SOCIETY OF ACTUARIES

2017 Universal Life with Secondary Guarantees Survey

Survey of Assumptions for Policyholder Behavior in the Tail

July 2017

2017 Universal Life Secondary Guarantees Survey

Survey of Assumptions for Policyholder Behavior in the Tail

AUTHOR   Jeff Hartman

Table of Contents

Survey Highlights

In 2017, the Policyholder Behavior in the Tail (PBITT) working group distributed its annual survey to insurers and asked for information on their assumptions used in modeling of Universal Life with Secondary Guarantees. The goal of the survey was to gain further insight into the ranges of companies' assumptions in the tail of a stochastic risk based capital calculation.

There were a total of 25 respondents in 2017. While the identities of the responding companies for a particular response remain anonymous to the Policyholder Behavior in the Tail (PBITT) working group, companies were given a chance to identify themselves as a participating company. The committee would like to thank these and all anonymous companies for their contribution.

<div align="center">

AIG

Allstate

Brighthouse Financial

Farm Bureau Life Insurance Company

Kansas City Life Insurance Company

Knights of Columbus

Liberty Mutual

Lincoln Benefit Life

Lincoln Financial Group

MetLife

Midland National Life and North American Company

Mutual of Omaha

Nationwide

New York Life Insurance Company

Penn Mutual Life Insurance Company

Principal Financial Group

RiverSource Life Insurance Company

Sagicor Life Insurance Company

Securian Financial Group

Transamerica Life Insurance Company

United Farm Family Life

Western & Southern Financial Group

</div>

Overview

- The latest survey regarding Universal Life with secondary guarantees reflects a different response group from those in the prior survey. Some of the changes described below reflect different respondents, not necessarily a change by any given company. SOA research staff was able to confirm that 12 of the participating companies this year are the same as in the prior survey.

- Most companies continue to view the investment returns in tail scenarios (cited by 75% of respondents) and lapse assumptions (79%) to be their most critical risk assumptions when analyzing policyholder behavior in the tail for secondary guarantees (Figure 45).

Tail Scenarios

- Overall, 48% of companies use stochastic scenarios to set or analyze capital levels. It is less common for companies with a small block of business to use stochastic scenarios (Figure 3). Of the companies that do use stochastic scenarios, only 9% reported projecting 100 or fewer scenarios while 36% project 1,000 or more (Figure 4).

- More than one-half of companies (62%) project for at least 51 years (Figure 5).

- The scenarios used are summarized in Figure 6 through Figure 17.

Lapse Assumptions

- Lapse rates in the tail continue to vary widely among insurers. Assumed lapse rates do not show substantial variation by issue age for most individual insurers, but are lower for the highest issue ages (70-79). Only select age groups are shown in Figure 20 and Figure 22.

- Median lapse rates for 2017 are similar to those in past surveys (Figure 21 and Figure 23).

- The percentage of companies that reported using dynamic lapse assumptions is somewhat higher than in prior years. Dynamic lapses were used by 63% this year (Figure 19).

- Companies were asked how many policies on a block of business that experienced the tail scenario would be kept in force by the secondary guarantee. After 31 years, the average response was 35% of policies and median response was 40% of policies (Figure 24).

- For the second survey in a row, the 2017 survey saw a fairly small percentage of companies that measure lapses by distribution system (25%; 3 of 12). Two companies vary their lapse assumptions by distribution system including one of those three which measures lapses by distribution, and one which does not.

- Just over half (13 of 25) of companies vary lapse assumptions by premium. This is consistent with recent surveys (Figure 28). Several responses mentioned higher lapse rates for level premium patterns and/or lower lapse rates for single premiums.

- In regards to sources of base lapse assumptions, "Company Experience" (88%) and "Actuarial Best Estimate" (72%) were cited as the most common sources (Figure 29).

- When asked about the number of years of experience companies use in their lapse studies, the most common response was "5-7 years" (55%) with even fewer companies using less than 5 years (5%) than in past surveys (Figure 31).

- Actuarial best estimate continues to be the most common source of dynamic assumptions at 73%, although that response rate is down from recent surveys. A variety of other sources were reported, similar to past surveys (Figure 33).

Mortality Assumptions

- Companies showed a wide range of assumptions, especially after age 100 (Figure 35 through Figure 40).

- This year's survey saw an increase in the number of companies using 2001 VBT as their reference table and a decrease in the number using 2008 VBT. This is counter to the recent trend, but could be a function of a different response group relative to the prior survey. There was an increase in the number of companies using 2014/15 VBT although it is still not yet common (13%; 3 of 24) (Figure 34).

- Median mortality rates are comparable although slightly lower than the 2008 VBT (Figure 35 through Figure 40).

- Future mortality improvement is modeled by 60% of responding companies, a similar but slightly lower rate as compared to past surveys. Improvements vary by a variety of factors including gender, smoking status, age and policy duration (Figure 44).

Background

In 2017, the Policyholder Behavior in the Tail (PBITT) working group distributed a survey to insurers and asked for information on assumptions used in their modeling of Universal Life with Secondary Guarantees. The goal of the survey was to gain insight into companies' assumptions in the tail of a stochastic capital calculation. This survey had 25 usable responses, up from 20 in 2015 and 21 in 2014. The survey was not distributed in 2016.

The distribution of responses by company size in 2017 leaned toward very small (< $1B UL face) and medium ($15-30B face) sized companies relative to past surveys. Not every company answers every question. To inform the credibility of results, most charts indicate how many companies responded to the question.

It is the intention of the PBITT working group to continue to conduct this survey annually by distributing it each year in April. It is the group's hope that with the publication of these and future survey results, it will increase the awareness of expected industry experience for all companies to consider when setting assumptions or when extrapolating to the tail. Others may wish to consider the relative financial impact of the various assumptions shown. Individual companies may also want to use the results to help design stress tests and experience studies. The group welcomes comments or suggestions for new or revised questions in future surveys.

While the exact relationships of new versus prior respondents vary by individual question, at the level of the total survey SOA staff was able to confirm 12 respondents from 2015 repeated in 2017, out of 20 total responses in 2015. Therefore, some of the changes described below reflect different respondents, not necessarily a change by any given company. Figure 1 shows the change in the distribution by size over the last five surveys.

Parameters of Stochastic Capital Calculation

Insurers were asked in Question 2 of the survey to indicate whether or not they analyze capital levels for UL with Secondary Guarantees using stochastic scenarios, as well as how many scenarios are used and the length of the projection. Figure 2 shows that 48% of insurers used stochastic scenarios to set or analyze capital levels, continuing a generally upward trend in affirmative responses. Figure 3 looks at stochastic scenario use by company size. Of those reporting company size and stochastic scenario usage, the smaller companies typically do not use stochastic modeling to set capital levels, the medium-sized companies were more evenly split between those that do and those that do not, and the larger companies generally use stochastic modeling.

In the 2017 survey, 36% (4 of 11) of the respondents that reported using stochastic scenarios indicated that they use 1,000 or more scenarios, as shown in Figure 4. The number of companies that reported using "100 or fewer" was again very low, as it was in the prior survey, with only 9% (1 of 11) marking that selection. Figure 5 shows the distribution of number of years modeled. Although there has been a downward trend, the most common response continues to be over 75 years (38%; 8 of 21).

Figure 1

Percentage of insurers that use stochastic scenarios to set or analyze capital levels

Figure 2

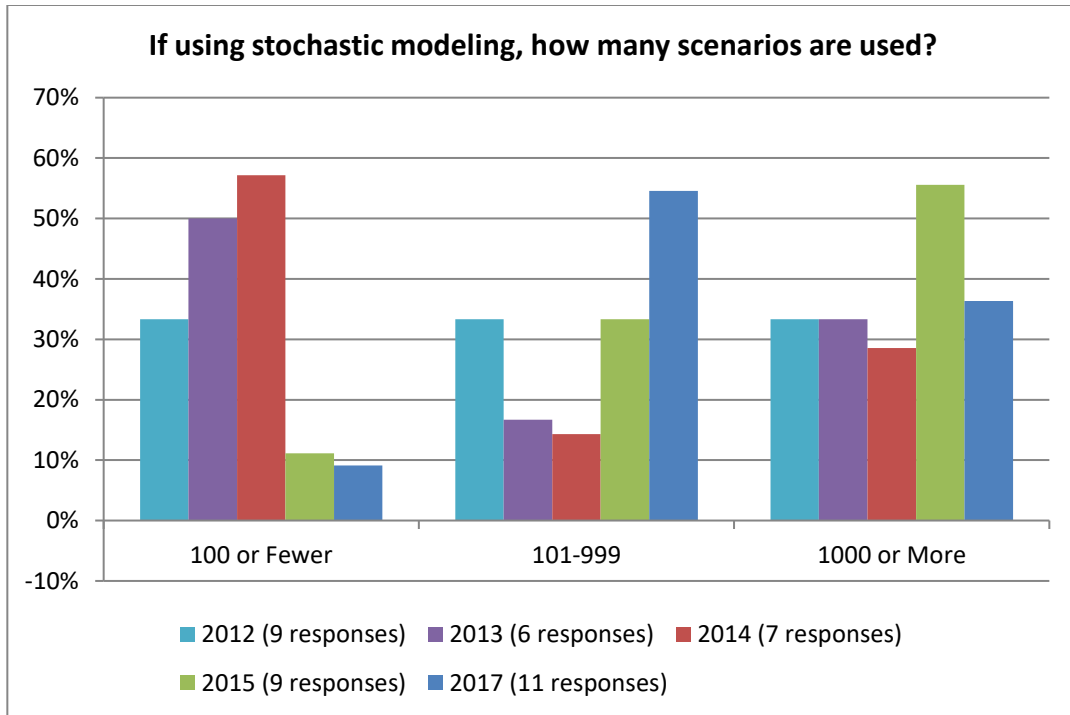**Stochastic Scenario Use by Size (23 responses)**
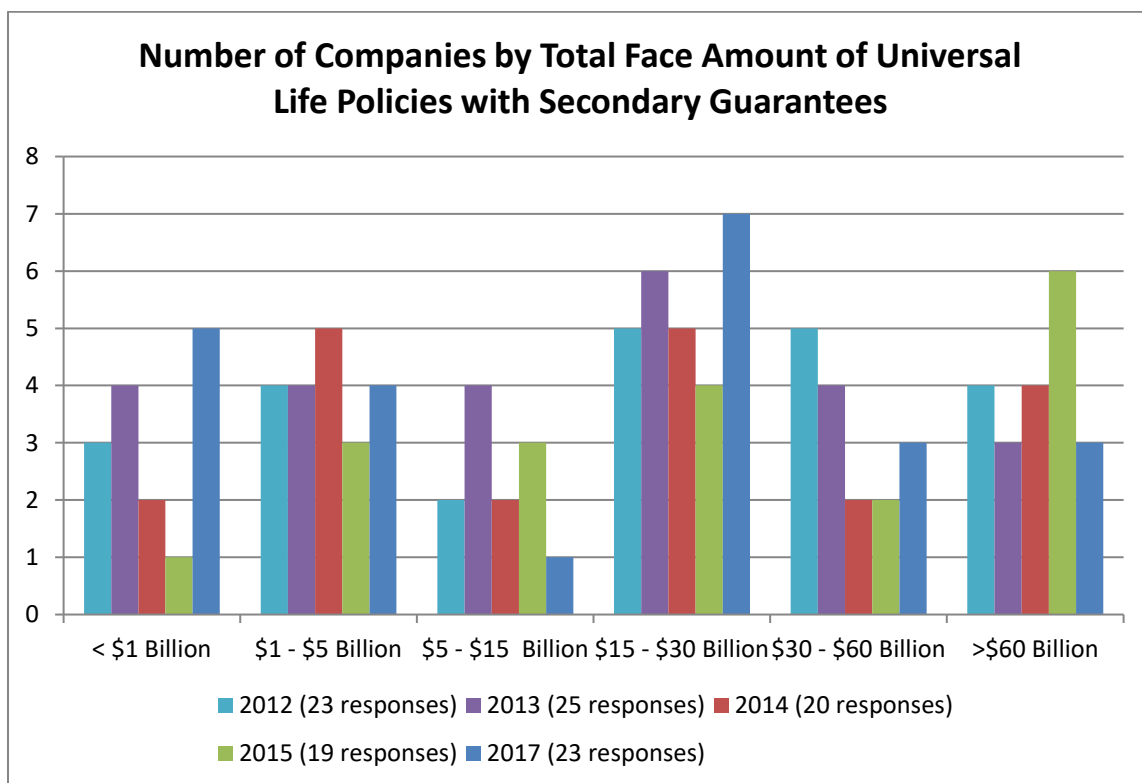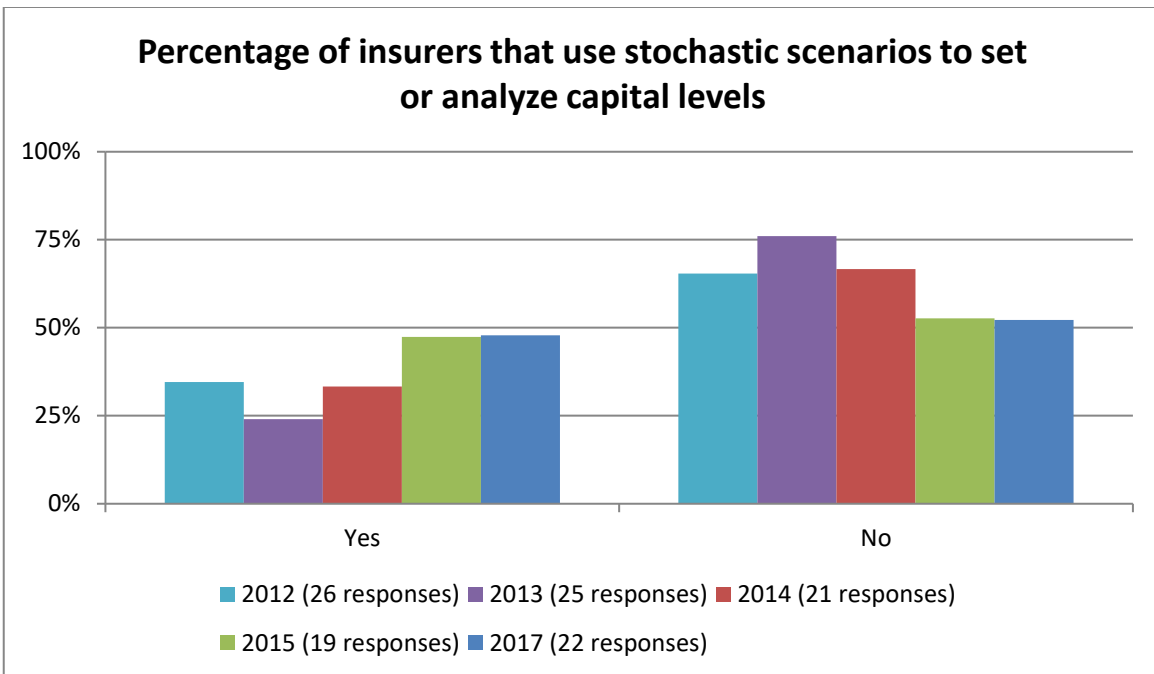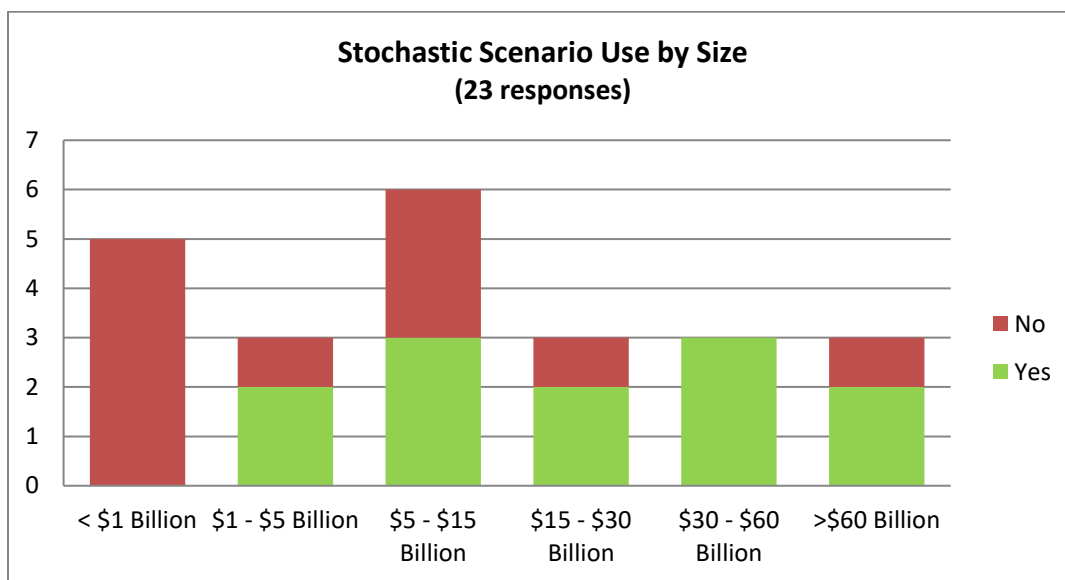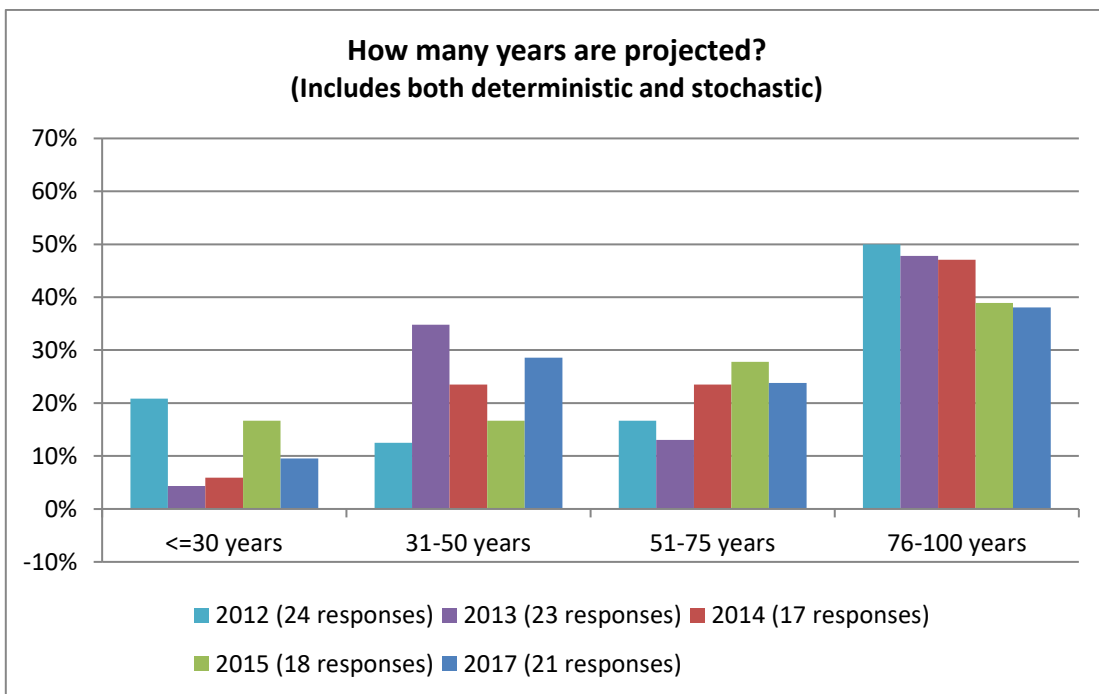
Figure 3

Figure 4

Figure 5

Tail Scenario

The tail scenario is defined as the scenario which gives the largest present value of the death benefits paid in all years where no COI is collected. (This differs from the tail scenario definition used in the committee's VA survey.) Insurers were asked to list 1 year, 7 year, and 30 year interest rates in the tail scenario (whether a stochastic scenario or a deterministic scenario depending on the respondent's methodology). Responses varied widely across insurers regarding the description of the tail scenario. The charts below show each insurer's tail scenario for the three maturities, separated between those that report using a stochastic methodology and those that report not using a stochastic methodology, which we then label "deterministic" methodology. Sometimes a company reports the use of stochastic methodology, yet provides a tail interest rate path that appears deterministic. While the reasons are not known, one possibility is that their method becomes deterministic but is informed by earlier stochastic modeling which is the basis of their chosen scenario.

Of the eleven companies that reported using stochastic modeling, ten provided requested interest rate scenarios. And of the twelve that reported not using stochastic modeling for capital analysis, four of them provided their deterministic interest rate scenarios.

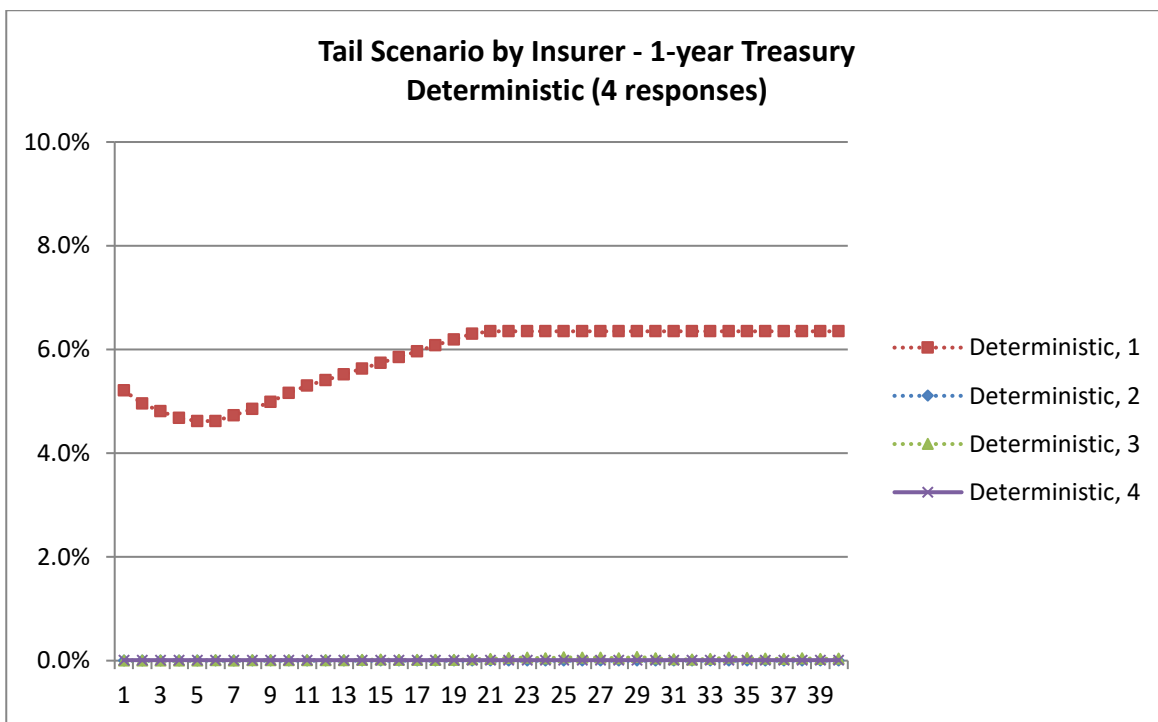The companies are comparable across the figures (i.e., Stochastic, 2 in Figure 6 is the same company as Stochastic, 2 in Figure 8 and Figure 10.)
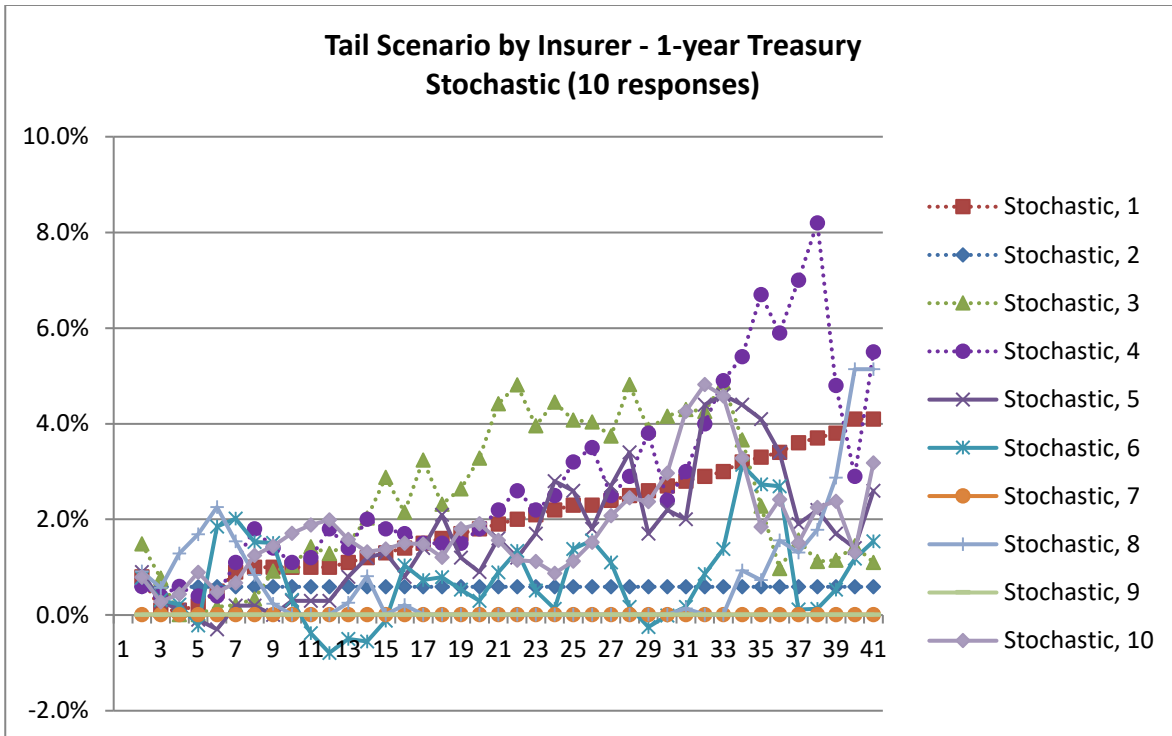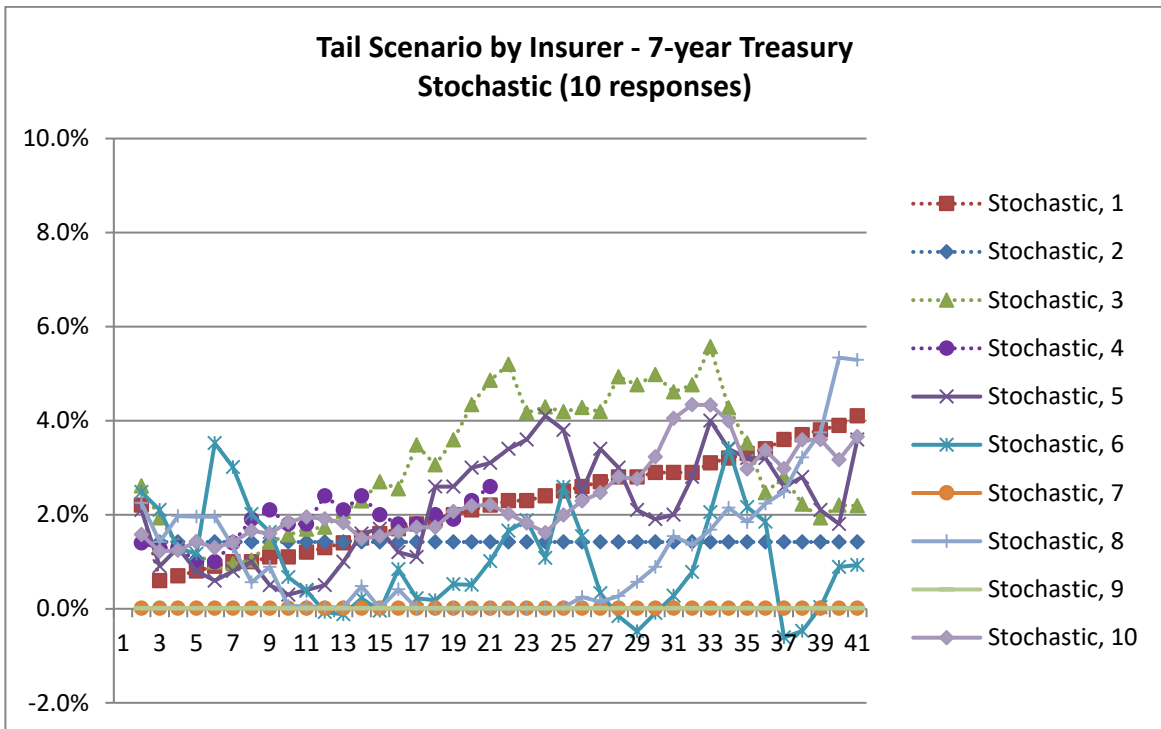
Figure 6
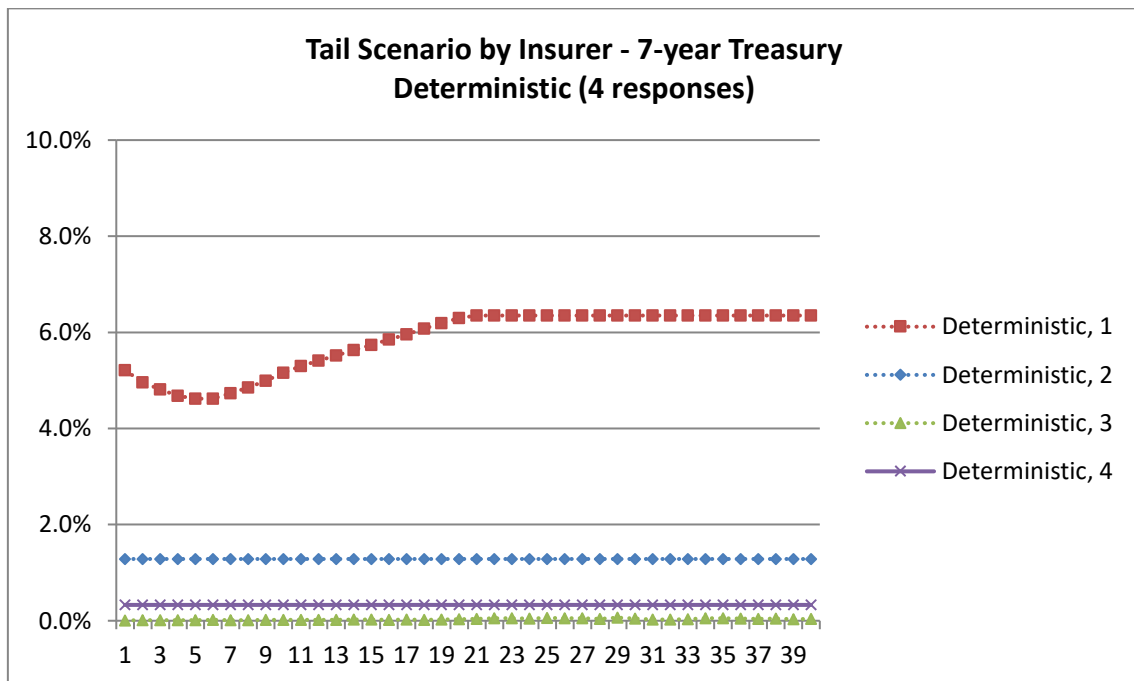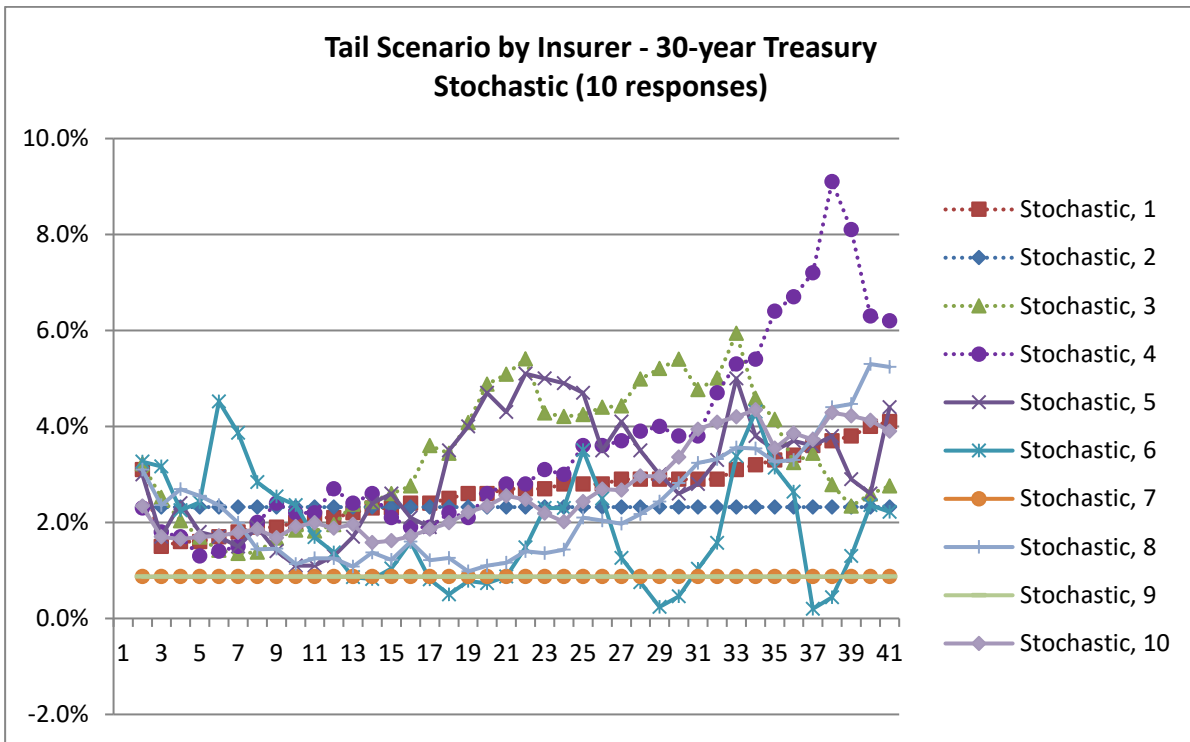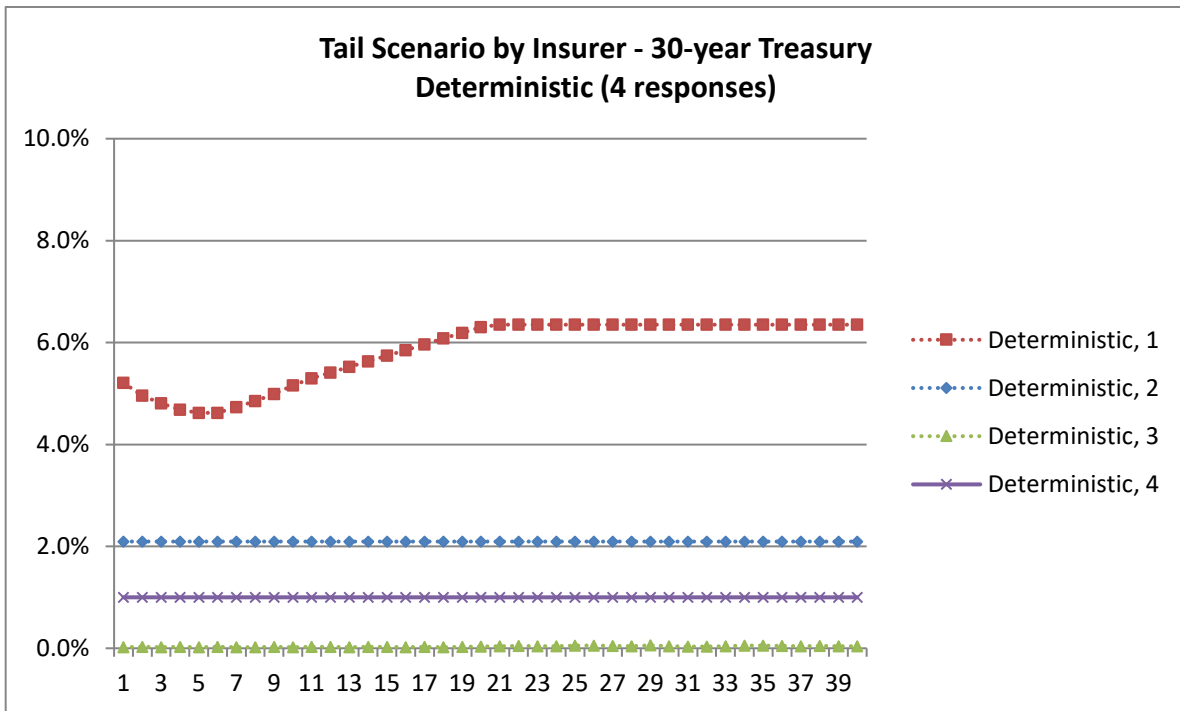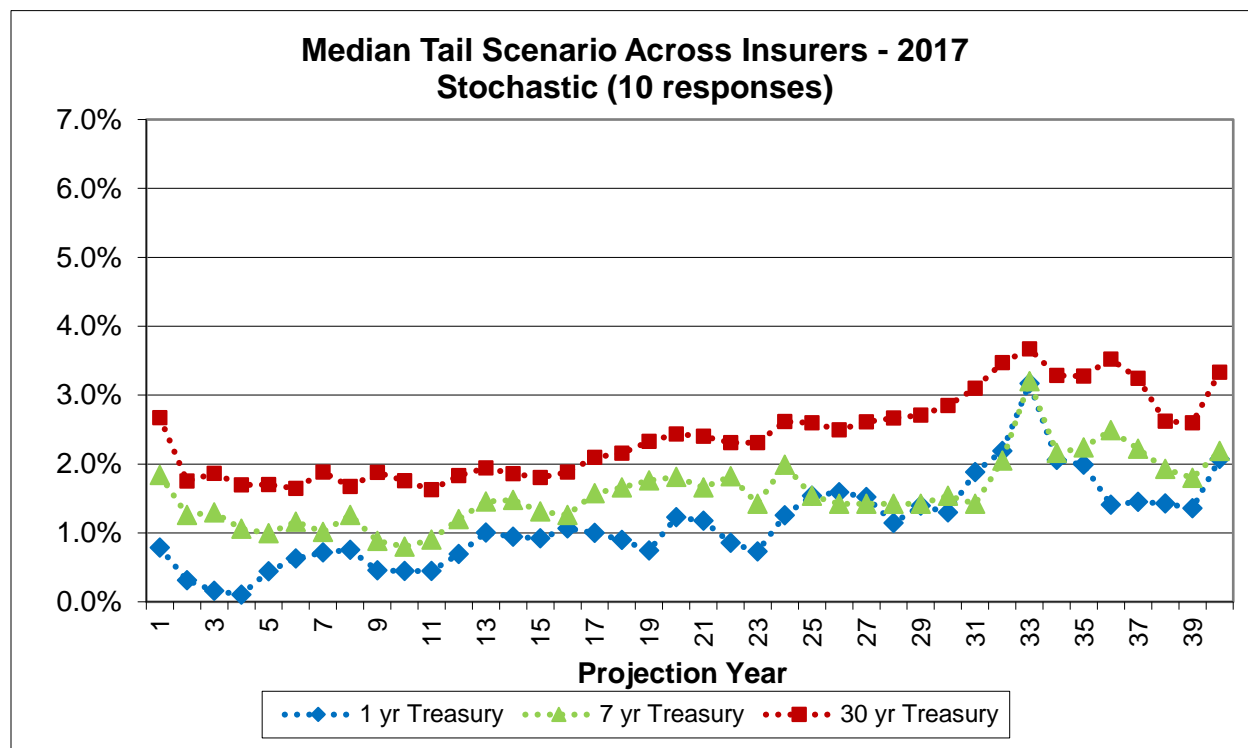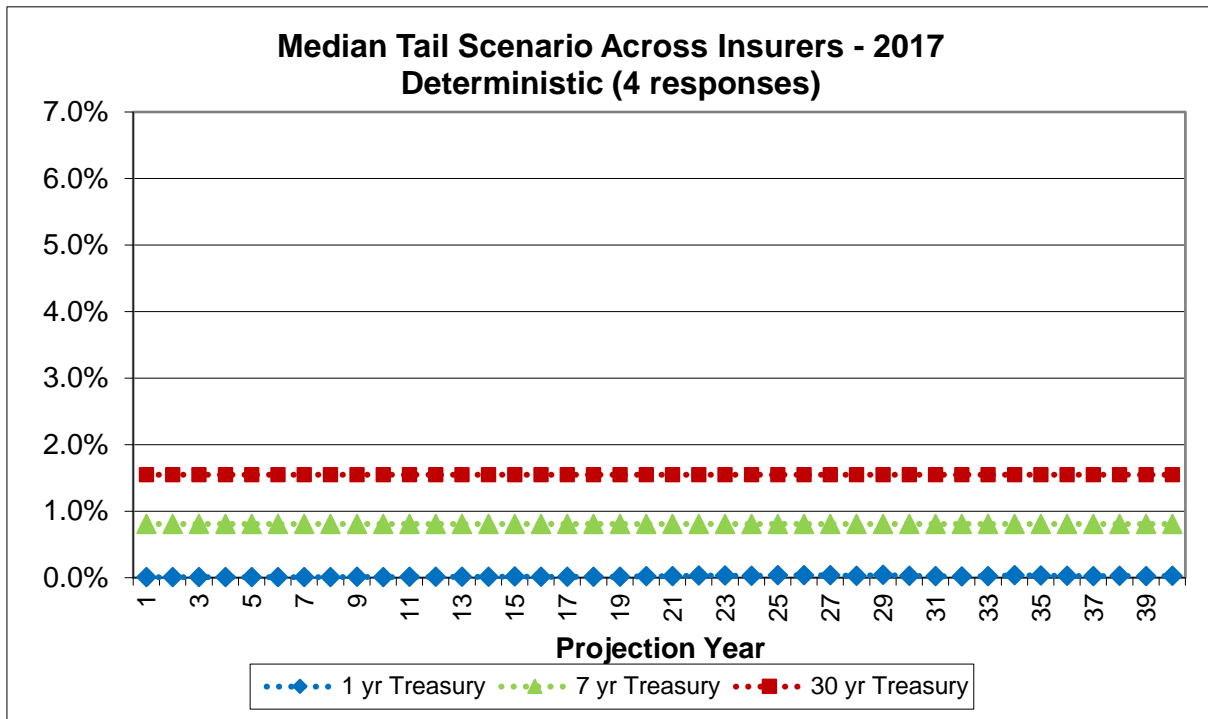

Figure 7
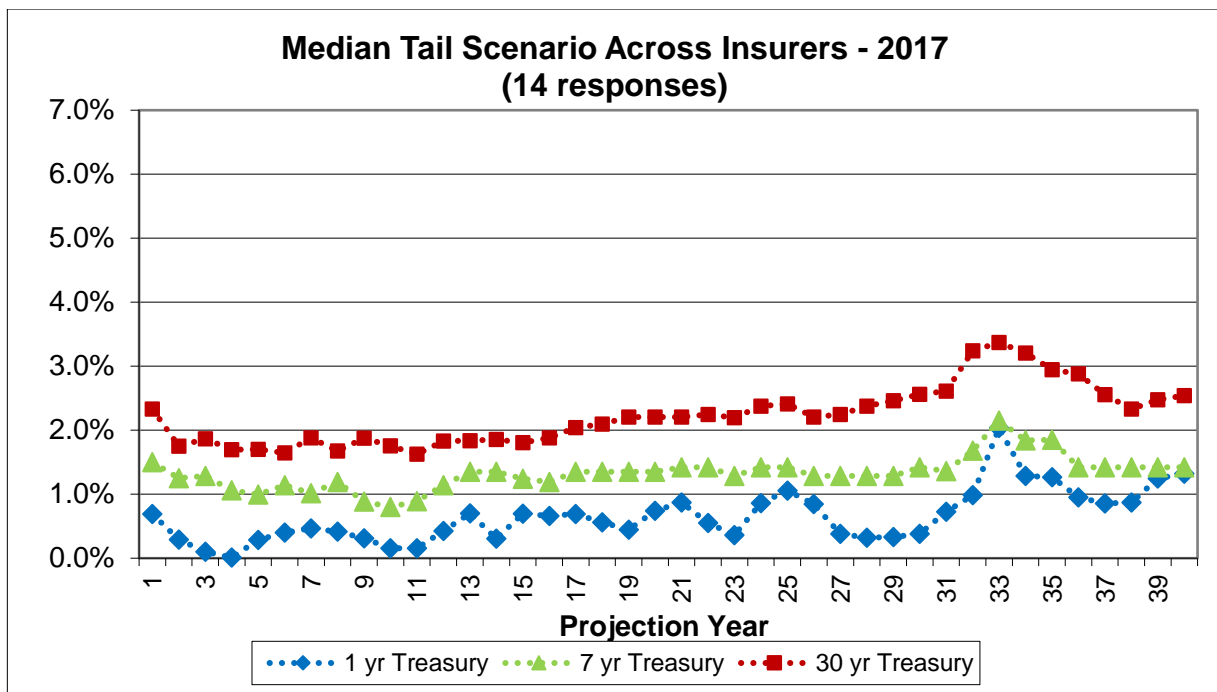
Figure 8

Figure 9

Figure 10

Figure 11

The following graphs of tail scenarios show the median reported value across insurers for each of three maturities (1, 7 and 30 Year Treasuries). The first pair of graphs separate stochastic from deterministic for 2017, followed by their combination. Thereafter, combinations only are shown from recent survey results. Overall, there is a trend toward lower median tail scenarios, although that trend seems to have stabilized.

These lines do not represent any one single company's response, but rather the median of the rates across all companies' responses calculated independently at each projection year duration.
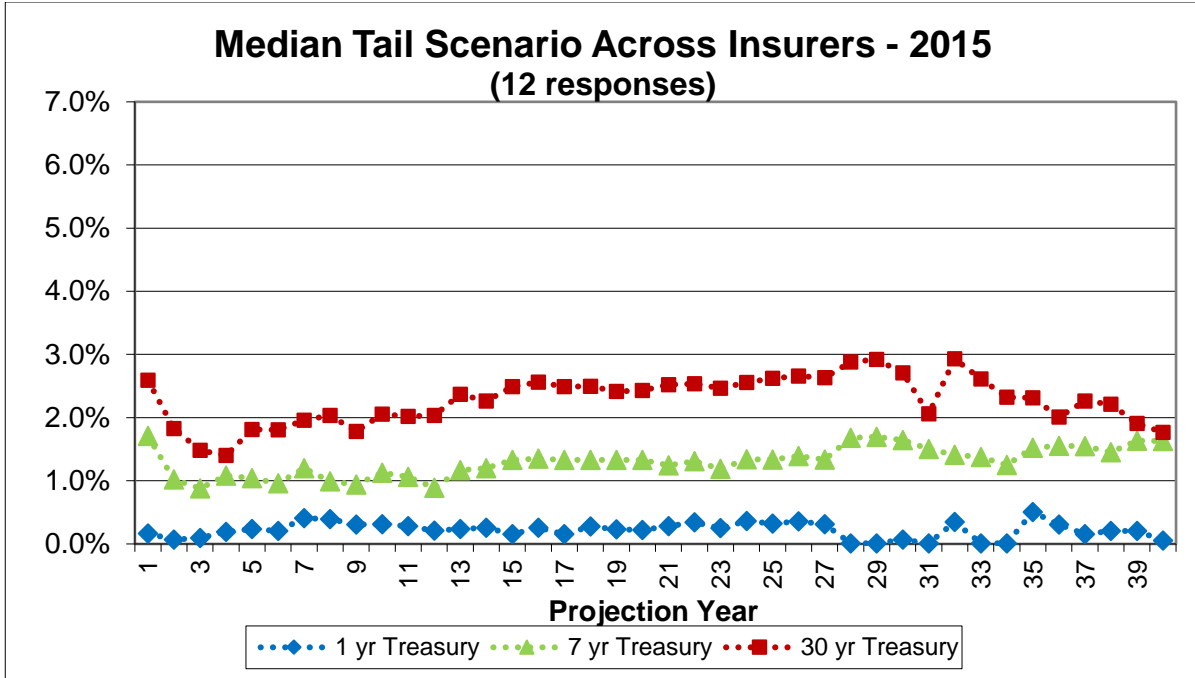
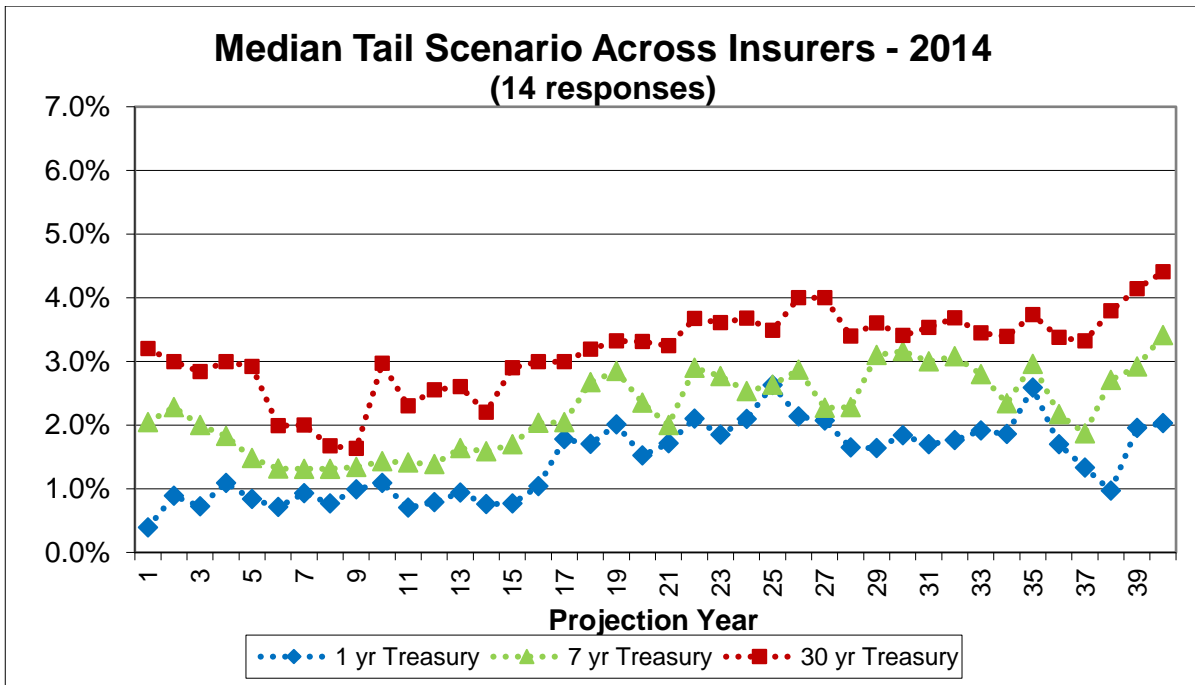

Figure 12

Figure 13

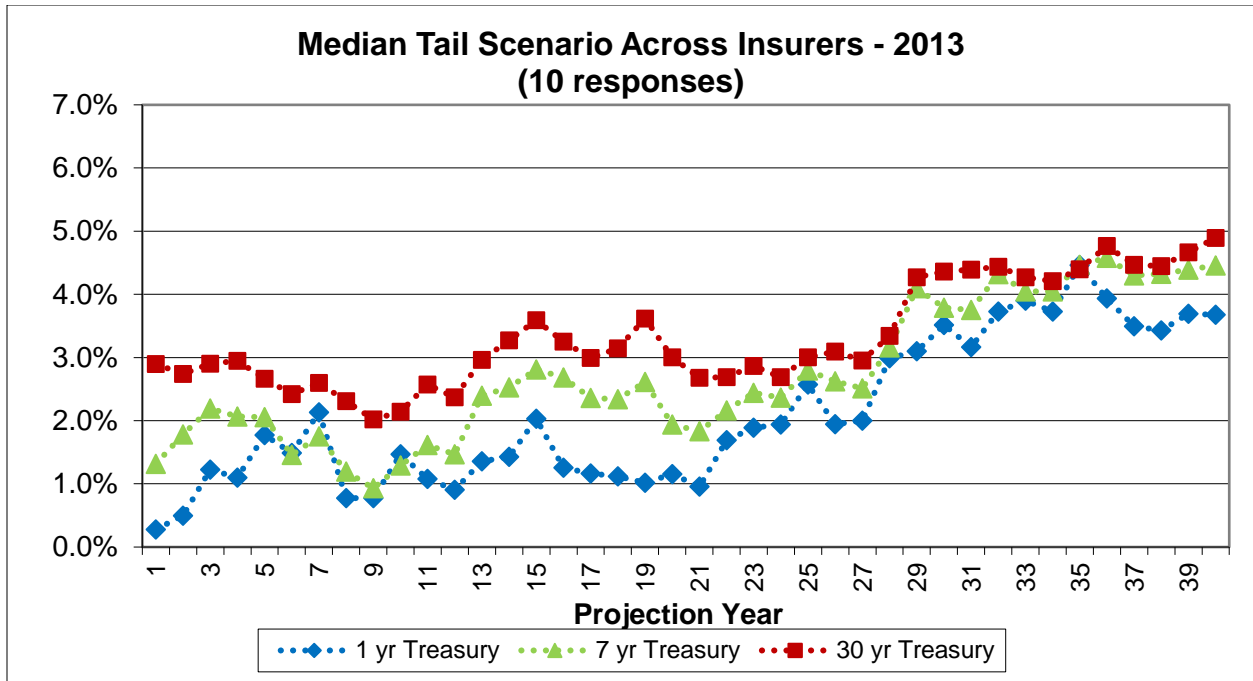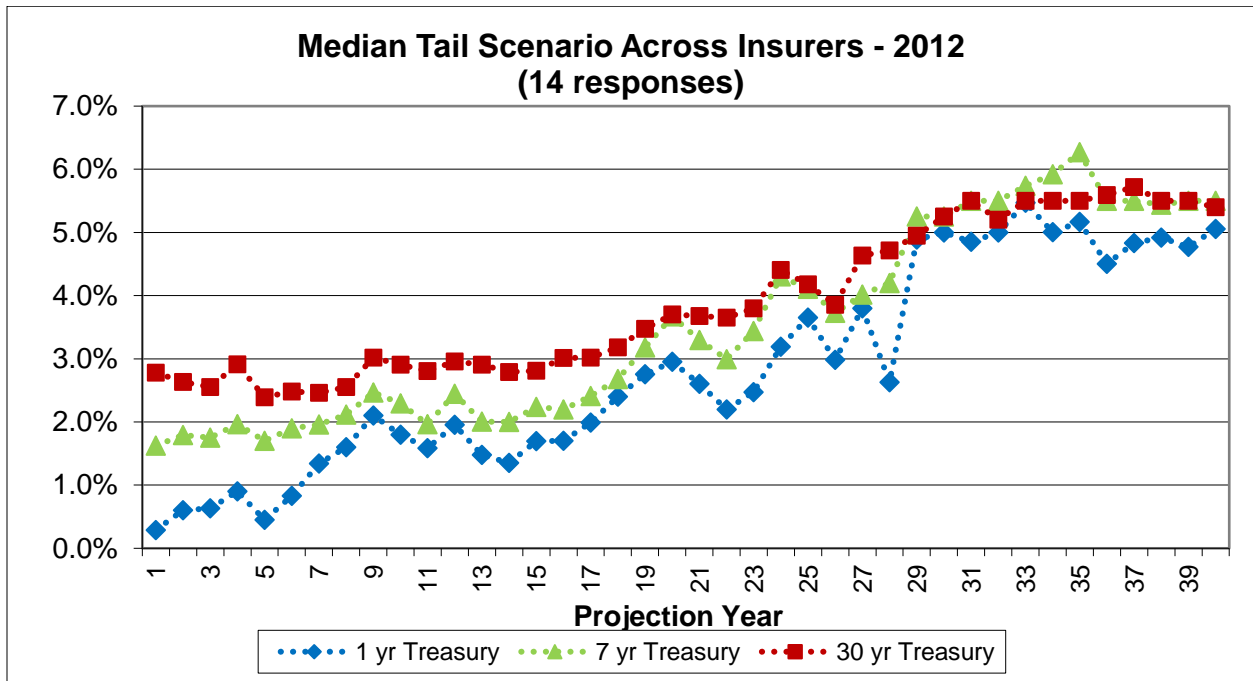Figure 14

Figure 15

Figure 16

Figure 17

Figure 18

Lapse Assumptions

Question 3 asked about lapse assumptions. The following chart shows the percentage of insurers who use dynamic lapse functions for policies with secondary guarantees. The number of insurers using dynamic lapse functions was higher this year (63% of responses; 15 of 24) relative to the prior four surveys.

Do you use dynamic lapses when modeling Universal Life with secondary guarantees?
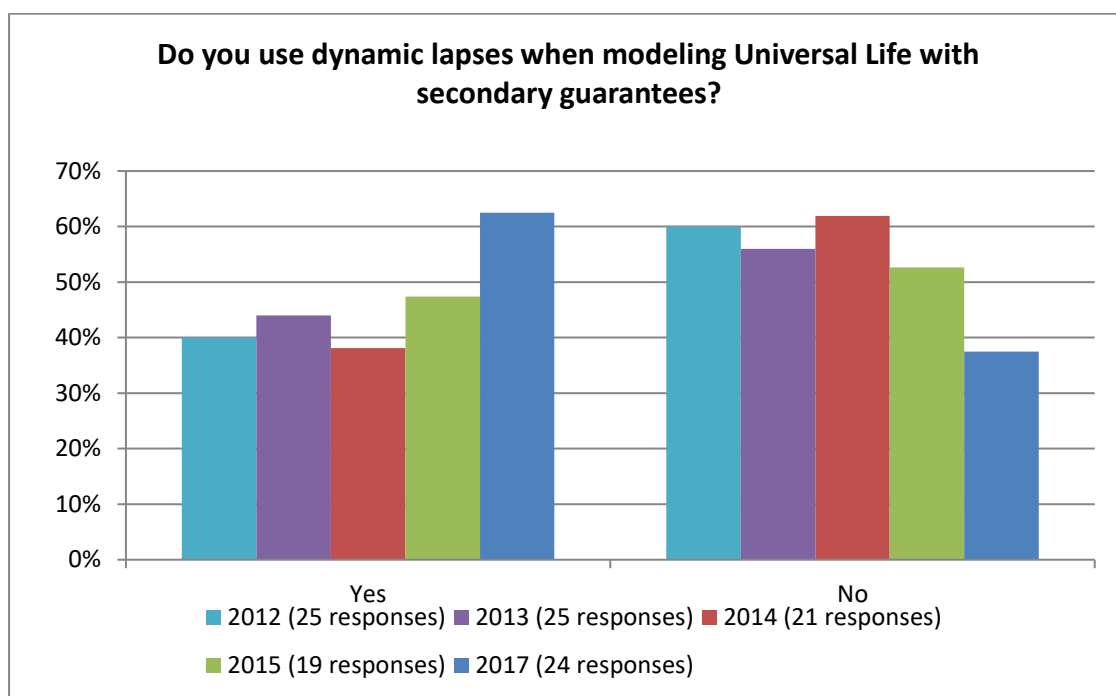

Figure 19

A follow-up question in the last 3 surveys asked those companies that had dynamic lapses whether lapses could be greater than zero if a secondary guarantee renders a policy to be paid-up. In 2017, six of fifteen responders (40%) indicated that it could, which is similar although slightly lower than in 2015 (56%; 5 of 9) and 2014 (43%; 3 of 7). Additional commentary indicated that this was generally only possible if the secondary guarantee was in effect and the policy still had a cash surrender value greater than zero.

In Question 4, insurers were asked to list their lapse assumption in the tail scenario by duration and by various issue ages. The charts below show the highest, median, and lowest lapse rates used across duration. The graphs show the responses for issue ages 40-49 and 70-79. The 2017 median responses are in line with those from the past two years. The responses for other issue ages were very similar to those for age 40-49.
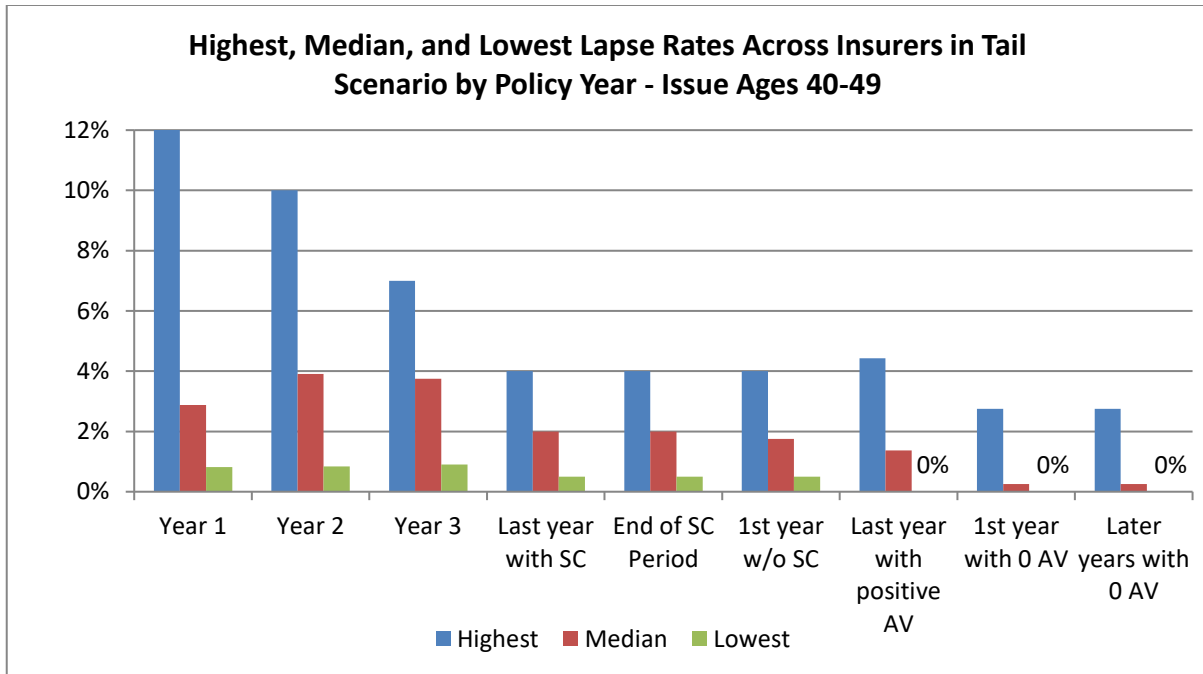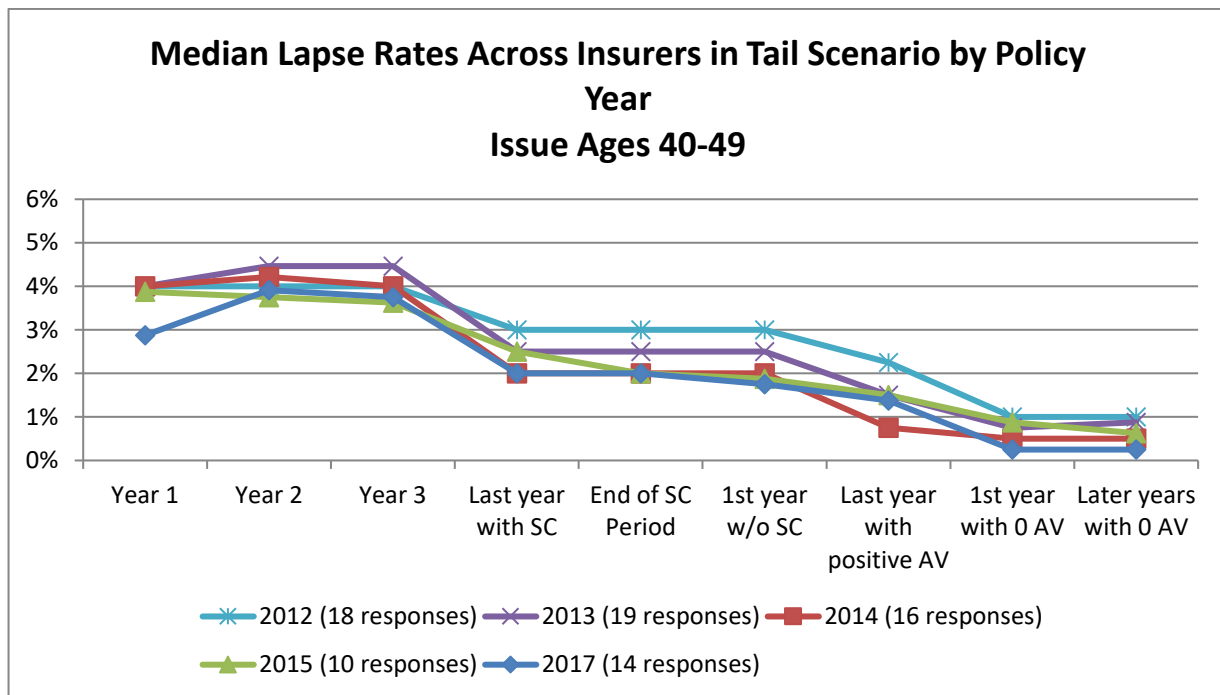
Highest, Median, and Lowest Lapse Rates Across Insurers in Tail Scenario by Policy Year - Issue Ages 40-49

Figure 20

**Median Lapse Rates Across Insurers in Tail Scenario by Policy Year
Issue Ages 40-49**

Figure 21

Highest, Median, and Lowest Lapse Rates Across Insurers in Tail Scenario by Policy Year - Issue Ages 70-79

Figure 22

Median Lapse Rates Across Insurers in Tail Scenario by Policy Year Issue Ages 70-79
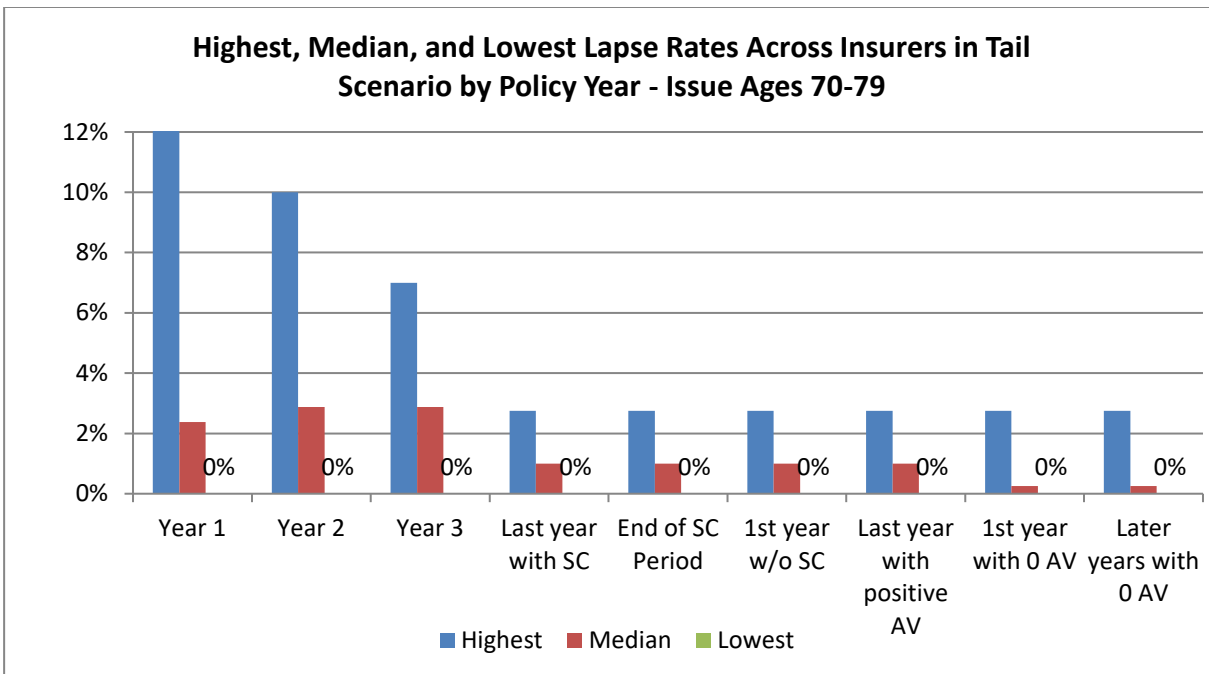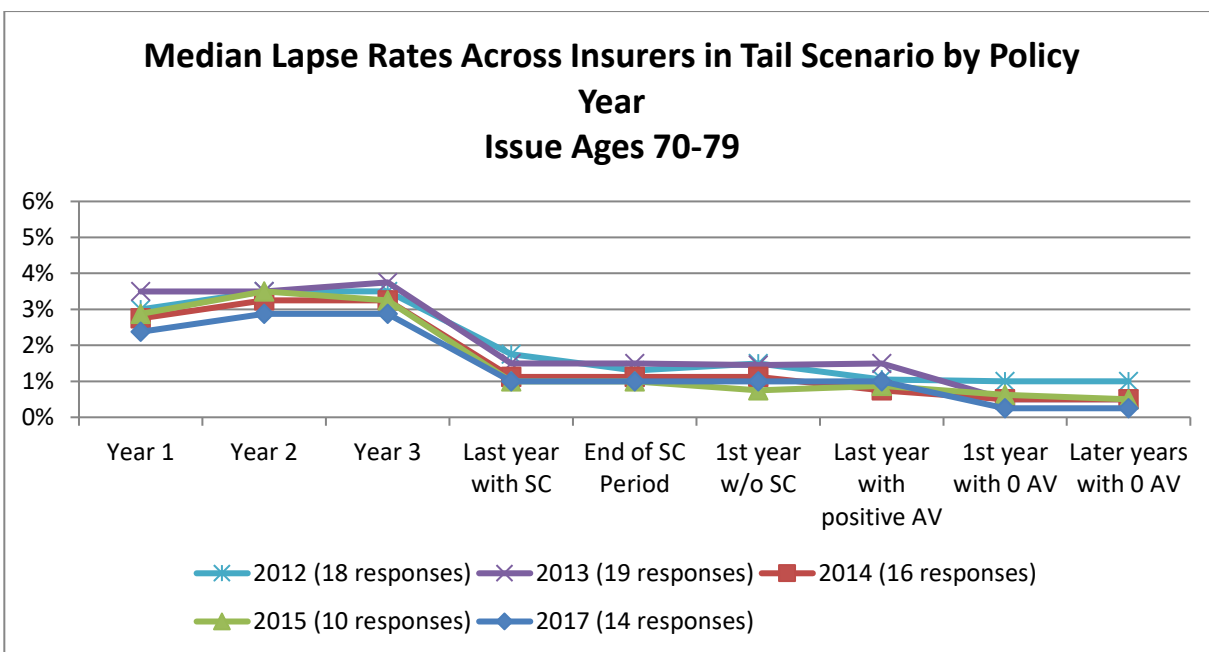

Figure 23

Next, in Question 5, the companies were asked, out of 10,000 newly issued policies that would experience the tail scenario, how many would first have a zero cash surrender value but be kept in force by the secondary guarantee at a given duration for issue ages 50-59. The results were then converted to a cumulative basis in Figure 24.

Cumulative percentage of policies kept inforce by No-Lapse Guarantee, by duration
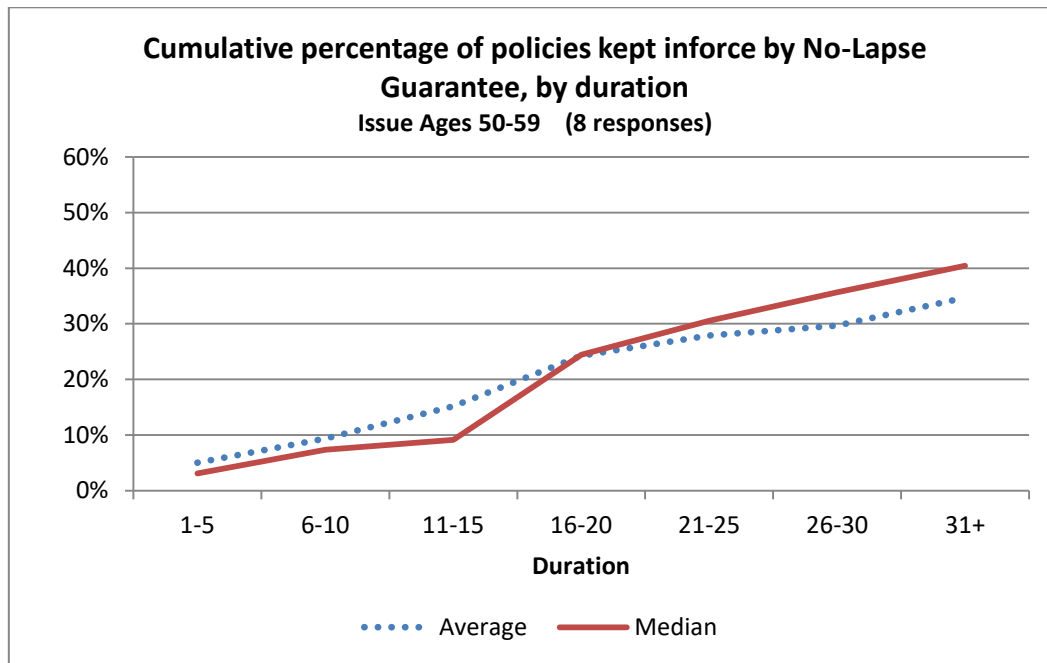Issue Ages 50-59   (8 responses)

Figure 24

Comparing the median result over time, the 2017 survey showed more policies being kept in force by the secondary guarantee in the early durations relative to prior surveys. This is shown in Figure 25.
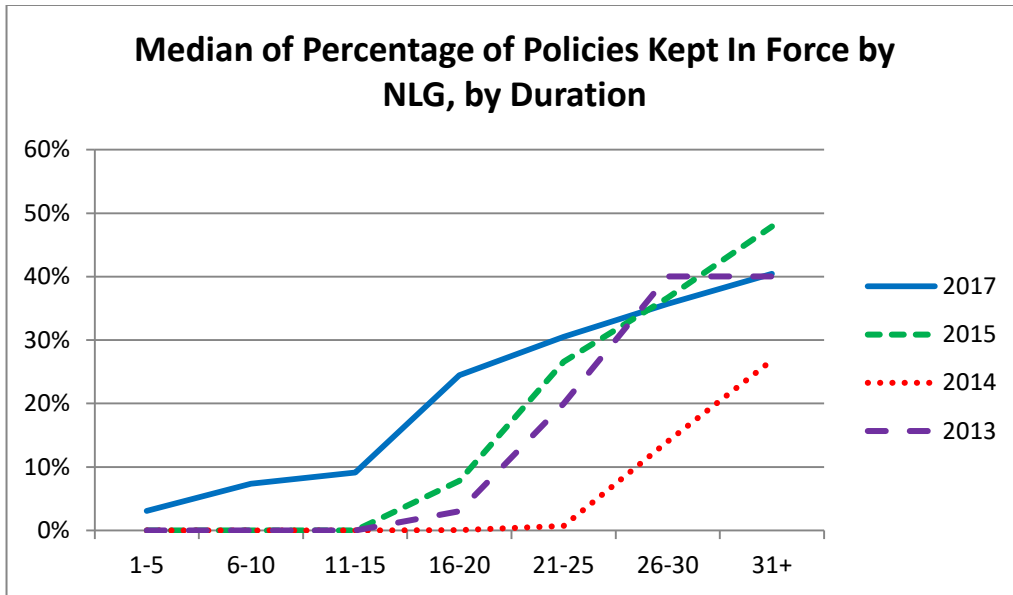
Figure 25

Lapses by Distribution System

In Question 6, the survey asked insurers whether their lapse assumptions vary by distribution. Out of 25 respondents, 12 (48%) indicated that they sell through multiple distributions. This is lower than in past years.

Figure 26 indicates the distribution systems used by these respondents, with a heavier proportion using wirehouse and direct distribution relative to prior years.
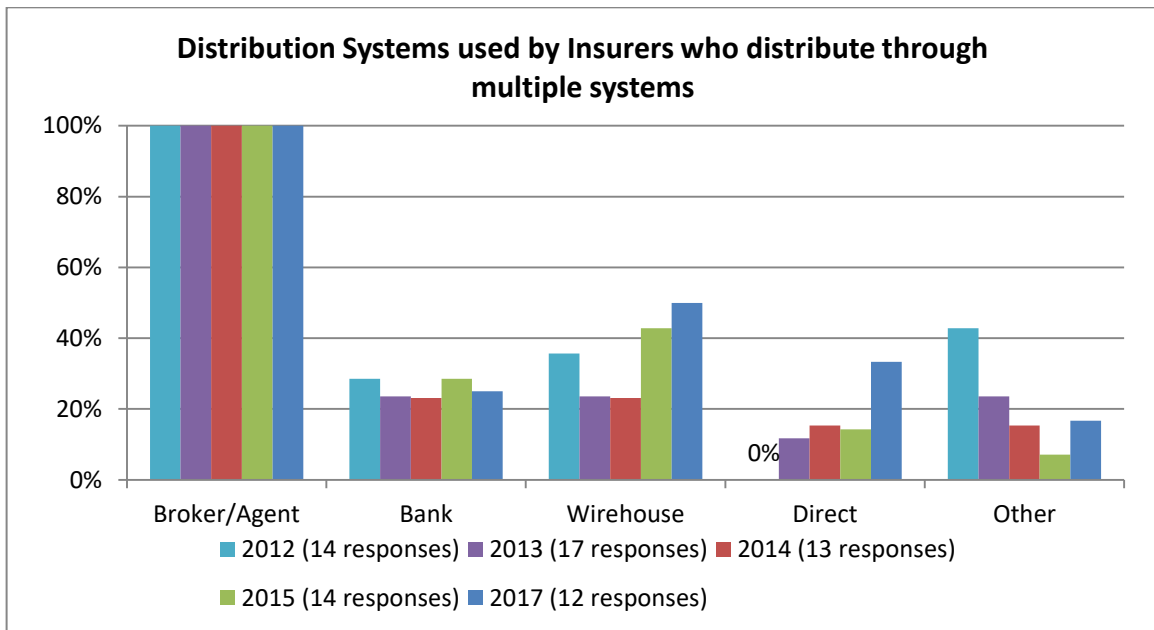
Distribution Systems used by Insurers who distribute through multiple systems

■ 2012 (14 responses) ■ 2013 (17 responses) ■ 2014 (13 responses)
■ 2015 (14 responses) ■ 2017 (12 responses)

Figure 26

An additional question asked insurers whether they measure lapses by distribution system. Of the 12 insurers who responded, three (25%; 3 of 12) measure lapses by distribution system as seen in Figure 27.
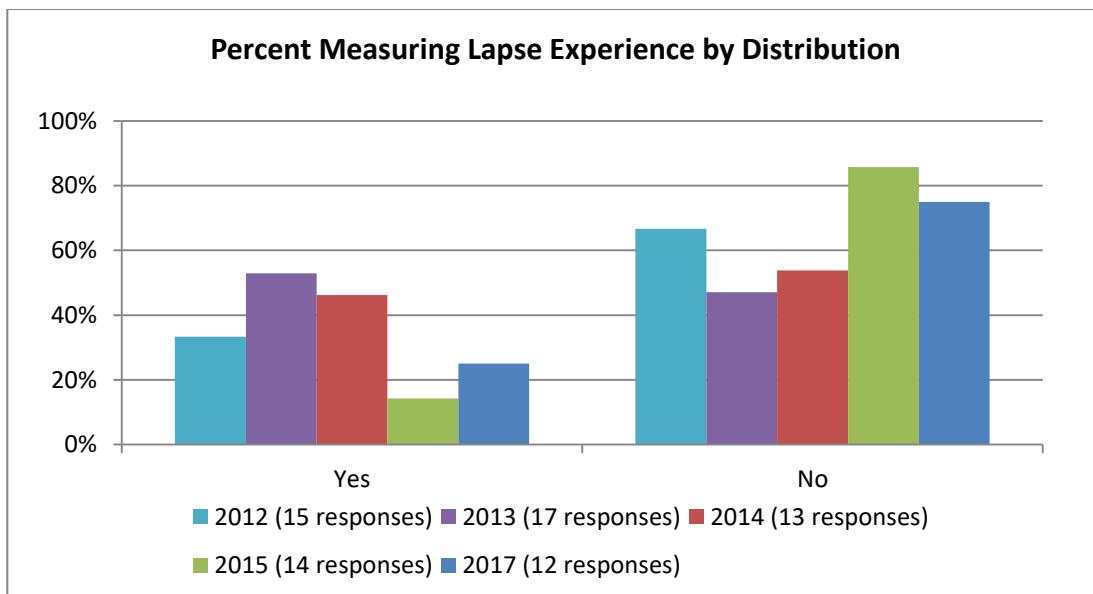
Percent Measuring Lapse Experience by Distribution

Figure 27

Of those three, two do not vary lapse assumptions by distribution system and the third indicated that lapse assumptions vary by captive versus independent agents. Additionally, one insurer reported varying its lapse assumption by distribution system although it does not measure lapse by distribution system.

Lapses by Premium Assumption

Question 7 asked about lapses relative to premium assumptions. A little over half of the respondents (13 of 25; 52%) indicated that lapse rates vary by premium assumption, which is similar to past surveys (Figure 28). Where the lapse rates do vary by premium assumptions, they are typically bucketed by single pay, level pay, 10-pay, and paid up or else by the level of funding (high/medium/low) relative to, for example, planned premium.
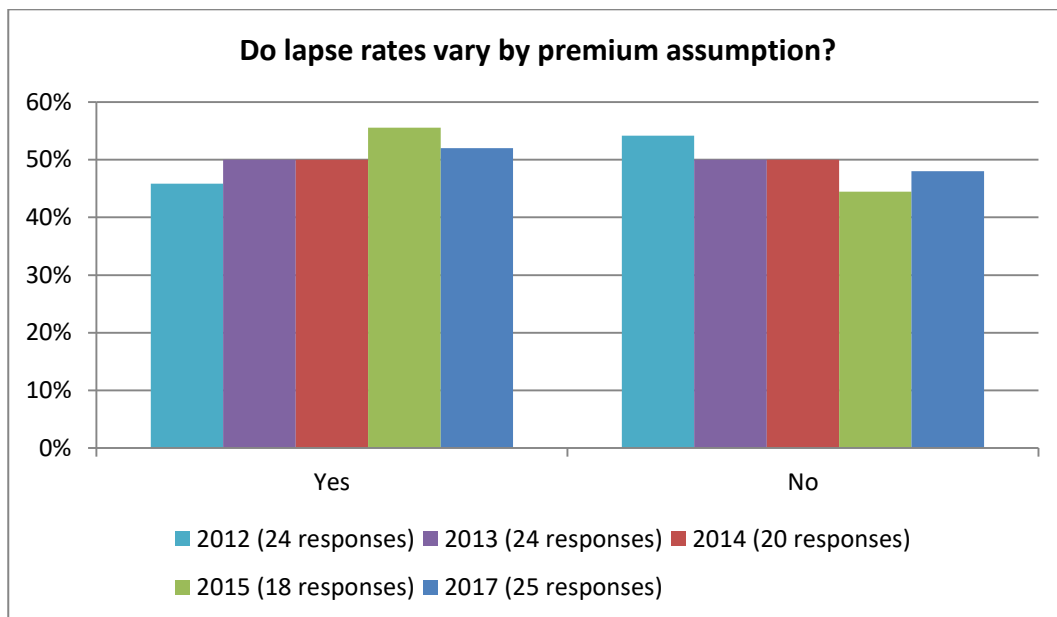

Figure 28

Sources of Base Lapse Assumption

In question 8, insurers were asked about the source of their base lapse assumptions. Respondents could include more than one source. Responses were similar to past surveys although fewer selected "Company experience" than in past years. Nevertheless, "Company experience" (88%) and "Actuarial best estimate" (72%) remained the most commonly cited sources (Figure 29).
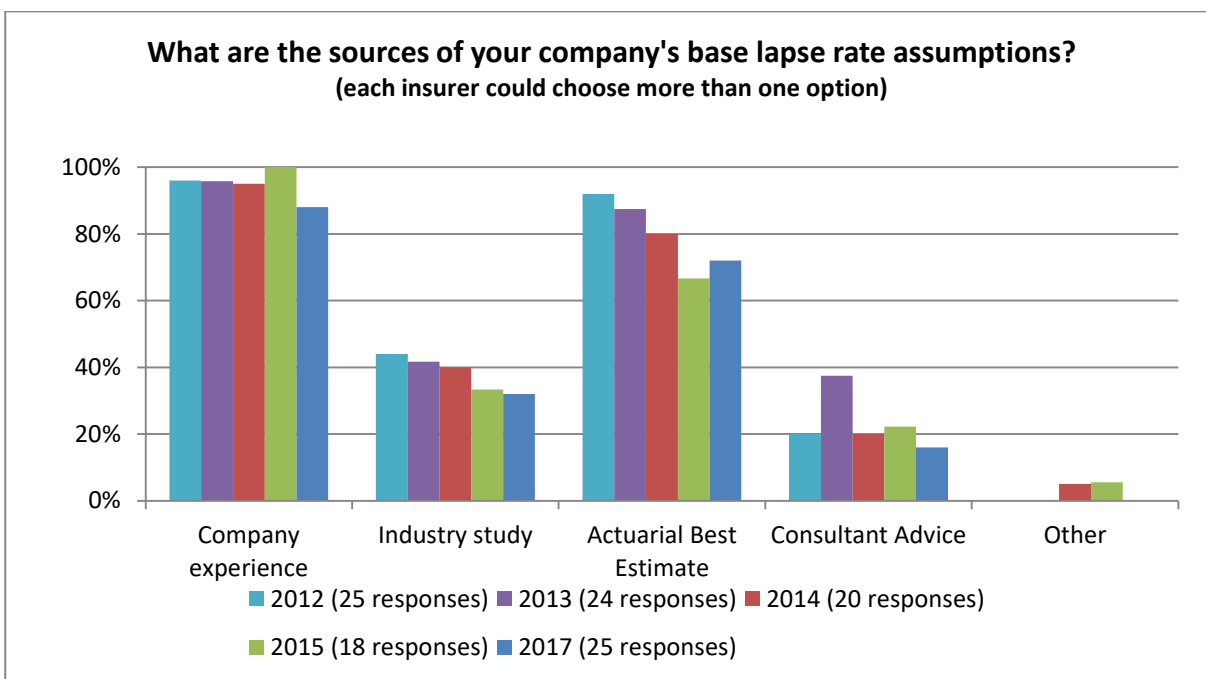
What are the sources of your company's base lapse rate assumptions?
(each insurer could choose more than one option)

Figure 29

The survey then asked if companies perform lapse studies for UL policies with secondary guarantees, and if so, how frequently. As in past surveys, a strong majority of companies (88%, 22 of 25 in 2017) perform such lapse studies. Of those 22 companies that perform lapse studies of UL polices with secondary guarantees, "Annually" remained the dominant frequency for doing so (Figure 30).
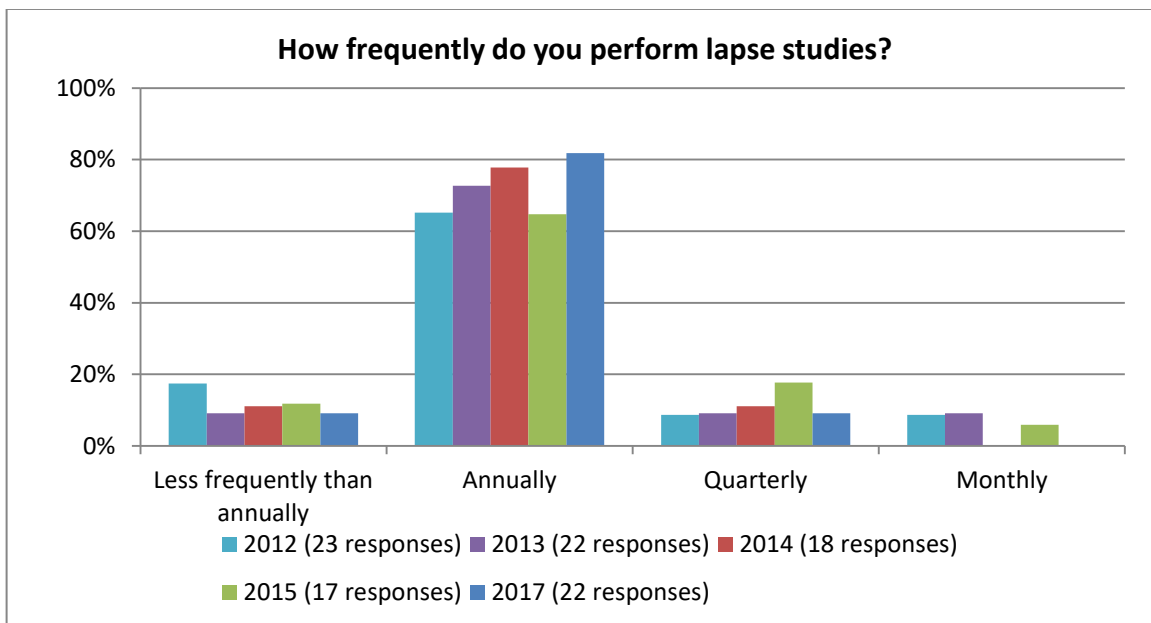

Figure 30

Companies were asked how many years of experience data were used in their latest lapse study. Over half of the respondents indicated "5-7 years" (55%; 12 of 22). Longer time periods were also cited, with very few companies (5%; 1 of 22) using less than 5 years.
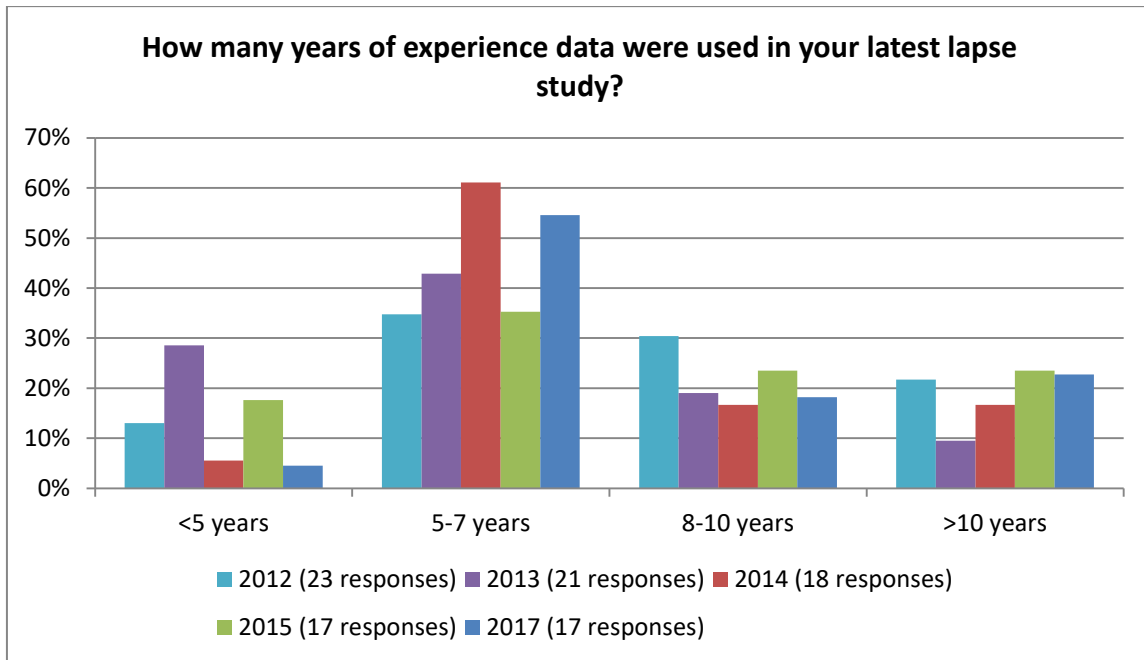

Figure 31

Companies were asked about their dynamic lapse assumptions specifically. Of the 25 respondents, 15 (60%) vary their assumptions dynamically (Figure 32). Of those fifteen companies that vary assumptions dynamically, "Actuarial Best Estimate" continues to be the most commonly cited source although less so than in prior surveys. Fewer companies also reported using industry studies and consultant advice while more reported using company experience as compared to prior surveys (Figure 33).
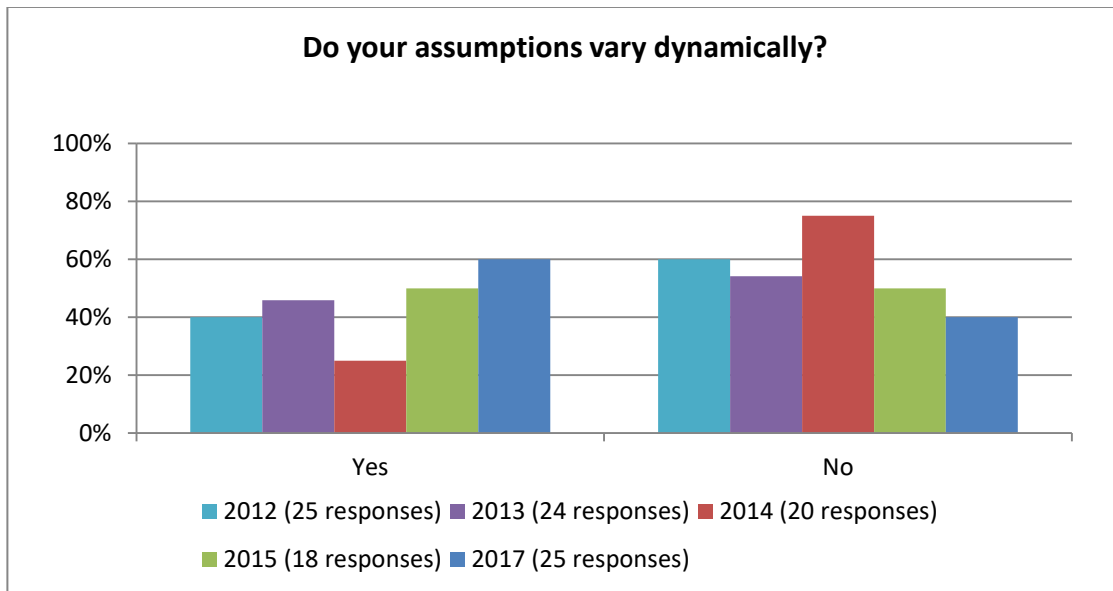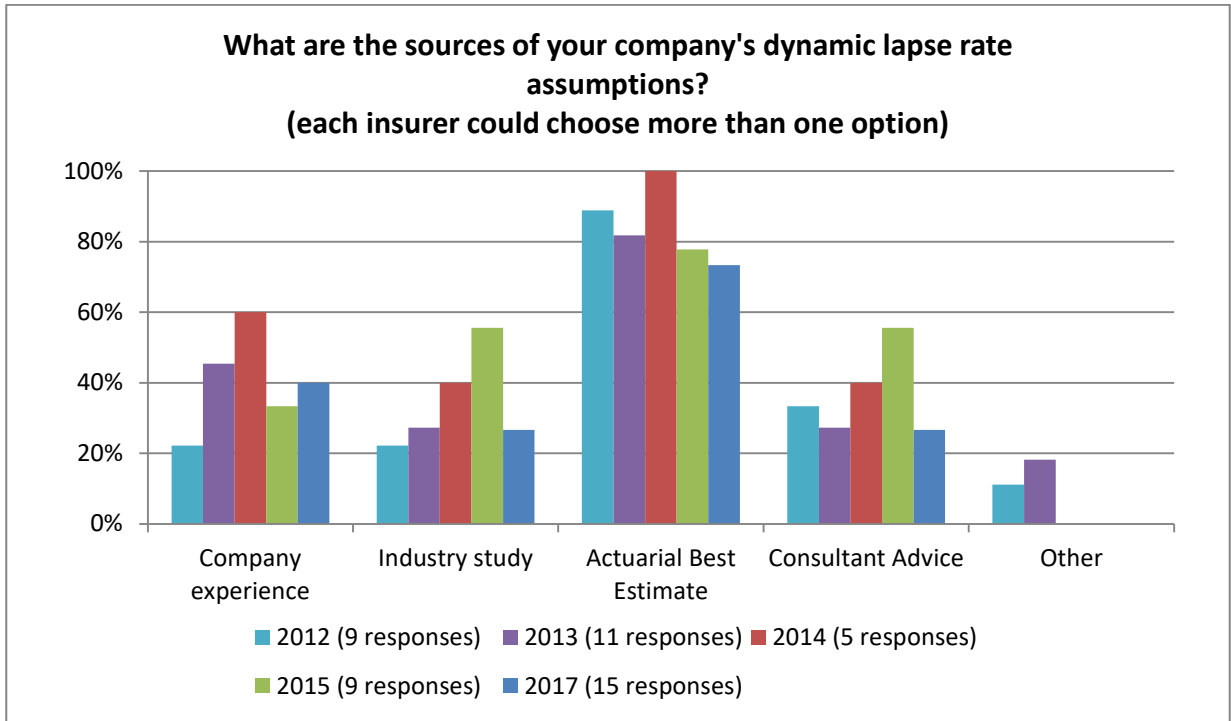

Figure 32

What are the sources of your company's dynamic lapse rate assumptions?
(each insurer could choose more than one option)

Legend: 2012 (9 responses), 2013 (11 responses), 2014 (5 responses), 2015 (9 responses), 2017 (15 responses)

Figure 33

Mortality Assumptions

Companies were asked about their mortality assumptions in the tail in Question 9. Half of the companies use 2008 VBT, which is lower than in the prior survey. Use of the 2001 VBT table increased relative to the prior survey. This could be due to a different set of responding companies. Three of the twenty-four companies reported using either the 2014 or 2015 VBT tables which is an increase from the past but indicates that their use is still not widespread (Figure 34). Those marking "Other" indicated that they derived mortality from company experience or tables from reinsurer experience.
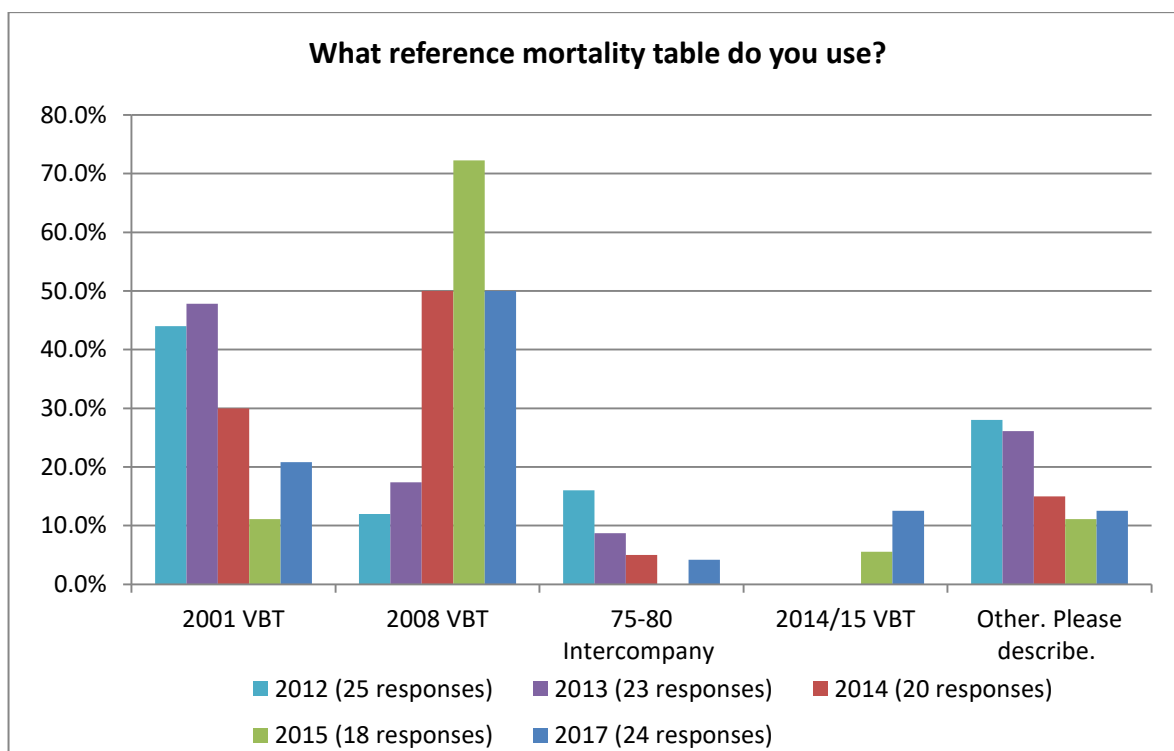

Figure 34

Sixteen companies provided ultimate mortality rates per 1,000 assumed at higher attained ages for various underwriting classes for males and females. The minimum, maximum and median of those responses are summarized below, alongside the 2001 VBT and 2008 VBT rates (ultimate, gender and tobacco distinct, age nearest birthday) for comparison (Figure 35 through Figure 40). The median mortality rates tend to be similar to the 2008 VBT. Note that the minimum, maximum, and median responses do not necessarily represent the response of any given company, but are determined independently for each age. In addition, some companies did not provide mortality rates for the older ages.
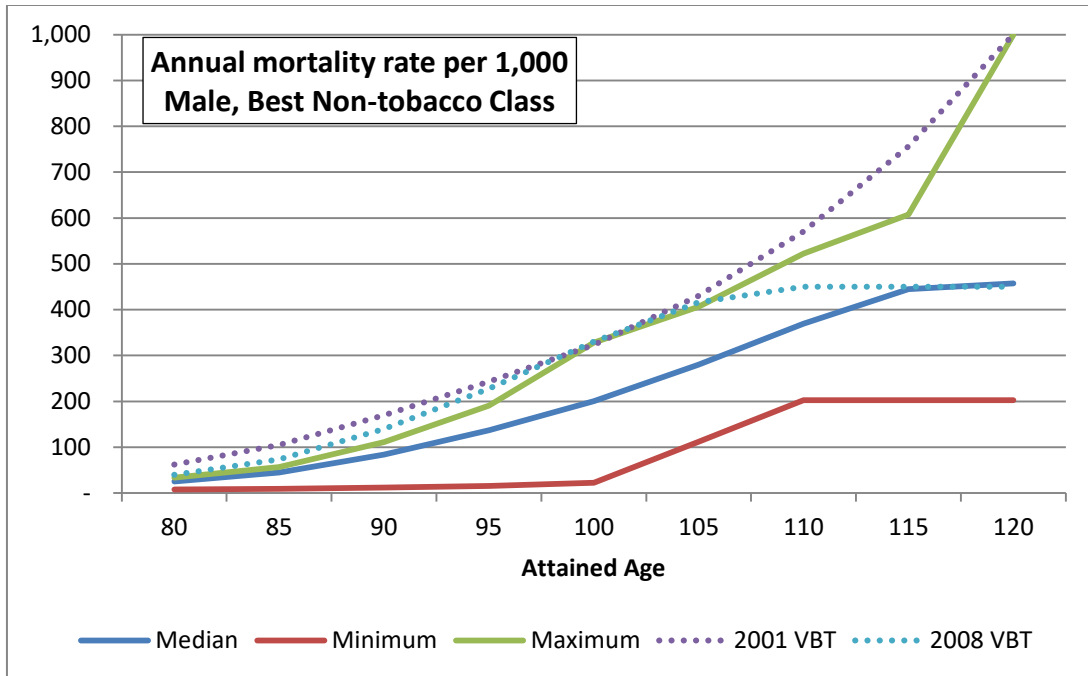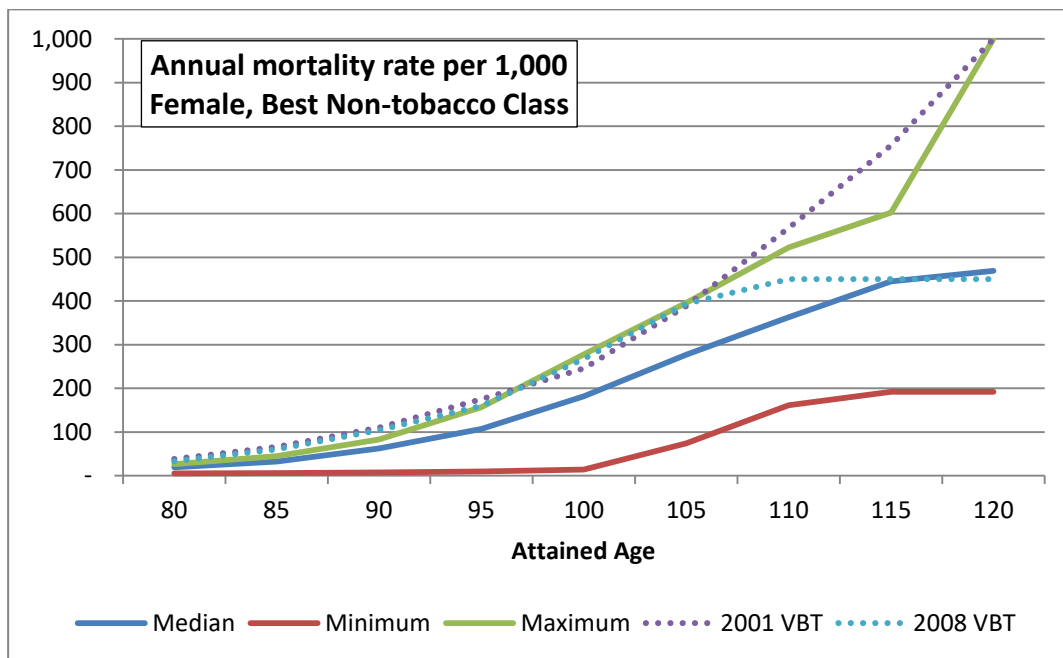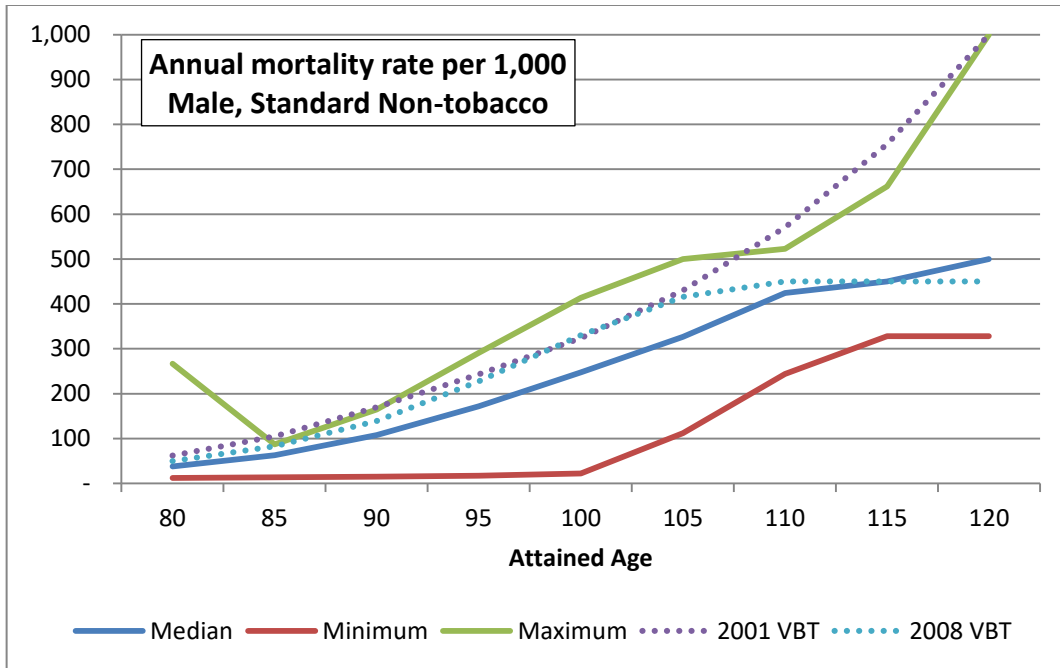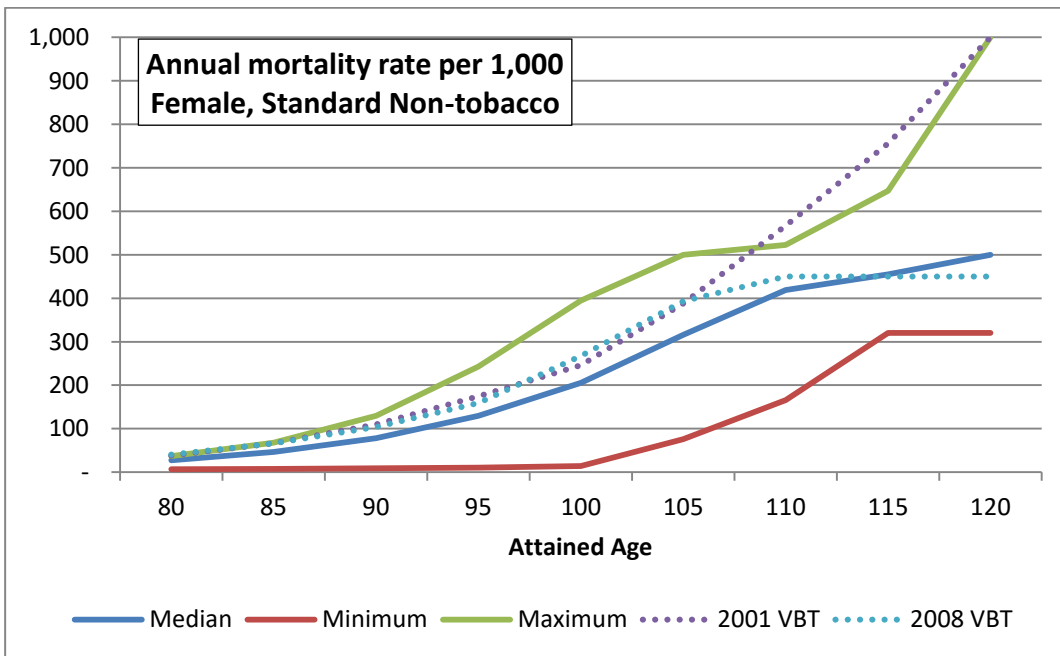
Figure 35

Figure 36
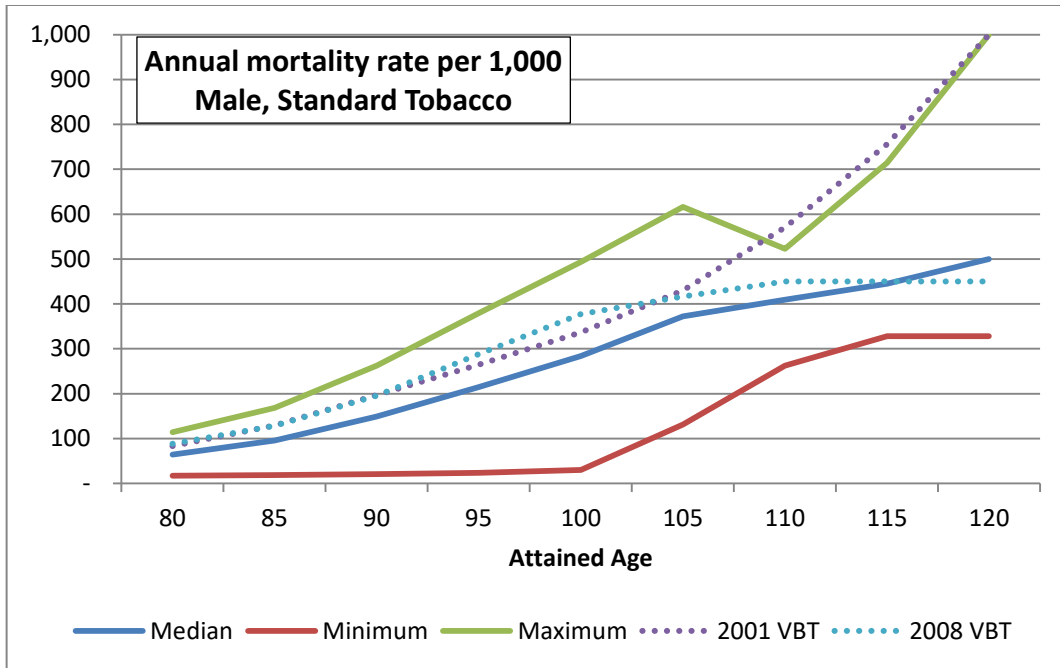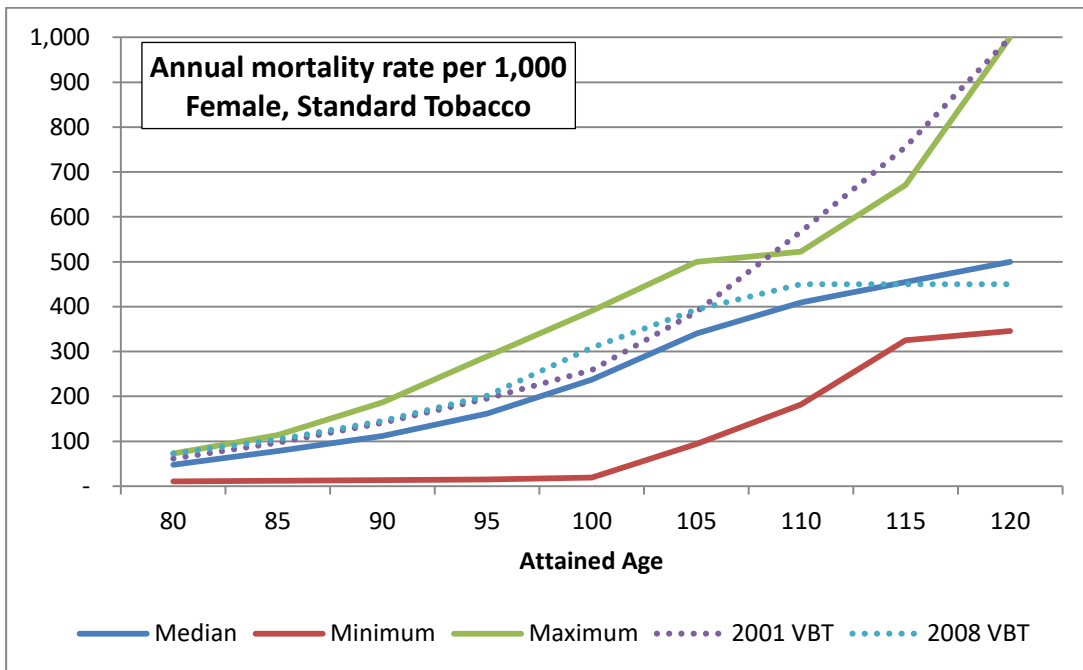
Figure 37

Figure 38

Figure 39

Figure 40

Companies were asked again this year about the number of underwriting classes used. The majority of companies (71%; 17 of 24) responded with three non-tobacco classes, and 4 of 24 (17%) responded with four non-tobacco classes (Figure 41). For tobacco classes, two continues to be the predominant response with 96% (23 of 24) citing two tobacco classes this year (Figure 42).
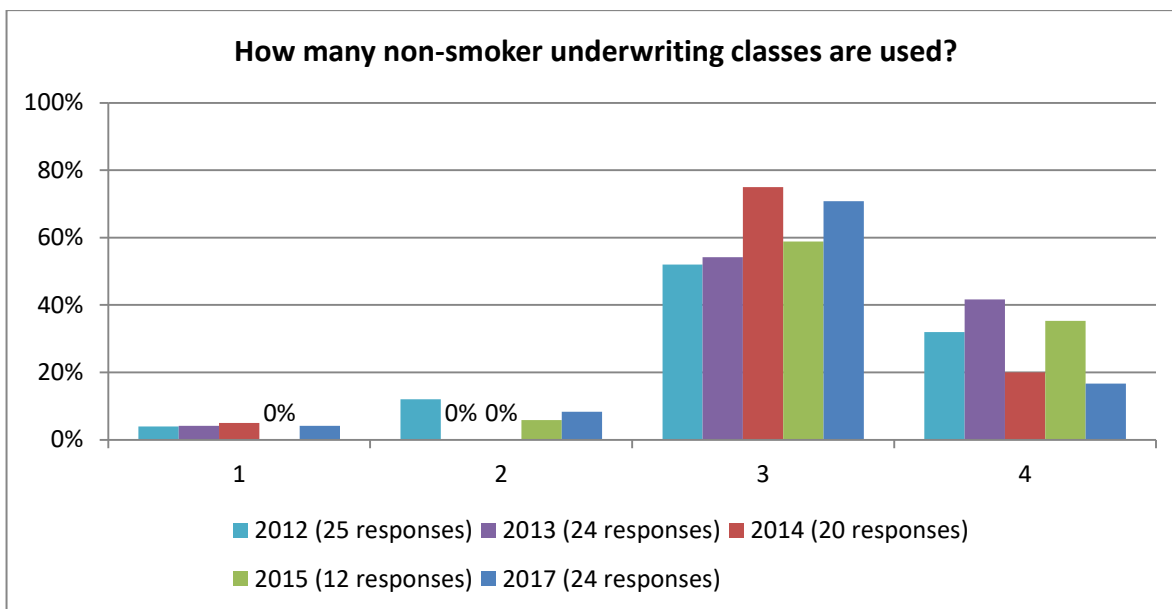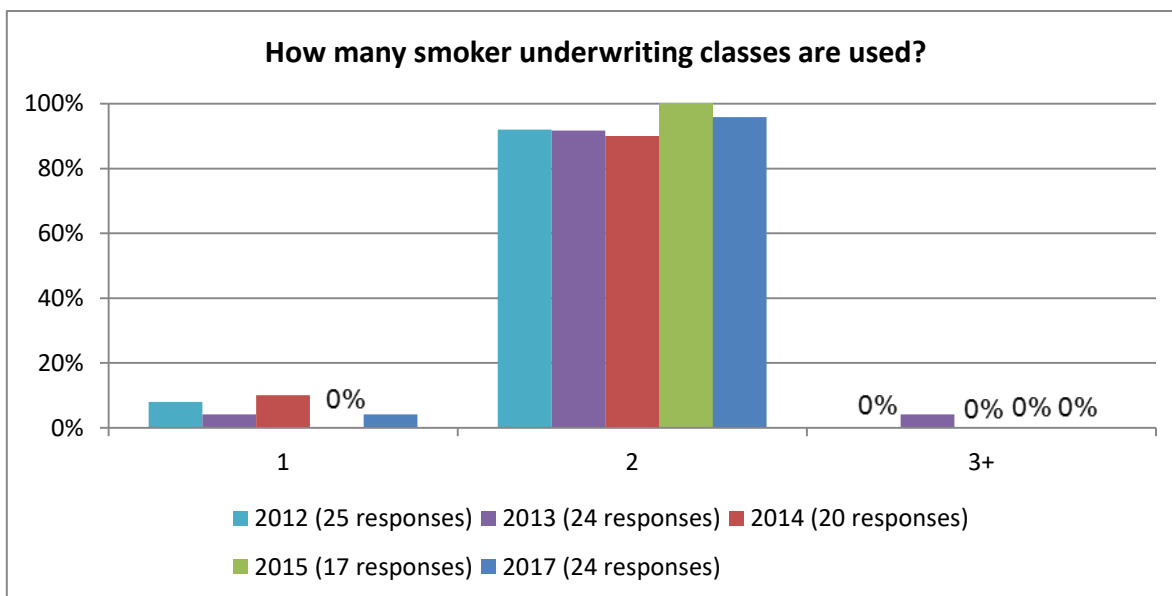
How many non-smoker underwriting classes are used?

2012 (25 responses) 2013 (24 responses) 2014 (20 responses)
2015 (12 responses) 2017 (24 responses)

Figure 41

How many smoker underwriting classes are used?

2012 (25 responses) 2013 (24 responses) 2014 (20 responses)
2015 (17 responses) 2017 (24 responses)

Figure 42

The percentage of respondents incorporating future mortality improvement into their models dropped to 60% (15 of 25).

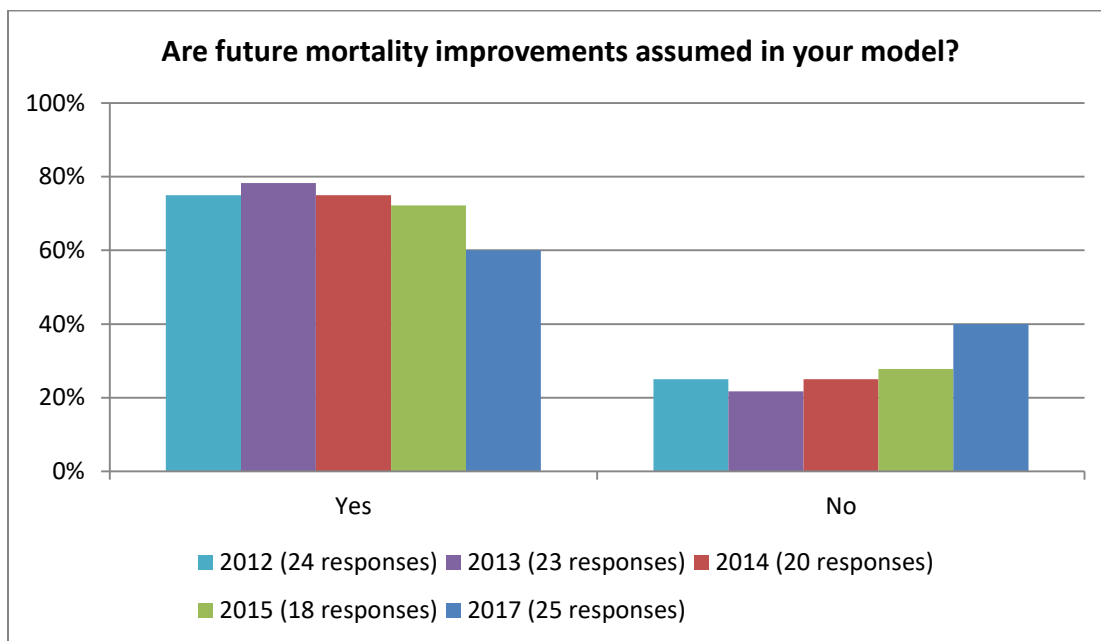**Are future mortality improvements assumed in your model?**

Figure 43

Most of the 15 companies modeling future mortality improvements had improvement assumptions that were gender, age, and/or duration distinct (Figure 44).

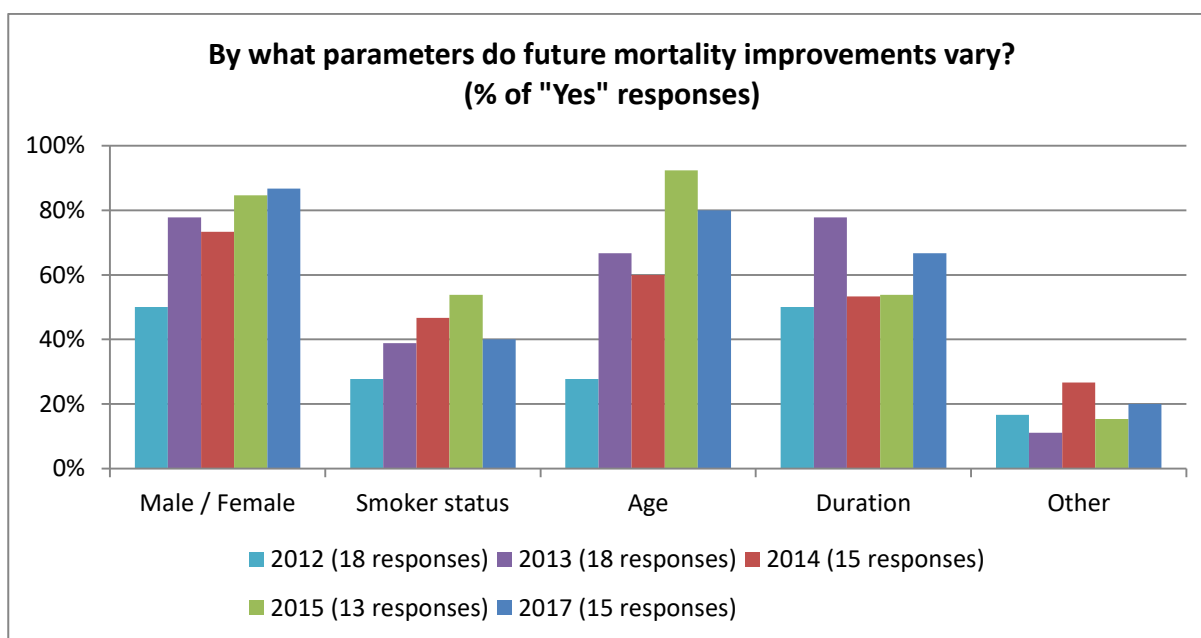**By what parameters do future mortality improvements vary? (% of "Yes" responses)**

Figure 44

Twenty companies responded to a question about whether mortality assumptions change when the secondary guarantee is in-the-money and the account value is zero. The vast majority responded that mortality assumptions do not vary by the in-the-moneyness of the secondary guarantee. One company indicated that mortality does vary by in-the-moneyness and further elaborated that their mortality assumption increases based on the length of time that the no-lapse guarantee has been active.

Critical Assumptions

The survey then asked for assumptions that the companies considered critical to analyzing experience in the tail. A company could indicate more than one response. Investment return and lapse assumptions continue to be cited as the most critical assumptions for analyzing experience in the tail. There was also an increase in the responses for mortality and life settlements (Figure 45).
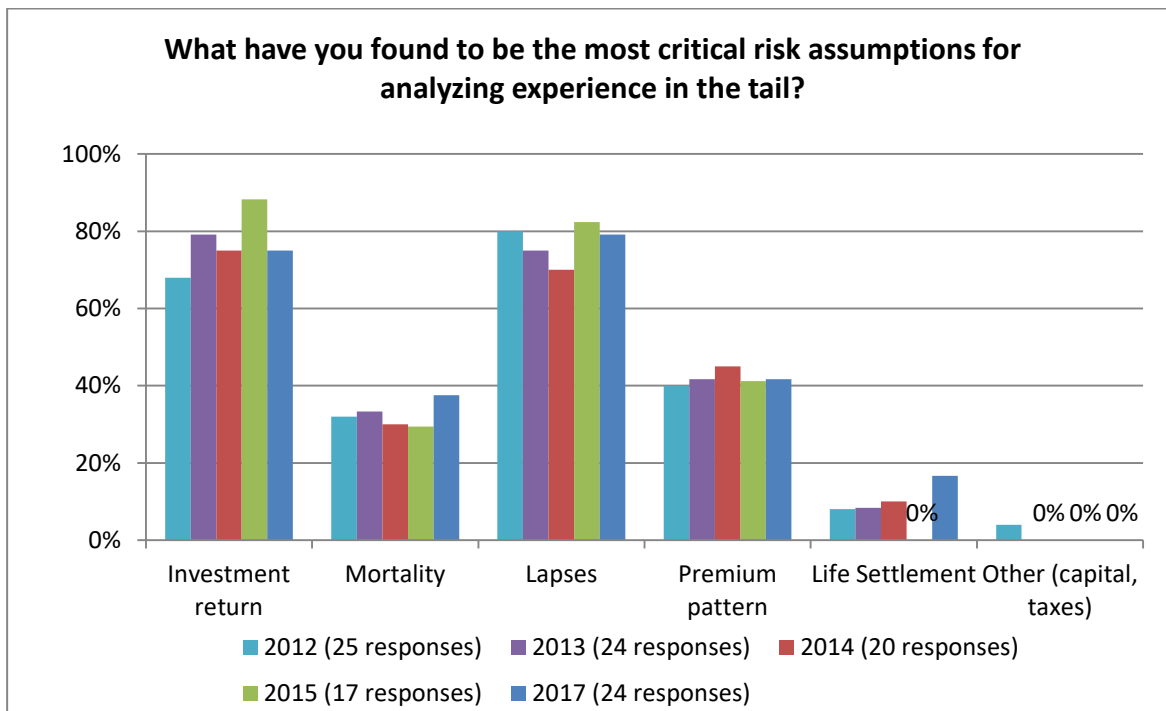

Figure 45