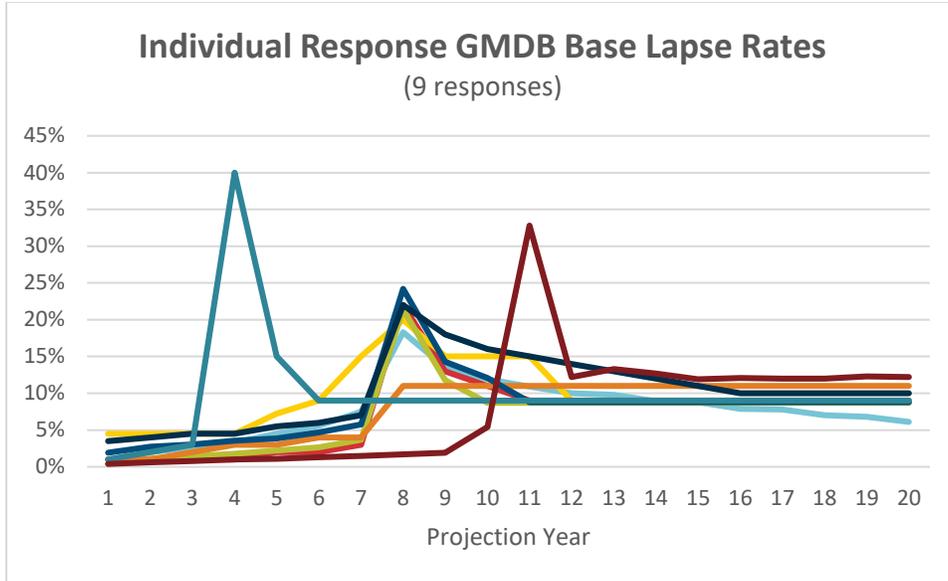


Figure 21

### Individual Response GMIB Base Lapse Rates

Individual Responses Not Shown Since  
There Were Fewer Than 5 Responses.

Figure 22

### Individual Response GMWB Base Lapse Rates

Individual Responses Not Shown Since  
There Were Fewer Than 5 Responses.

Figure 23

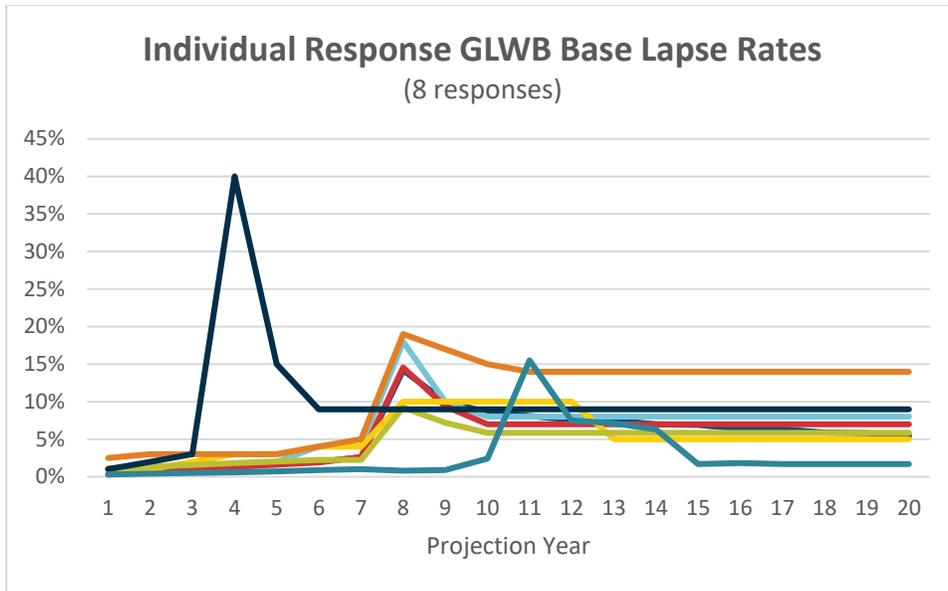


Figure 24

### Individual Response GMAB Base Lapse Rates

Individual Responses Not Shown Since  
There Were Fewer Than 5 Responses.

Figure 25

## Lapses in the Tail – Newly Issued Policy

Insurers were asked to list the dynamic lapse rate assumption assuming the tail scenario for each of the five benefit types. As described in the Tail Scenario section, the tail scenario is defined as the scenario that gives the first negative result of the insurer’s modified 90 CTE calculation when rank ordered.

Figure 26 compares the median tail lapse response for each of the benefit types. GMIB and GLWB median lapse rates in the tail are significantly lower than the median lapse rate of other benefit types in the tail.

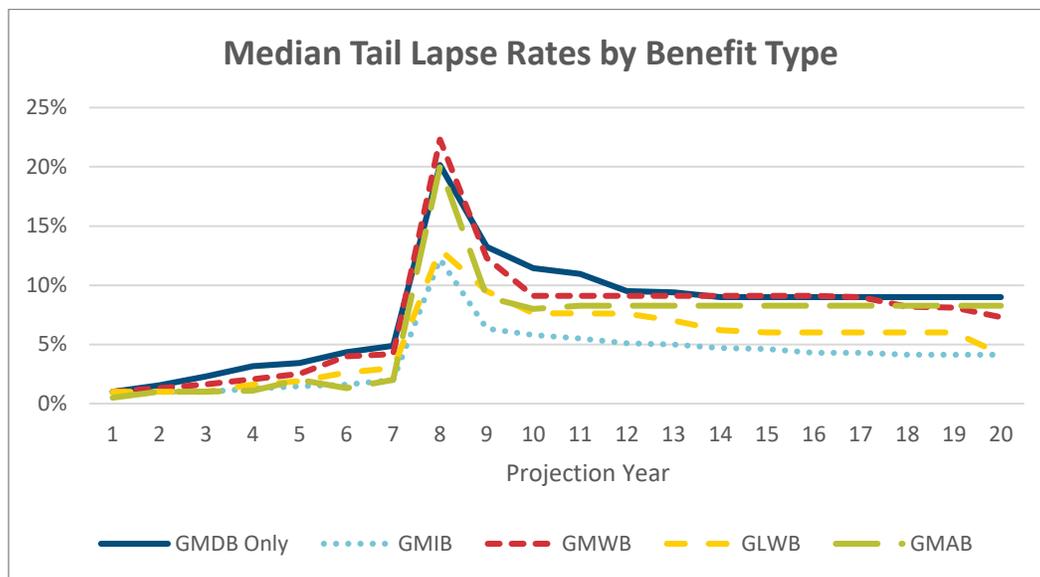


Figure 26

Figure 27 through Figure 31 show the distribution of individual company responses for tail lapses for each benefit type, but only if there are at least five responses for a given benefit. Most but not all companies indicated an increase in base lapse rates after surrender charge expiration.

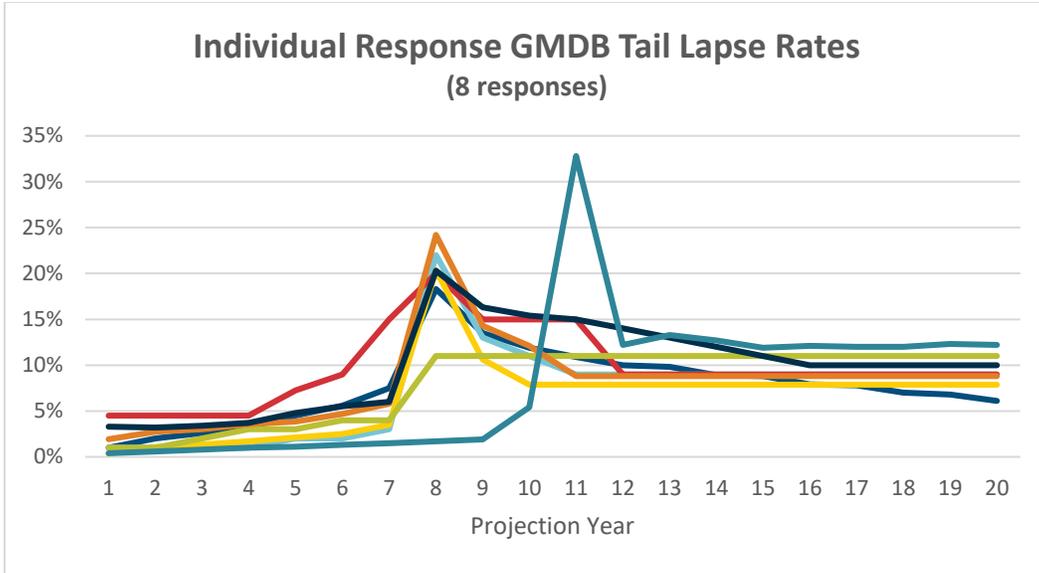


Figure 27

**Individual Response GMIB Tail Lapse Rates**

Individual Responses Not Shown Since There Were Fewer Than 5 Responses.

Figure 28

**Individual Response GMWB Tail Lapse Rates**

Individual Responses Not Shown Since There Were Fewer Than 5 Responses.

Figure 29

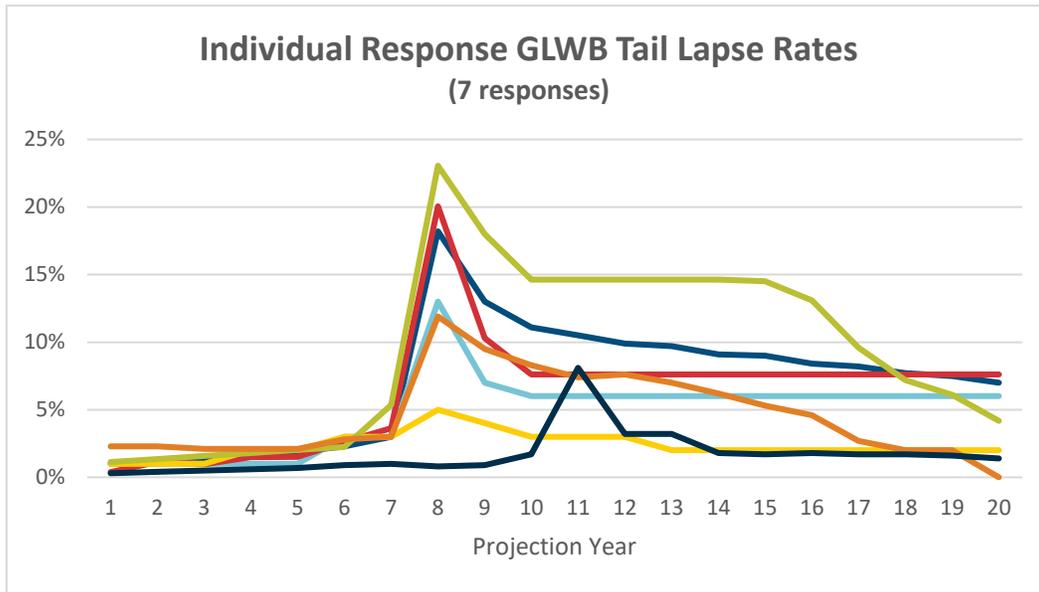


Figure 30

### Individual Response GMAB Tail Lapse Rates

Individual Responses Not Shown Since There  
Were Fewer Than 5 Responses.

Figure 31

## Base Lapse Assumptions – Aggregate Block

In contrast to the individual policy view starting at the issue date, insurers were asked to list their aggregate non-dynamic lapse assumption in a normal (non-tail) scenario for each of the five benefit types for business in force.

Figure 32 compares the median lapse rate response for each of the benefit types. GMWB and GLWB are noticeably lower than the other benefit types, especially at later projection years.

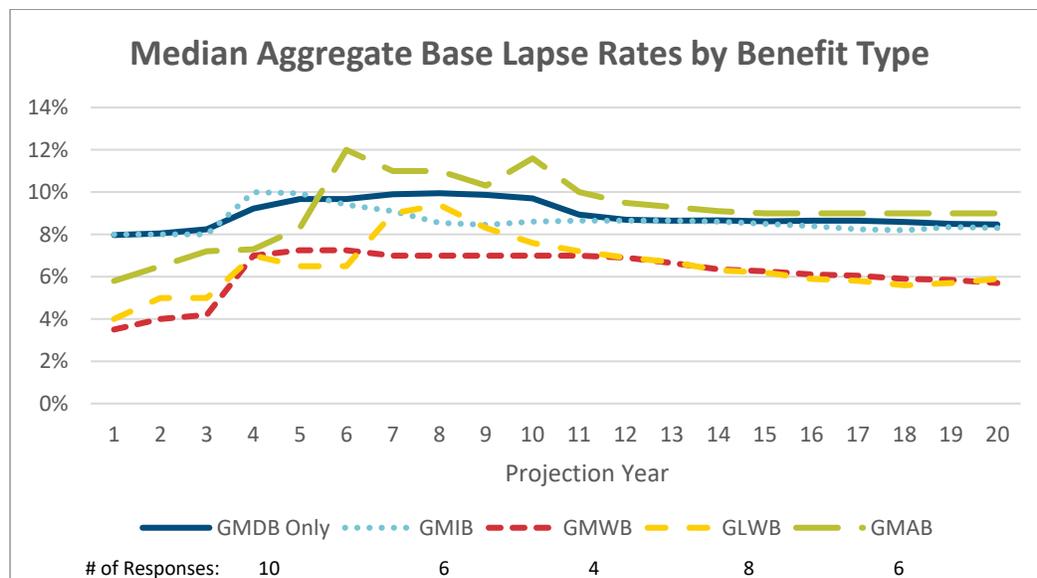


Figure 32

Figure 33 through Figure 37 show the distribution of individual company responses for aggregate normal (non-tail) lapses for each benefit type, but only if there are at least five responses for a given benefit.

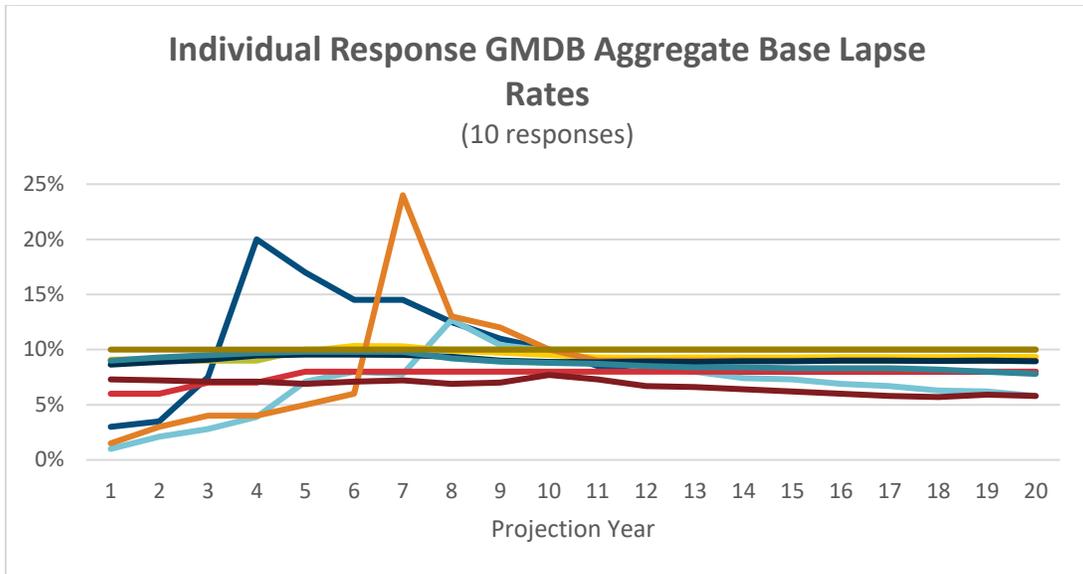


Figure 33

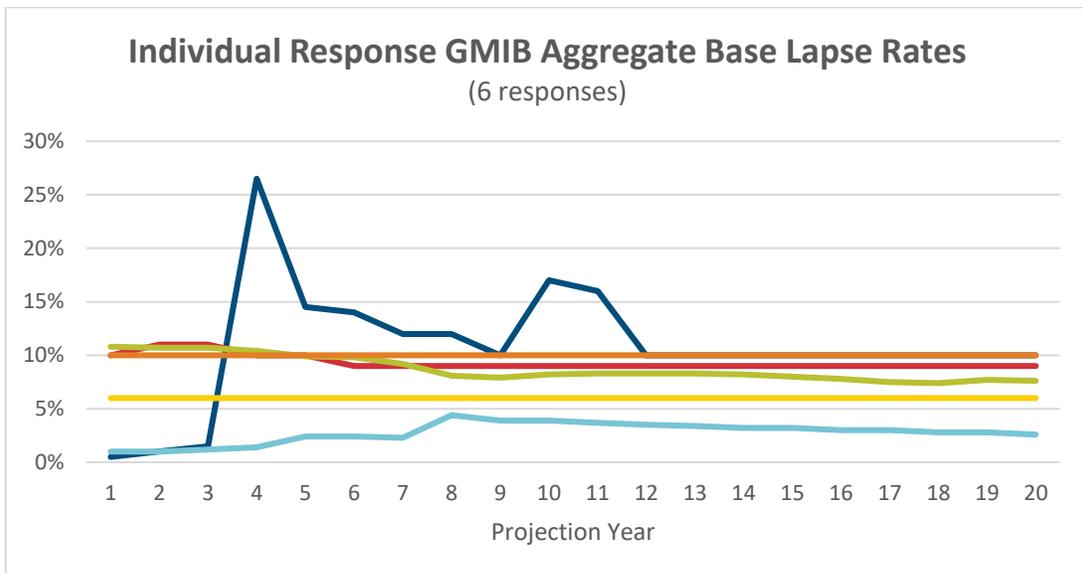


Figure 34

**Individual Response GMWB Aggregate Base Lapse Rates**  
 Individual Responses Not Shown Since There Were Fewer Than 5 Responses.

Figure 35

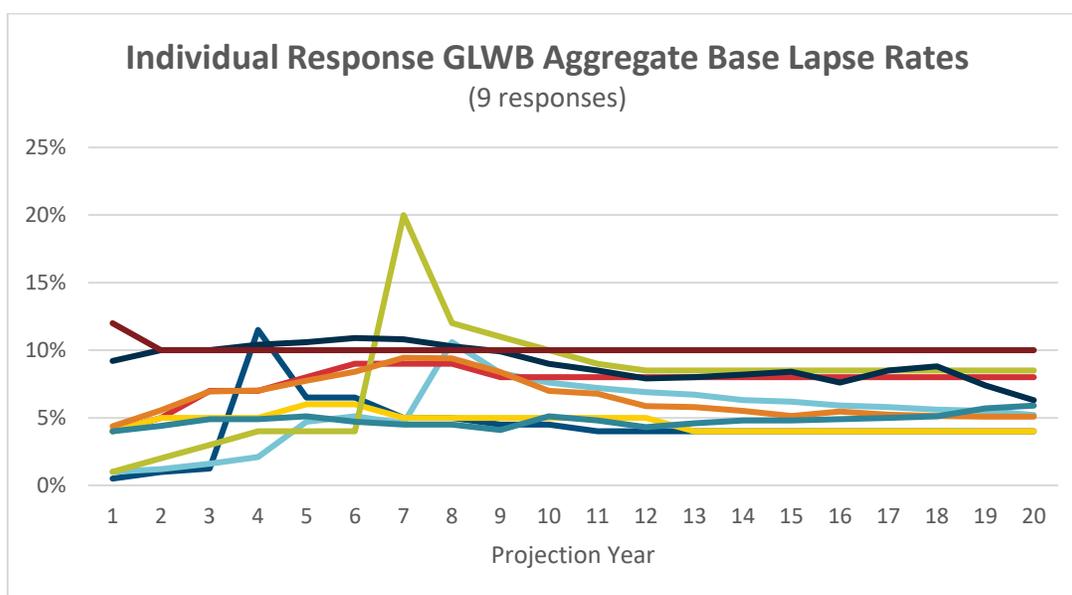


Figure 36

**Individual Response GMAB Aggregate Base Lapse Rates**  
 Individual Responses Not Shown Since There Were Fewer Than 5 Responses.

Figure 37

## Lapses in the Tail – Aggregate Block

In contrast to the individual policy view starting at the issue date, insurers were asked to list their aggregate lapse assumption in the tail scenario for each of the five benefit types for business in force.

Figure 38 compares the median lapse rate response for each of the benefit types. The lapse rate assumption for GLWB is noticeably low, which was also true in prior figures (Figure 20, Figure 26, and Figure 32). In contrast, the lapse rate assumptions for GMIB are low in tail situations (Figure 26 and Figure 38) but not in base situations (Figure 20 and Figure 32).

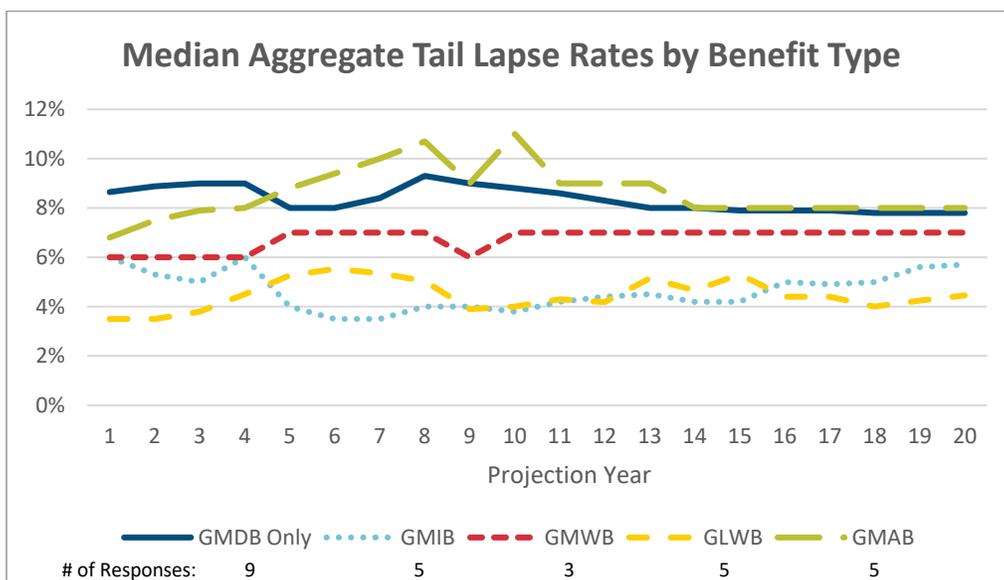


Figure 38

Figure 39 through Figure 43 show the distribution of individual company responses for aggregate tail lapses for each benefit type, but only if there are at least five responses for a given benefit.

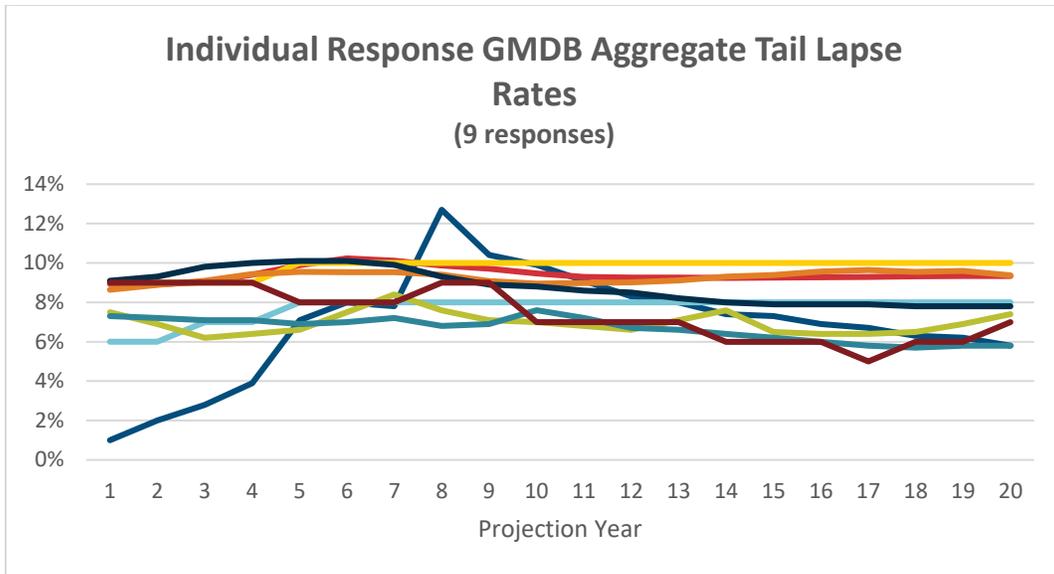


Figure 39

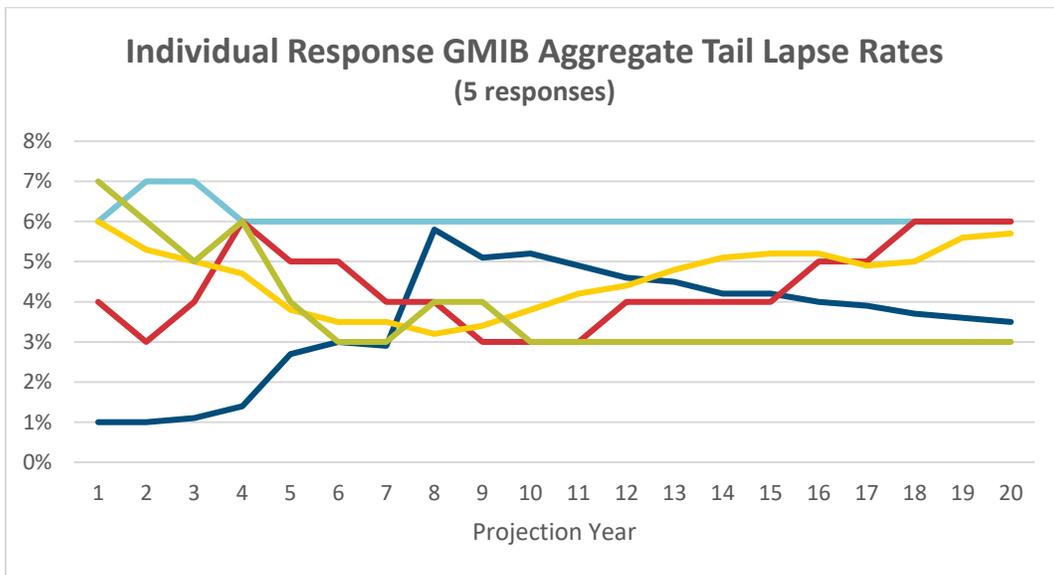


Figure 40

**Individual Response GMWB Aggregate Tail Lapse Rates**  
**Rates**  
 Individual Responses Not Shown Since There  
 Were Fewer Than 5 Responses.

Figure 41

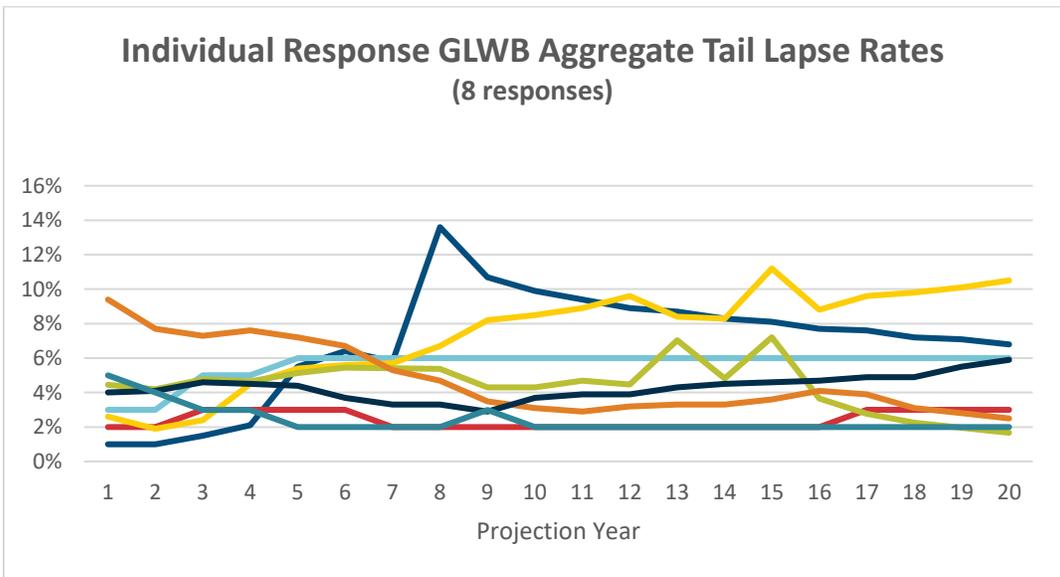


Figure 42

**Individual Response GMAB Aggregate Tail Lapse Rates**  
**Rates**  
 Individual Responses Not Shown Since There  
 Were Fewer Than 5 Responses.

Figure 43

The next set of charts (Figure 44 through Figure 48) compare the median tail scenario lapse rate to the median base scenario lapse rate for each benefit type for the aggregate block. The lapse rate in the tail is generally lower as guarantees are in-the-money, but the degree varies by benefit type. For GMDB, GMWB, and GMAB the tail lapse rates are very similar to base lapse rates. In contrast, GMIB lapses in the tail scenario are significantly lower than in the base scenario. GLWB lapses in the tail scenario are somewhat lower than in the base, but not as dramatically as GMIB.

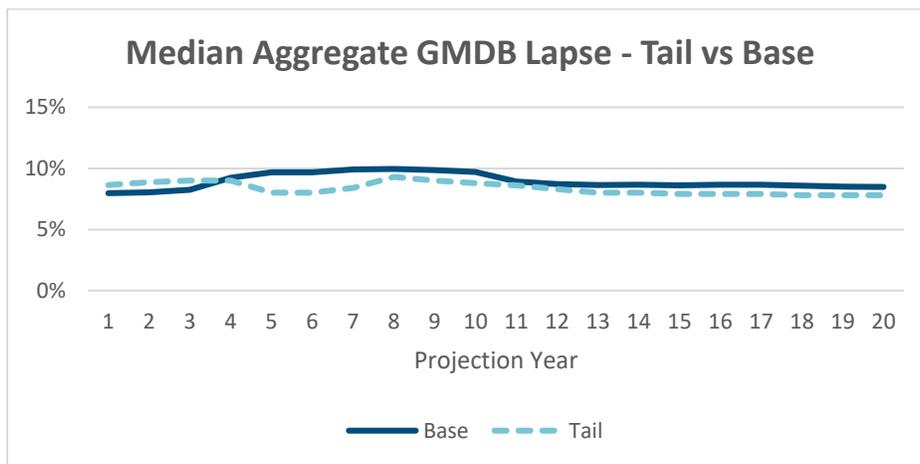


Figure 44

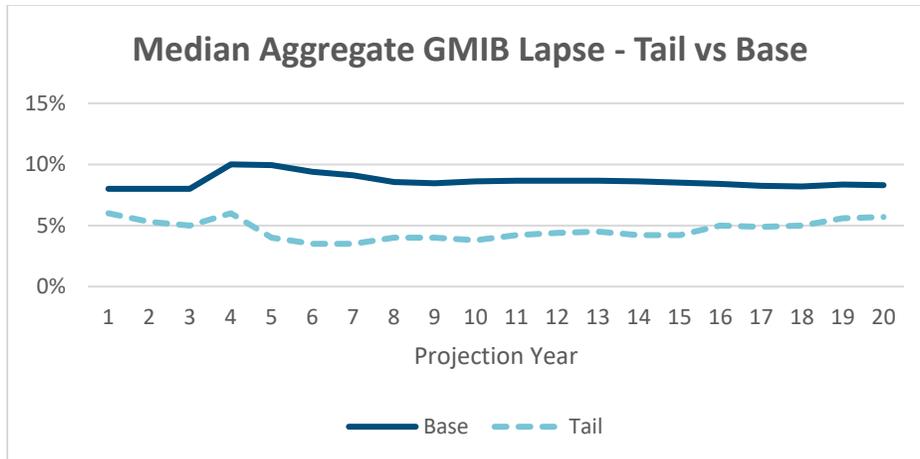


Figure 45

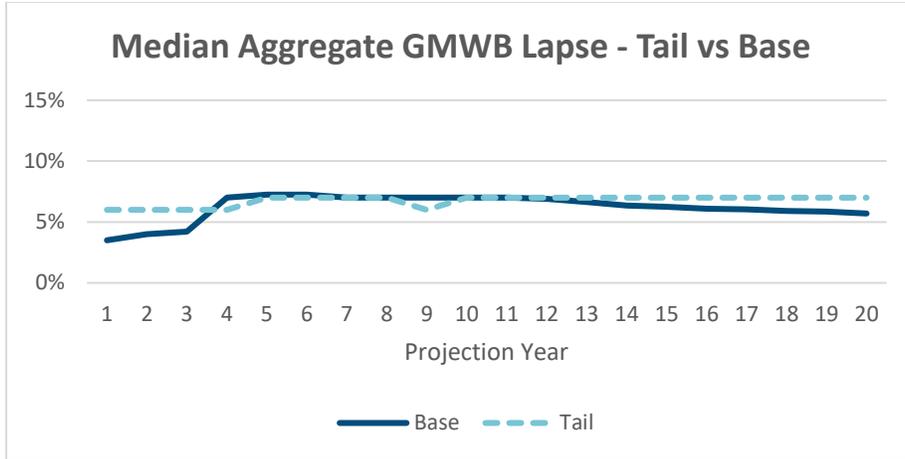


Figure 46

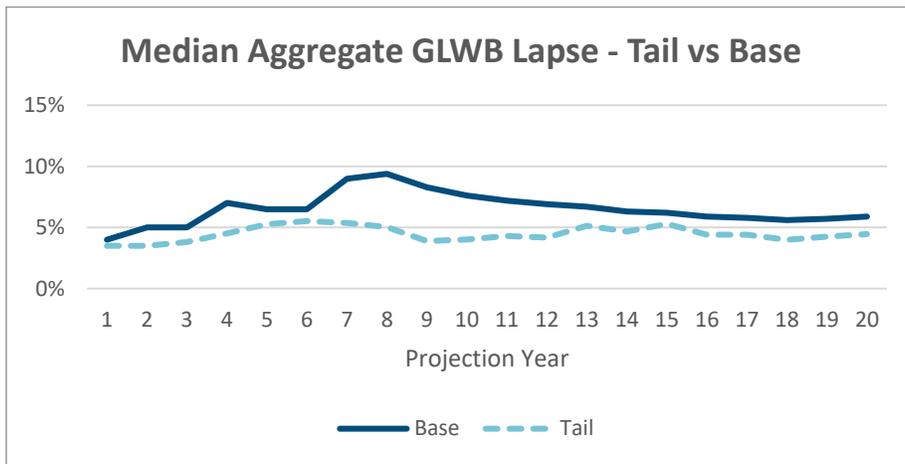


Figure 47

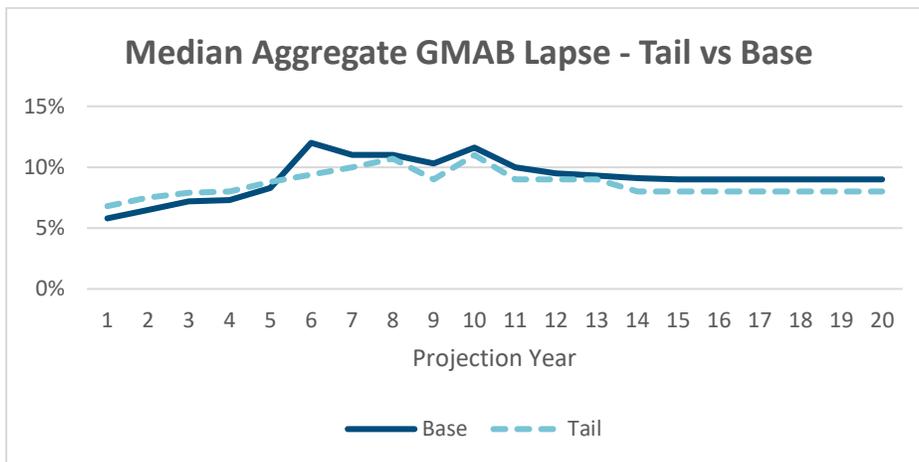


Figure 48

## GMIB Annuitization Utilization Rates in the Tail

An open-ended question regarding utilization rates for GMIB annuitization rates asked whether or how the utilization rates assumed in the tail scenario differed from those in a normal scenario.

Seven (7) companies responded to this question. In general, respondents agreed that there is a strong correlation between utilization rates and the degree of in-the-moneyness, and much less so for other parameters given the same age group. Utilization rates increase as the policies become more in-the-money. Two (2) companies also cited that a max utilization rate is applied depending on age, and one company cited policy duration as a parameter that could influence GMIB utilization rates.

## GMWB Withdrawal Utilization Rates in the Tail

An open-ended question regarding utilization rates for GMWB withdrawal rates asked whether or how the utilization rates assumed in the tail scenario differed from those in a normal scenario.

Six (6) companies responded to this question. For most of those companies, utilization rate function and parameters used in the tail scenario are substantially the same as those used in the base scenario.

For a given age group, one company also cited tax qualified status regarding parameters that could influence GMWB utilization rates.

## GLWB Withdrawal Utilization Rates in the Tail

An open-ended question regarding utilization rates for GLWB withdrawal rates asked whether or how the utilization rates assumed in the tail scenario differed from those in a normal scenario.

Eleven (11) companies responded to this question. Those eleven companies generally agreed that the utilization rates used in the tail scenario are the same as in the base scenario.

For a given age cohort, four companies cited any parameters by which GLWB utilization rates would vary. Those parameters included in-the-moneyness, duration, tax qualified status, bonus level, lapse rate and death benefit type.

## Income and Withdrawal Utilization Rates

A recently added question explores the complexity of assumptions related to income and partial withdrawal utilization rates. Fourteen (14) companies responded to this question. Companies were prompted to select all factors that apply, and there are numerous factors that influence utilization rates as summarized in Figure 49. Duration was the most commonly identified factor (as it was in 2018), whereas in 2017 attained age was the most commonly identified factor. The “Other” responses generally described the type of benefit or related features.

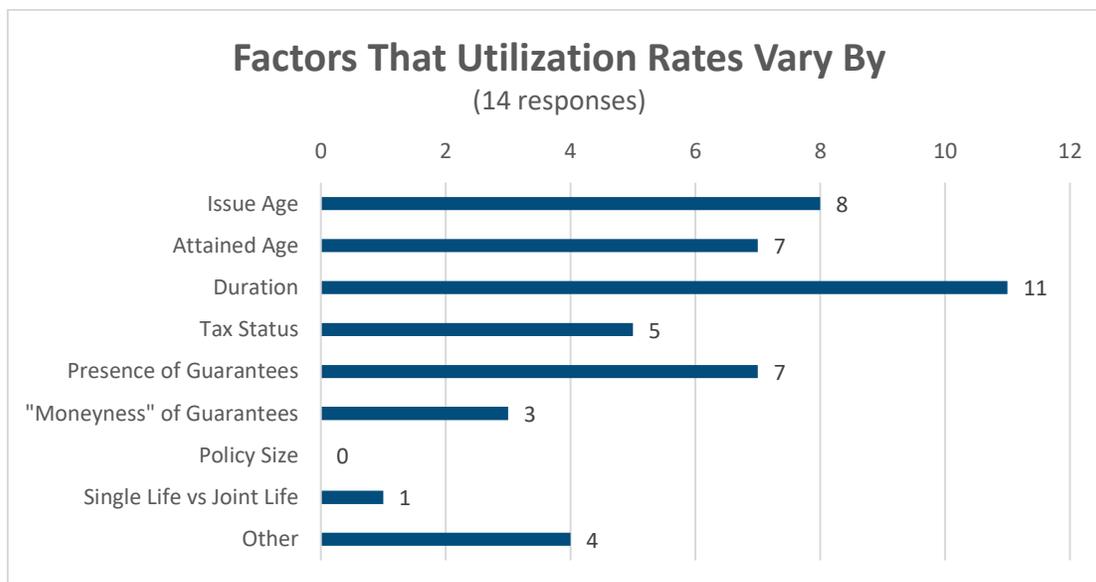


Figure 49

## Tax Qualified Status

To further explore the impact of tax qualified status on the utilization assumption for GMIB, GMWB, and GLWB, an additional question was added to the survey in 2017 for those companies that did not cite tax qualified status as a driver of utilization rates.

Eight (8) companies responded, and 6 of the 8 (75%) indicated that utilization rate assumptions are implicitly aggregate assumptions across tax-qualified and non-qualified business for both the base case and tail scenarios. This compares to 9 of the 12 (75%) from 2018 indicating the same aggregate approach.

Other responses included (a) two companies that use an explicit weighted assumption for tax qualified status, and (b) one company that indicated that its experience does not show tax qualified status to have a significant impact on GMIB utilization.

## Lapses by Distribution Channel

Insurers were asked several questions about their distribution channels. 77% of responses (10 of 13) said that their products were sold through multiple distribution channels.

Of the 10 that use multiple distribution channels, Figure 50 shows the distribution of channels used.

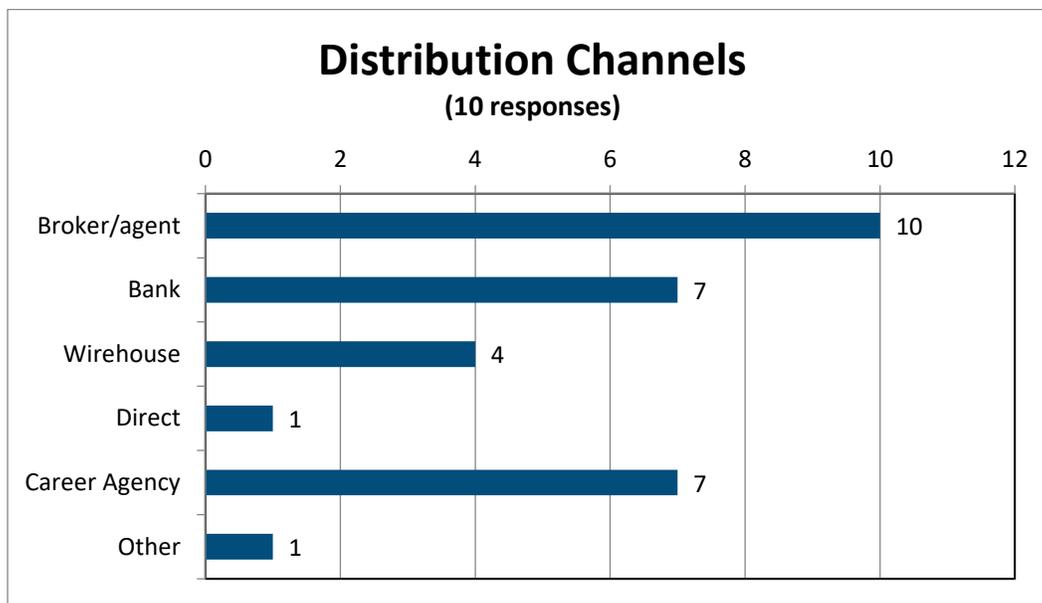


Figure 50

40% of respondents (4 of 10) measure lapse experience by distribution channel. This is a somewhat higher positive response rate than 2018 but is comparable to the earlier surveys.

Twenty percent (2 of 10) indicated that they vary lapse assumptions by distribution channel which is a similar rate as in past surveys. One of these two companies indicated that its direct business had different lapse rates. The other response varying lapse assumptions by distribution channel stated that it noticed different lapse rates in its third-party financial advisor distribution channel.

## Source of Assumptions

Insurers were asked to provide the sources they used for their expected lapse assumptions and the frequency of lapse studies performed in the company. “Company experience studies” continue to be the most popular source of base case assumptions (see Figure 51).

Collection, analysis, and publication of industry experience would be valuable as a supplement to any company’s specific experience. Companies of various sizes can be challenged by the statistical credibility available from only their own data, especially in the rare occurrence of a “tail” situation. Aggregation of data makes it easier to see trends otherwise obscured by statistical fluctuations. As with any aggregate industry study, each company needs to be aware of any inherent reasons why its own results may legitimately vary from that of the aggregate industry.

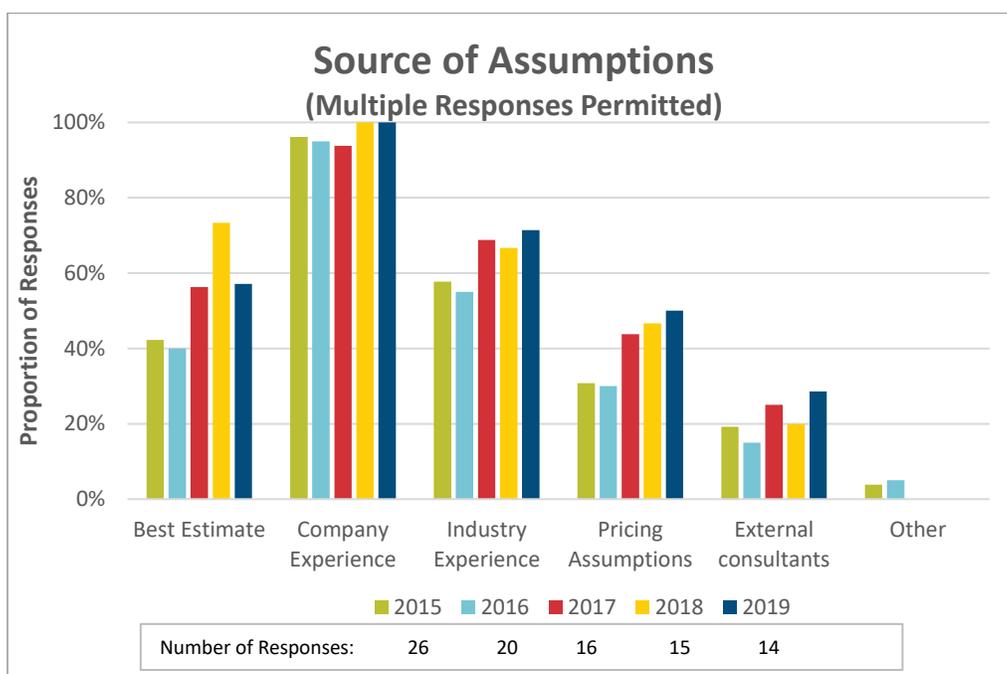


Figure 51

The most common frequency to perform experience studies is “Annually” (see Figure 52). In 2019, 86% (12 of 14) of respondents reported performing annual experience studies, and 93% (13 of 14) perform experience studies on an annual or more frequent basis.

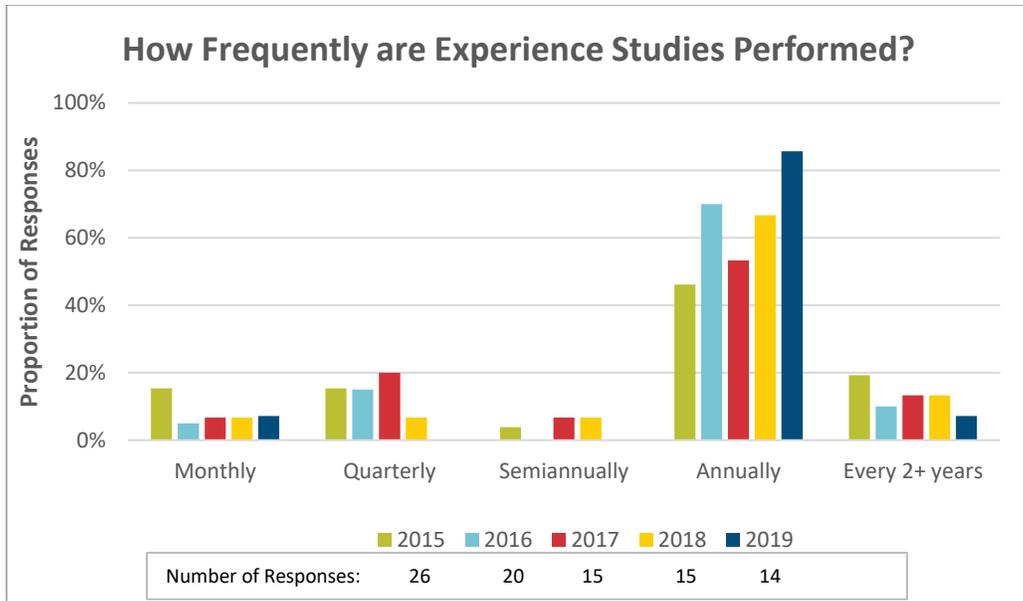


Figure 52

Insurers were asked how many years of data were used in their latest lapse study (Figure 53). Results were generally similar to past surveys, although a significantly higher percentage of companies indicated that they use 10+ years of experience as seen in Figure 53.

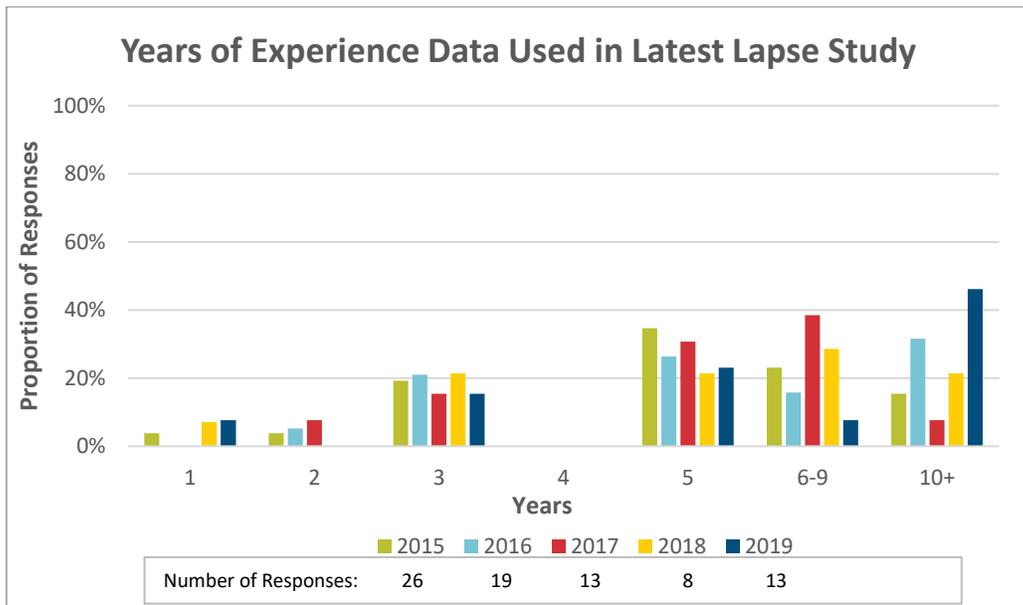


Figure 53

Companies were also asked about the sources of assumptions for “in the tail” lapsation with responses summarized in Figure 54. Responses were somewhat shifted to external sources, in comparison to the responses from the last few years.

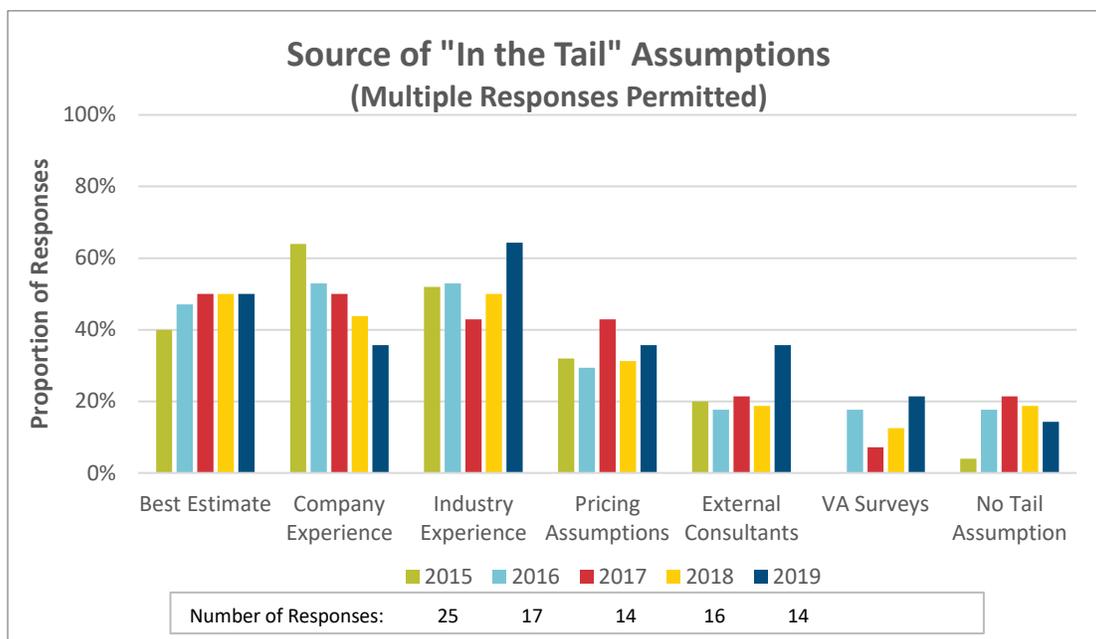


Figure 54

When asked about the years of experience considered in studies for lapses in the tail, almost all companies indicated the same time periods as in the base lapse study. One indicated that they extended the years of the study for the tail assumptions.

Figure 55 compares the source of base assumptions with the source of “In the Tail” assumptions for this year’s survey, comparing the 2019 data from Figure 51 and Figure 54. This shows that more reliance is placed on company experience for base assumptions than for assumptions “In the tail.” This is not unexpected since most actual experience is not in a tail scenario. Lapse assumptions “In the tail” require more judgement.

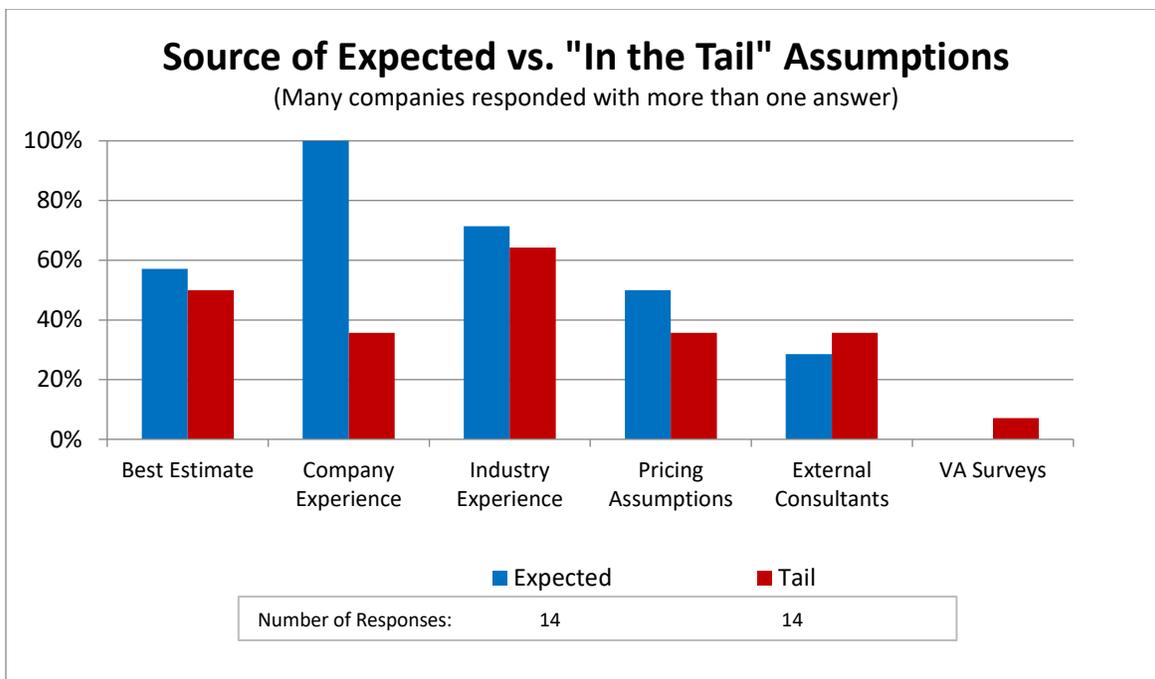


Figure 55

The survey asked companies if emerging policyholder behavior experience since 2008 (for many, a “tail” environment) caused a revision in policyholder behavior assumptions in the tail. Figure 56 shows that 71% (10 of 14) made changes following the crisis with the vast majority of those (80%; 8 of 10) revising assumptions further since then.

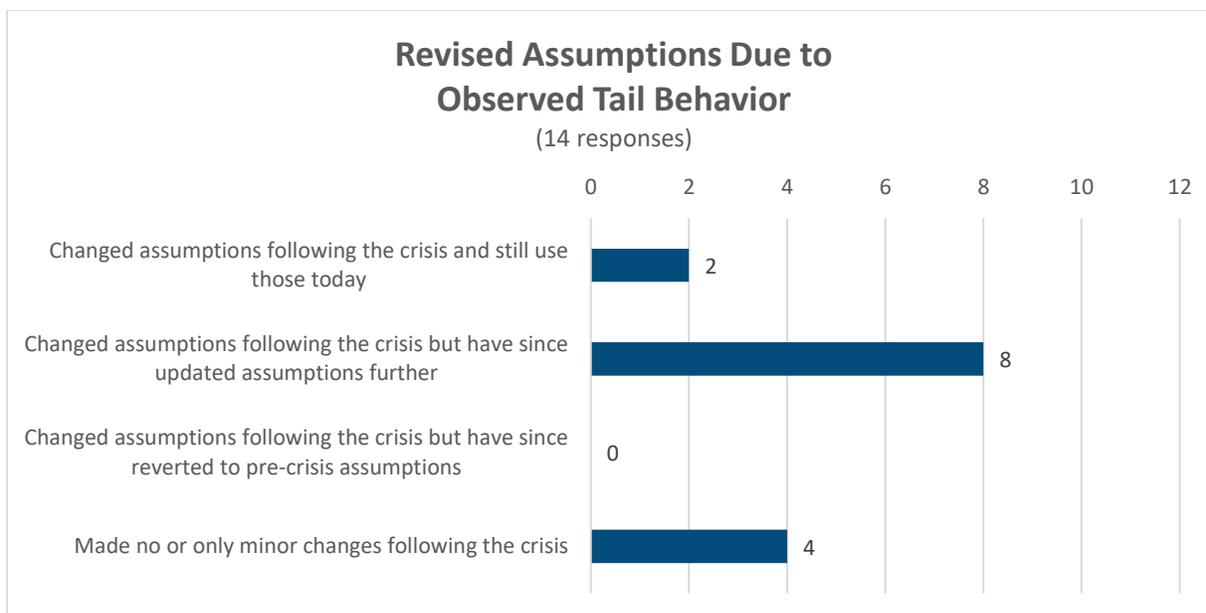


Figure 56

## Changes in Assumptions

Insurers were asked if any of the assumptions previously discussed in the survey were changed from the previous year’s analysis. The percentage of respondents indicating that some assumptions were changed in this year’s survey was 57% (8 of 14) which is slightly higher than 2018 but otherwise lower than prior surveys (Figure 57).

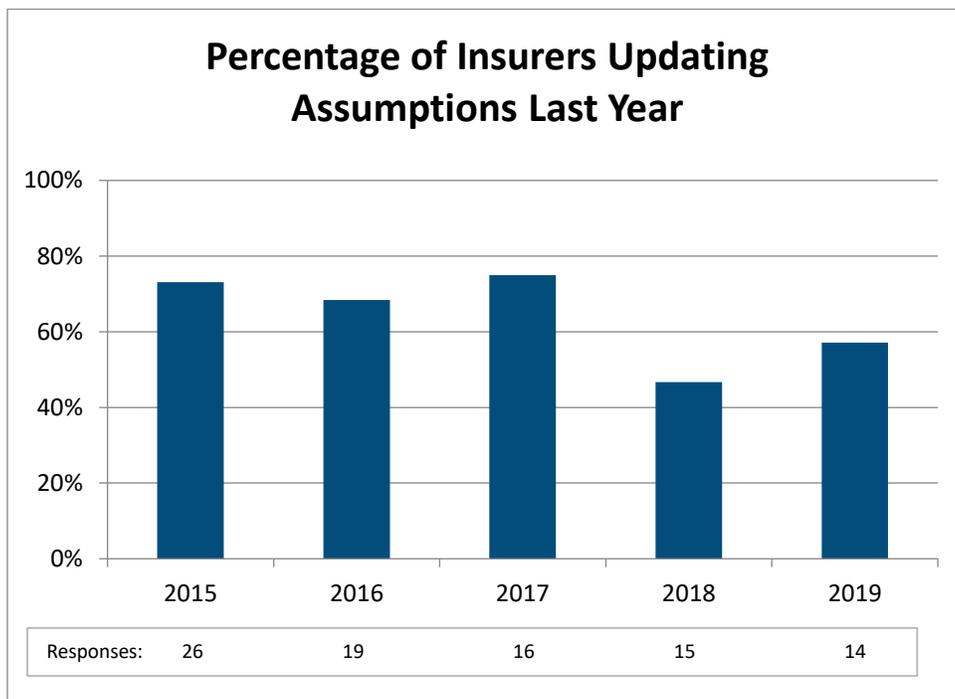


Figure 57

The question further sought open-ended responses describing what was changed for each of the five benefit types. The responses are summarized here, followed by the number of companies citing a particular response.

### GMDB

- Updated base lapse experience (4)
- Changed dynamic function (1)

### GMIB

- Updated base lapse experience (4)
- Changed dynamic function (1)

### GMWB

- Updated base lapse experience (4)
- Changed dynamic function (1)

### GLWB

- Updated base lapse experience (6)

- Changed dynamic function (2)

GMAB

- Updated base lapse experience (3)

### Sensitivities

All 14 companies responding indicated that they are performing sensitivity analyses related to assumptions that impact policyholder behavior. The types of sensitivities performed are summarized in Figure 58. Sensitivity to the base lapse rate, equity scenario, and utilization assumption were the most common types of analyses performed. The “Other” responses were further described as testing the sensitivity of the dynamic factors on lapse rates as well as mortality and expense sensitivities.

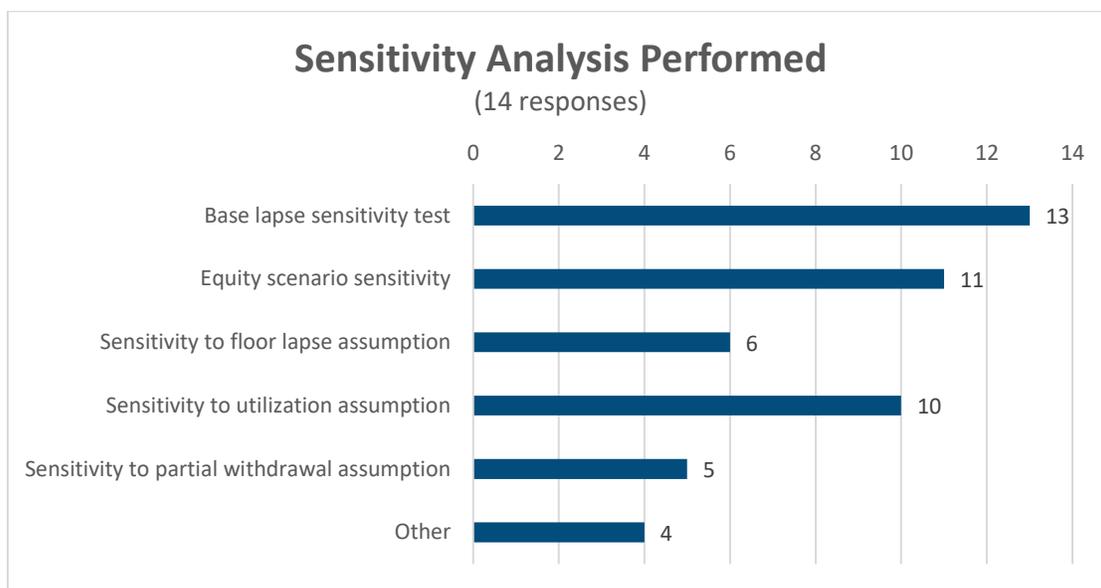


Figure 58

## About The Society of Actuaries

The Society of Actuaries (SOA), formed in 1949, is one of the largest actuarial professional organizations in the world dedicated to serving more than 31,000 actuarial members and the public in the United States, Canada and worldwide. In line with the SOA Vision Statement, actuaries act as business leaders who develop and use mathematical models to measure and manage risk in support of financial security for individuals, organizations and the public.

The SOA supports actuaries and advances knowledge through research and education. As part of its work, the SOA seeks to inform public policy development and public understanding through research. The SOA aspires to be a trusted source of objective, data-driven research and analysis with an actuarial perspective for its members, industry, policymakers and the public. This distinct perspective comes from the SOA as an association of actuaries, who have a rigorous formal education and direct experience as practitioners as they perform applied research. The SOA also welcomes the opportunity to partner with other organizations in our work where appropriate.

The SOA has a history of working with public policymakers and regulators in developing historical experience studies and projection techniques as well as individual reports on health care, retirement and other topics. The SOA's research is intended to aid the work of policymakers and regulators and follow certain core principles:

**Objectivity:** The SOA's research informs and provides analysis that can be relied upon by other individuals or organizations involved in public policy discussions. The SOA does not take advocacy positions or lobby specific policy proposals.

**Quality:** The SOA aspires to the highest ethical and quality standards in all of its research and analysis. Our research process is overseen by experienced actuaries and nonactuaries from a range of industry sectors and organizations. A rigorous peer-review process ensures the quality and integrity of our work.

**Relevance:** The SOA provides timely research on public policy issues. Our research advances actuarial knowledge while providing critical insights on key policy issues, and thereby provides value to stakeholders and decision makers.

**Quantification:** The SOA leverages the diverse skill sets of actuaries to provide research and findings that are driven by the best available data and methods. Actuaries use detailed modeling to analyze financial risk and provide distinct insight and quantification. Further, actuarial standards require transparency and the disclosure of the assumptions and analytic approach underlying the work.

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## Policyholder Behavior Assumptions in the Tail Annual Variable Annuity Guaranteed Benefits Survey

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### Default Question Block

NOTE: A printable version of the survey is available here: [2019 VA Survey-FINAL.pdf](#)

The Society of Actuaries' Risk Management Task Force seeks to help actuaries develop better estimates of policyholder behavior in the tail (PBITT), that is, to set policyholder behavior assumptions in extreme scenarios. We are most interested in the assumptions for a tail scenario in the development of CTE 90 level reported in your C3 Phase II memo this last year-end. Certain questions range beyond the actual risk-based capital (RBC) development to add context to your assumptions. **Please respond even if you are unable to answer all questions, and disregard any questions that are not relevant to your business.**

This survey is designed to confidentially gather the range of assumptions actuaries use in RBC development regarding secondary guarantees of minimum benefits on variable annuity products. The definitions of these benefits for this survey are as follows:

Guaranteed Minimum Death Benefit (GMDB)

*guarantees minimum account value at death with no living benefit*

Guaranteed Minimum Income Benefit (GMIB)

*guarantees minimum income at annuitization; may also include a death benefit*

Guaranteed Minimum Withdrawal Benefit (GMWB)

*provides a guaranteed minimum income over a specified (non-lifetime) period; may also include a death benefit*

Guaranteed Living Withdrawal Benefit (GLWB)

*provides a guaranteed income stream for life; may also include a death benefit*

Guaranteed Minimum Accumulation Benefit (GMAB)

*guarantees a minimum account value at a specified time; may also include a death benefit*

We greatly appreciate your time and efforts in helping us to attain our goal. It is our hope that the results of this survey will enhance the actuary's ability to set assumptions for these products in extreme scenarios and also enable better peer review. As an added incentive for participants, the results will be provided to them in advance of the report's availability on the SOA website.

Responses will be gathered by SOA staff and will be kept confidential, with results reported anonymously.

Please submit responses to the survey by **June 28, 2019**.

If you have any questions or have additional information you would like to add, please email Barbara Scott at [bscott@soa.org](mailto:bscott@soa.org).

### **Question 1: BACKGROUND Variable Annuity Guaranteed Benefits Information**

List the approximate size of your company's current total VA book by line (understanding there may be some contracts with more than one guaranteed benefit). Please enter amounts in millions. For example, 20,000,000 should be entered as 20.

NOTE: Totals are not necessarily the sum for individual benefits

\* For the last column, please report only the TOTAL of excess liability, not the breakdown by guaranteed benefit.

		2018 Account Value	Liability Value in Excess of Account Value (fill in TOTAL ONLY) *
Yr began writing	2018 Premiums		

	Yr began writing	2018 Premiums	2018 Account Value	Liability Value in Excess of Account Value (fill in TOTAL ONLY) *
GMDB only	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
GMIB	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
GMWB	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
GLWB	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
GMAB	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Total	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

## Question 2: TAIL SCENARIO for Variable Annuity Guaranteed Benefits

Before examining policyholder behavior in the tail, the "tail scenario" needs to be defined. Information on your particular tail scenario will provide a frame of reference for each set of results.

2a. Do you currently use stochastic modeling to set capital levels? (e.g. for the RBC C-3 phase 2 calculation)

Yes

No

2b. If so, how many scenarios do you typically model?

2c. How many years in the future do you typically project?

2d. Do your projections include hedges in accordance with a clearly defined hedging strategy (CDHS)?

Yes

No

2e. If you are performing stochastic modeling for required capital/RBC calculation purposes, please list the scenario with the first negative result of your modified 90 CTE calculation (that is, the least negative result of all scenarios with a negative present value in these calculations). If no negative scenarios, provide the smallest positive. If you are not currently using stochastic modeling, please list the tail scenario. Please provide your scenario in the format of annual non-cumulative returns. The interest rate should be based on the 5-year Treasury Rate.

Please answer questions in decimal format (i.e., 3% should be entered as 0.03).

	Equity	Bond	Int Rates
Projection Year 1	<input type="text"/>	<input type="text"/>	<input type="text"/>
Projection Year 2	<input type="text"/>	<input type="text"/>	<input type="text"/>
Projection Year 3	<input type="text"/>	<input type="text"/>	<input type="text"/>
Projection Year 4	<input type="text"/>	<input type="text"/>	<input type="text"/>
Projection Year 5	<input type="text"/>	<input type="text"/>	<input type="text"/>
Projection Year 6	<input type="text"/>	<input type="text"/>	<input type="text"/>
Projection Year 7	<input type="text"/>	<input type="text"/>	<input type="text"/>
Projection Year 8	<input type="text"/>	<input type="text"/>	<input type="text"/>
Projection Year 9	<input type="text"/>	<input type="text"/>	<input type="text"/>
Projection Year 10	<input type="text"/>	<input type="text"/>	<input type="text"/>
Projection Year 11	<input type="text"/>	<input type="text"/>	<input type="text"/>
Projection Year 12	<input type="text"/>	<input type="text"/>	<input type="text"/>
Projection Year 13	<input type="text"/>	<input type="text"/>	<input type="text"/>
Projection Year 14	<input type="text"/>	<input type="text"/>	<input type="text"/>
Projection Year 15	<input type="text"/>	<input type="text"/>	<input type="text"/>
Projection Year 16	<input type="text"/>	<input type="text"/>	<input type="text"/>
Projection Year 17	<input type="text"/>	<input type="text"/>	<input type="text"/>
Projection Year 18	<input type="text"/>	<input type="text"/>	<input type="text"/>
Projection Year 19	<input type="text"/>	<input type="text"/>	<input type="text"/>
Projection Year 20	<input type="text"/>	<input type="text"/>	<input type="text"/>

For Question 2e, if in years 21 and later, there are unusual movements in the investment scenarios, such that there are unusual patterns in the tail lapse rates, please describe the pattern of investment and surrender rates for these years.

2f. Have you modified your scenarios to show fatter tails, for reasons such as new product designs or actual experience that has emerged?

Yes

No

Please provide comments.

2g. If your tail scenario involves high equity returns, please describe what drives the adverse outcome in that equity scenario. (Under many product designs in the marketplace, it is easy to imagine low equity returns triggering the guarantees, but perhaps there are other influences from hedging strategy, a different product design, or other.)

### Question 3: DYNAMIC ASSUMPTIONS for Variable Annuity Guaranteed Benefits

**Please answer the following Dynamic Assumption questions, if possible. If the set up of your combinations do not fit the format of the following questions, please provide the additional information requested to Barbara Scott at [bscott@soa.org](mailto:bscott@soa.org).**

3a. For which benefits do you use a dynamic lapse function (select all that apply)?

GMDB

GMIB  
GMWB  
GLWB  
GMAB

3b. Please respond to the following questions if your company's dynamic lapse function varies by **GMDB**.

3b.1. Is your formula:

One-sided  
Two-sided

3b.2. Is there a floor lapse rate that is greater than zero?

No, floor lapse rate is zero  
Floor is a percent of the base lapse rate  
Floor is a non-zero constant

Other non-zero floor. Please describe.

3b.3. Is the dynamic aspect of your lapse function related to 'in-the-moneyness'?

Yes  
No

3b.4. Does the dynamic aspect of your lapse function vary by other factors (select all that apply)?

Policy duration  
Withdrawal type (dollar-for-dollar vs. pro rata)  
Length of surrender charge schedule  
Policy size

Attained age

Other. Please describe.

3c. Please respond to the following questions if your company's dynamic lapse function varies by **GMIB**.

3c.1. Is your formula:

One-sided

Two-sided

3c.2. Is there a floor lapse rate that is greater than zero?

No, floor lapse rate is zero

Floor is a percent of the base lapse rate

Floor is a non-zero constant

Other non-zero floor. Please describe.

3c.3. Is the dynamic aspect of your lapse function related to 'in-the-moneyness'?

Yes

No

3c.4. Does the dynamic aspect of your lapse function vary by other factors (select all that apply)?

Policy duration

Withdrawal type (dollar-for-dollar vs. pro rata)

Length of surrender charge schedule

Policy size

Attained age

Remaining time to maturity guarantee date

Other. Please describe.

3d. Please respond to the following questions if your company's dynamic lapse function varies by **GMWB**.

3d.1. Is your formula:

One-sided

Two-sided

3d.2. Is there a floor lapse rate that is greater than zero?

No, floor lapse rate is zero

Floor is a percent of the base lapse rate

Floor is a non-zero constant

Other non-zero floor. Please describe.

3d.3. Is the dynamic aspect of your lapse function related to 'in-the-moneyness'?

Yes

No

3d.4. Does the dynamic aspect of your lapse function vary by other factors (select all that apply)?

Policy duration

Withdrawal type (dollar-for-dollar vs. pro rata)

Length of surrender charge schedule

Policy size

Attained age

Remaining time to maturity guarantee date

Other. Please describe.

3e. Please respond to the following questions if your company's dynamic lapse function varies by **GLWB**.

3e.1. Is your formula:

One-sided

Two-sided

3e.2. Is there a floor lapse rate that is greater than zero?

No, floor lapse rate is zero

Floor is a percent of the base lapse rate

Floor is a non-zero constant

Other non-zero floor. Please describe.

3e.3. Is the dynamic aspect of your lapse function related to 'in-the-moneyness'?

Yes

No

3e.4. Does the dynamic aspect of your lapse function vary by other factors (select all that apply)?

Policy duration

Withdrawal type (dollar-for-dollar vs. pro rata)

Length of surrender charge schedule

Policy size

Attained age

Remaining time to maturity guarantee date

Other. Please describe.

3f. Please respond to the following questions if your company's dynamic lapse function varies by **GMAB**.

3f.1. Is your formula:

One-sided

Two-sided

3f.2. Is there a floor lapse rate that is greater than zero?

No, floor lapse rate is zero

Floor is a percent of the base lapse rate

Floor is a non-zero constant

Other non-zero floor. Please describe.

3f.3. Is the dynamic aspect of your lapse function related to 'in-the-moneyness'?

Yes

No

3f.4. Does the dynamic aspect of your lapse function vary by other factors (select all that apply)?

Policy duration

Withdrawal type (dollar-for-dollar vs. pro rata)

Length of surrender charge schedule

Policy size

Attained age

Remaining time to maturity guarantee date

Other. Please describe.

3g. Does your dynamic lapse function vary by benefit combination or do you have separate dynamic formulas for contracts with each individual guaranteed benefit?

Varies by combination of benefits.

Formula for each benefit

3h. Regarding policyholder behavior assumptions that depend on "in-the-moneyness" of guarantees, upon which of the following bases of "in-the-moneyness" are your assumptions based?

"Nominal basis," comparing the Benefit Base of guarantees to the Account Value.

"Actuarial basis," comparing the present value of future guarantees to the Account Value.

"Replacement value" or other basis.

3h.1. Do you disclose the relevant values above to the policyholders or their financial advisor? In particular, do you disclose present values or replacement values?

Yes

No

3h.2. Does your state insurance regulator directly influence or require you to use one of these bases?

Yes

No

#### **Question 4: BASE LAPSE RATES FOR A NEWLY ISSUED POLICY for Variable Annuity Guaranteed Benefits**

Please identify the first policy year without surrender charge.

Please enter base (non-dynamic) lapse rates assumed by policy year from issue in the following table.

Please enter responses in decimal format (i.e., 3% should be entered as 0.03).

	GMDB Only	GMIB	GMWB	GLWB	GMAB
Policy Year 1	<input type="text"/>				
Policy Year 2	<input type="text"/>				
Policy Year 3	<input type="text"/>				
Policy Year 4	<input type="text"/>				
Policy Year 5	<input type="text"/>				
Policy Year 6	<input type="text"/>				
Policy Year 7	<input type="text"/>				
Policy Year 8	<input type="text"/>				
Policy Year 9	<input type="text"/>				
Policy Year 10	<input type="text"/>				
Policy Year 11	<input type="text"/>				
Policy Year 12	<input type="text"/>				
Policy Year 13	<input type="text"/>				
Policy Year 14	<input type="text"/>				
Policy Year 15	<input type="text"/>				
Policy Year 16	<input type="text"/>				
Policy Year 17	<input type="text"/>				
Policy Year 18	<input type="text"/>				
Policy Year 19	<input type="text"/>				
Policy Year 20	<input type="text"/>				

#### Question 5: TAIL SCENARIO LAPSE RATES FOR A NEWLY ISSUED POLICY for Variable Annuity Guaranteed Benefits

Please enter in the following table the dynamic lapse rates by policy year assuming the tail scenario identified in Question 2 started at the end of the first policy year. (For the avoidance of doubt, assume that the policy anniversary is the calendar year-end and that the first projection year of the tail scenario fully overlaps the second policy year.)

Please enter responses in decimal format (i.e., 3% should be entered as 0.03).

	GMDB Only	GMIB	GMWB	GLWB	GMAB
Policy Year 1	<input type="text"/>				
Policy Year 2	<input type="text"/>				
Policy Year 3	<input type="text"/>				
Policy Year 4	<input type="text"/>				
Policy Year 5	<input type="text"/>				
Policy Year 6	<input type="text"/>				
Policy Year 7	<input type="text"/>				
Policy Year 8	<input type="text"/>				
Policy Year 9	<input type="text"/>				
Policy Year 10	<input type="text"/>				
Policy Year 11	<input type="text"/>				
Policy Year 12	<input type="text"/>				
Policy Year 13	<input type="text"/>				
Policy Year 14	<input type="text"/>				
Policy Year 15	<input type="text"/>				
Policy Year 16	<input type="text"/>				
Policy Year 17	<input type="text"/>				
Policy Year 18	<input type="text"/>				
Policy Year 19	<input type="text"/>				
Policy Year 20	<input type="text"/>				

**Question 6: BASE LAPSE RATES IN AGGREGATE for full block partitioned by type of Variable Annuity Guaranteed Benefits**

Please enter the aggregate average base lapse rates produced in a normal (non-tail) scenario.

Please enter responses in decimal format (i.e., 3% should be entered as 0.03).

GMDB Only      GMIB      GMWB      GLWB      GMAB

	GMDB Only	GMIB	GMWB	GLWB	GMAB
Projection Year 1	<input type="text"/>				
Projection Year 2	<input type="text"/>				
Projection Year 3	<input type="text"/>				
Projection Year 4	<input type="text"/>				
Projection Year 5	<input type="text"/>				
Projection Year 6	<input type="text"/>				
Projection Year 7	<input type="text"/>				
Projection Year 8	<input type="text"/>				
Projection Year 9	<input type="text"/>				
Projection Year 10	<input type="text"/>				
Projection Year 11	<input type="text"/>				
Projection Year 12	<input type="text"/>				
Projection Year 13	<input type="text"/>				
Projection Year 14	<input type="text"/>				
Projection Year 15	<input type="text"/>				
Projection Year 16	<input type="text"/>				
Projection Year 17	<input type="text"/>				
Projection Year 18	<input type="text"/>				
Projection Year 19	<input type="text"/>				
Projection Year 20	<input type="text"/>				

**Question 7: LAPSE RATES IN THE TAIL IN AGGREGATE for full block partitioned by type of Variable Annuity Guaranteed Benefits**

Please enter the aggregate average lapse rates produced in the tail scenario listed in Question 2.

Please enter responses in decimal format (i.e., 3% should be entered as 0.03).

	GMDB Only	GMIB	GMWB	GLWB	GMAB
Projection Year 1	<input type="text"/>				
Projection Year 2	<input type="text"/>				
Projection Year 3	<input type="text"/>				
Projection Year 4	<input type="text"/>				
Projection Year 5	<input type="text"/>				
Projection Year 6	<input type="text"/>				
Projection Year 7	<input type="text"/>				
Projection Year 8	<input type="text"/>				
Projection Year 9	<input type="text"/>				
Projection Year 10	<input type="text"/>				
Projection Year 11	<input type="text"/>				
Projection Year 12	<input type="text"/>				
Projection Year 13	<input type="text"/>				
Projection Year 14	<input type="text"/>				
Projection Year 15	<input type="text"/>				
Projection Year 16	<input type="text"/>				
Projection Year 17	<input type="text"/>				
Projection Year 18	<input type="text"/>				
Projection Year 19	<input type="text"/>				
Projection Year 20	<input type="text"/>				

For Question 7, if in years 21 and later there are unusual movements in the investment

scenarios, such that there are unusual patterns in the tail lapse rates, please describe the pattern in such surrender rates if not already described in question 2d.

### **Question 8: GMIB ANNUITIZATION UTILIZATION RATES IN THE TAIL**

For Income Benefits, please describe how the utilization rate (or set of rates) assumed in the tail scenario in Question 2 differs from that assumed in a normal scenario. If it helps to simplify the comparison, concentrate on attained ages 65-75, separately for non-tax-qualified and tax-qualified annuities.

Would this description (of the difference between utilization rates in the tail and normal utilization rates) depend greatly on (a) In-the-Moneyiness or (b) Duration or (c) any other parameter (please specify)?

### **Question 9: GMWB WITHDRAWAL UTILIZATION RATES IN THE TAIL**

For GMWB Benefits, please describe how the utilization rate (or set of rates) assumed in the tail scenario in Question 2 differs from that assumed in a normal scenario. If it helps to simplify the comparison, concentrate on attained ages 65-75, separately for non-tax-qualified and tax-qualified annuities.

Would this description (of the difference between utilization rates in the tail and normal utilization rates) depend greatly on (a) In-the-Moneyiness or (b) Duration or (c) any other

parameter (please specify)?

### Question 10: GLWB UTILIZATION RATES IN THE TAIL

For GLWB Benefits, please describe how the utilization rate (or set of rates) assumed in the tail scenario in Question 2 differs from that assumed in a normal scenario. If it helps to simplify the comparison, concentrate on attained ages 65-75, separately for non-tax-qualified and tax-qualified annuities.

Would this description (of the difference between utilization rates in the tail and normal utilization rates) depend greatly on (a) In-the-Moneyiness or (b) Duration or (c) any other parameter (please specify)?

### Question 11: UTILIZATION RATES

Do the income utilization rates (partial withdrawal rates) vary by any of the following? Select all that apply.

Issue age

Attained age

Duration (by policy year, rider year, or relative to surrender charge period)

Tax status

Presence of guarantees

"Moneyiness" of guarantees

Policy size

Single life vs. Joint life

Other, please explain

## Question 12: GMIB, GMWB, or GLWB TAX QUALIFICATION

If your assumptions regarding utilization of GMIB, GMWB, or GLWB (discussed in responses to Questions 8, 9, or 10 above) do not vary by the tax qualification status of the variable annuity, which of the following help explain why not? (select all that apply)

All (or almost all) of our business is in a single category with respect to tax qualification status, so there are no differences regarding required minimum distributions (RMDs) to drive different utilization assumptions.

In light of RMDs, we have developed explicit weighted average utilization rates across tax-qualified and non-tax-qualified business for both the base case and for the tail scenario.

In light of RMDs, our utilization rate assumptions are implicitly aggregate assumptions across tax-qualified and non-tax-qualified business for both the base case and for the tail scenario.

Other, please explain.

## Question 13: LAPSE RATES BY DISTRIBUTION SYSTEM for VA Guaranteed Benefits

13a. Do you sell business through different distribution systems?

Yes

No

13b. If so, what distribution systems do you use?

Broker/Independent Agent

Bank

Wirehouse

Direct

Career Agent

Other. Please List.

13c. Do you measure lapse experience separately by distribution system?

Yes

No

13d. Whether or not you have actually measured lapse experience by distribution system, do your lapse assumptions vary by distribution system?

Yes

No

13e. If so, please describe the differences in the lapse assumptions.

#### Question 14: SOURCES of Variable Annuity Lapse Rate Assumptions

14a. In developing your base lapse rate assumptions, what data sources or guidance did you consider (select all that apply)?

Best estimate

Company experience

Industry experience

Pricing assumptions

External consultants

Other. Please describe.

14b. If your company performs lapse experience studies, how often are they done?

Monthly

Quarterly

Semi-annually

Annually

Every 2+years

14c. If applicable, how many calendar years of experience data were used in your latest study?

14d. In developing your "in the tail" lapse rate assumptions, what data sources or guidance did you consider (select all that apply)?

Best estimate

Company experience

Industry experience

Pricing assumptions

External consultants

VA survey

No tail assumption

Other. Please describe.

14e. If your "in the tail" assumptions are based on an actual company study, what years were used?

14f. The financial crisis of 2008-2009 prompted many companies to review their assumptions for policyholder behavior in the tail. How did your company react?

Changed assumptions following the crisis and still use those today

Changed assumptions following the crisis but have since updated assumptions further

Changed assumptions following the crisis but have since reverted to the assumptions in place pre-crisis

Made no or only minor changes following the crisis

14g. The financial crisis that occurred in 2008-2009 may have created situations in which policyholder behavior in an actual tail situation can be observed, which offers the chance to make "tail" studies not normally available. Based on prior responses, the SOA is exploring the possibility to conducting such a study. Do you have experience data (including 2008-2009) that you would like to contribute to a study of policyholder behavior over the last few years?

Yes

No

### Question 15: CHANGES in ASSUMPTIONS from Previous Year

15a. Were any of the previously described assumptions changed from the previous year capital calculation (whether or not participating in prior survey)?

Yes

No

15b. If so, please describe the change.

Guaranteed Minimum Death Benefit (GMDB Only)

Guaranteed Minimum Income Benefit (GMIB)

Guaranteed Minimum Withdrawal Benefit (GMWB)

Guaranteed Living Withdrawal Benefit (GLWB)

## Guaranteed Minimum Accumulation Benefit (GMAB)

### Question 16: SENSITIVITIES

Are you performing sensitivity analyses related to assumptions that impact policyholder behavior?

Yes

No

If yes, please select the testing and analysis you perform.

Base lapse sensitivity tests

Equity scenario sensitivity

Sensitivity to floor lapse assumption

Sensitivity to utilization assumption

Sensitivity to partial withdrawal assumption

Other. Please describe.

### Question 17: COMMENTS

In light of the proposed NAIC changes to reserves and capital for VAs, please describe any anticipated changes in the assumptions you have described in this survey?

### Question 18:

Do you anticipate any changes due to your response in Question 17?

**Question 19:**

Would you be interested in joining the PBITT Working Group to share your expertise in evolving this survey?

Yes

No

**Question 19a**

If yes, please provide your name and email address.

**Question 20**

Are there new combination of benefits or new products not addressed in this survey? Please describe.

Please add any additional explanatory comments or clarifications.

**Question 21**

Please provide us with a primary and secondary contact in case we need to follow-up with

you on your submission.

	Name	Telephone	Email
Primary	<input type="text"/>	<input type="text"/>	<input type="text"/>
Secondary	<input type="text"/>	<input type="text"/>	<input type="text"/>

**Question 22**

In the summary report, we intend to recognize the companies that participated in this survey. There will be no reference to individual responses. Please indicate how your company's name should appear in the summary report.

Name of Company

My company prefers not to be listed in the summary report

Please contact [bscott@soa.org](mailto:bscott@soa.org) if you have any questions regarding this survey.

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