POLICYHOLDER BEHAVIOR IN THE TAIL
UL WITH SECONDARY GUARANTEE SURVEY
2009 RESULTS

Highlights of survey

- Investment return is the assumption that most respondents considered to be a critical risk; 15 respondents indicated that they felt this assumption was critical for analyzing experience in the tail. Slightly less than half of respondents considered the mortality and/or lapse assumptions to be critical.
- 75% of respondents who offer a secondary guarantee offer both a shadow account design and a cumulative premium design.
- Fewer than 50% of respondents use stochastic modeling to set or analyze capital levels for UL with secondary guarantees.
- Respondents who reported using stochastic modeling to set capital levels reported using more scenarios than in the previous survey's results; the most common response was 1000 scenarios compared to 200 scenarios in 2008.
- Descriptions of the tail scenario vary widely amongst insurers, but in general, rates remain low in the near future durations and rise after duration 20. Additionally, the yield curve tends to flatten over time, with the difference between 1-year and 30-year treasuries narrowing.
- More than half of respondents use dynamic lapse functions for UL policies with a secondary guarantee. Of those who use such a function, over 90% set lapses to zero if the guarantee is in-the-money and no further premium is required.
- In the tail scenarios, lapse rates vary widely amongst insurers. However, in general the lapse rates decrease with increasing issue age or policy duration. Lapse rates also decrease as the account value approaches zero.
- Fewer than 10% of respondents vary lapse rate assumptions by distribution or market, but 62% vary them by premium pattern. Single premium policies are typically modeled with lower lapse rates than level-premium policies.
- Mortality assumptions were typically based upon the 2001 VBT table (47%) or a company-specific table (29%).
- Half of respondents model future mortality improvement. Improvements typically vary by gender and are only applied until attained age 85-90.
- 95% of respondents use their company experience as a basis for setting lapse rate assumptions, most frequently relying on 5 years of experience data.

Acknowledgements

The Policyholder Behavior in the Tail 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 group, at jimreiskytl@wi.rr.com or Steve Siegel, Society of Actuaries Research Actuary at ssiegel@soa.org.
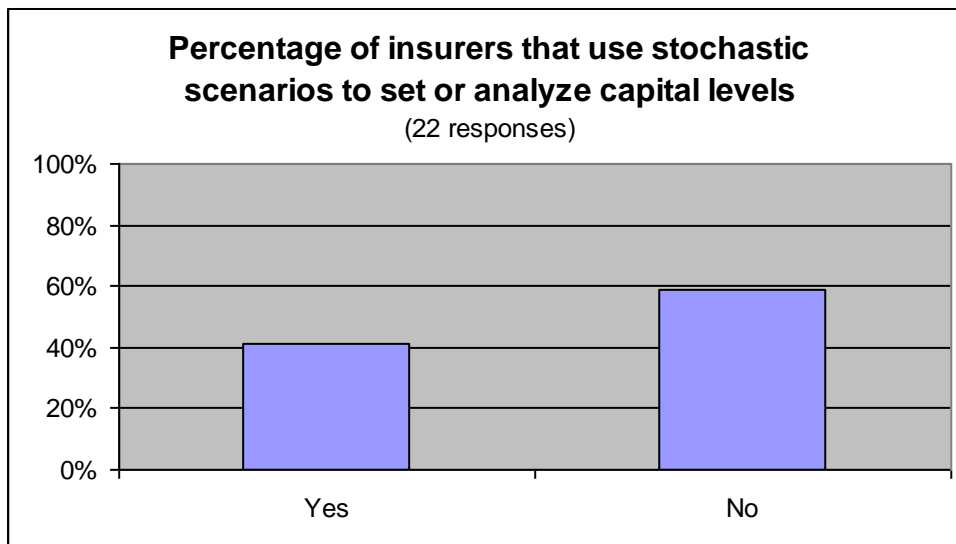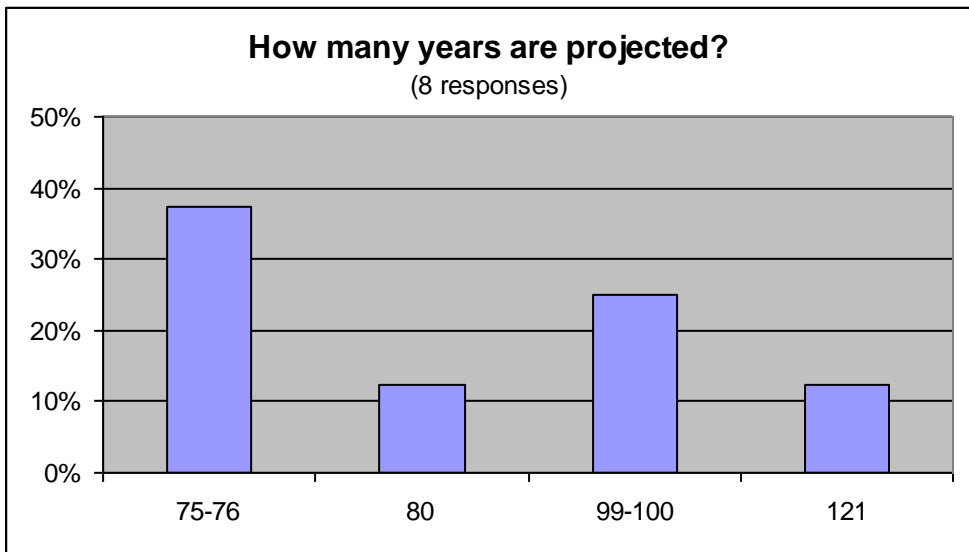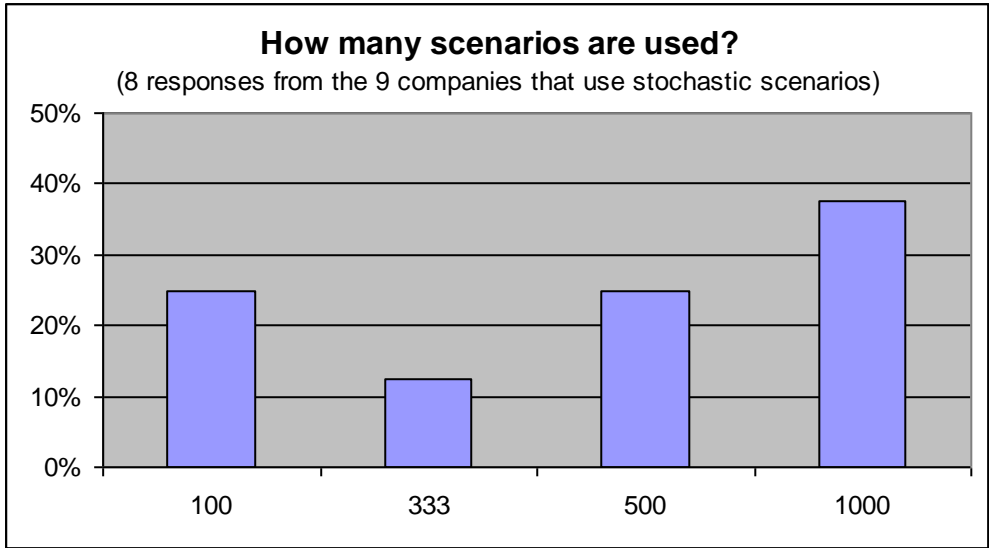
Background

In 2009, the Policyholder Behavior in the Tail (PBITT) working group distributed a survey to insurers and asked for feedback on assumptions in the 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 23 responses; however, not every company answered every question. As a way to illustrate the credibility of results, most charts indicate how many companies responded to the question.

It is the intention of the PBITT working group to conduct this survey annually. It is our hope that with the publication of these and future survey results, we will increase the availability of industry experience for all companies to consider when setting assumptions or when extrapolating to the tail.

Parameters of Stochastic Capital Calculation

Insurers were asked 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. The following graphs show the responses to these questions. About 41% of insurers use stochastic scenarios to set or analyze capital levels. 1,000 scenarios and 75-76 years were the most common answers regarding the number of scenarios used and the length of the projection.

Percentage of insurers that use stochastic scenarios to set or analyze capital levels
(22 responses)

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How many scenarios are used?
(8 responses from the 9 companies that use stochastic scenarios)

How many years are projected?
(8 responses)

Tail Scenario

Insurers were asked to list 1 year, 7 year, and 30 year interest rates in the tail scenario that gives the largest present value loss, defined in the survey as the greatest amount of death benefits paid in years where no COI is collected. 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.
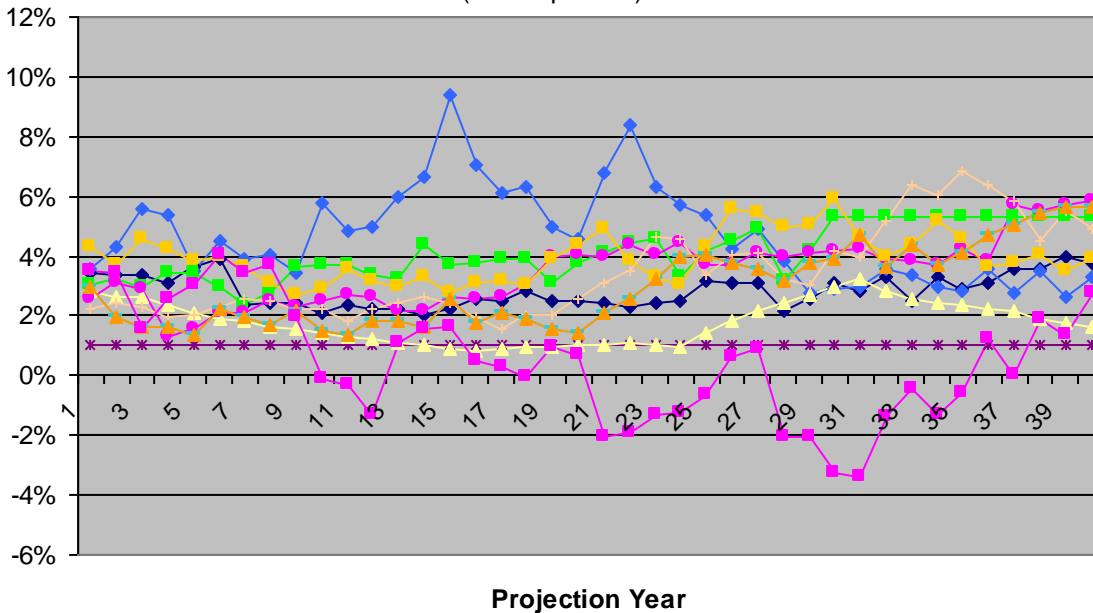
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Tail Scenario by Insurer -- 1 yr Treasury
(11 Responses)

Projection Year
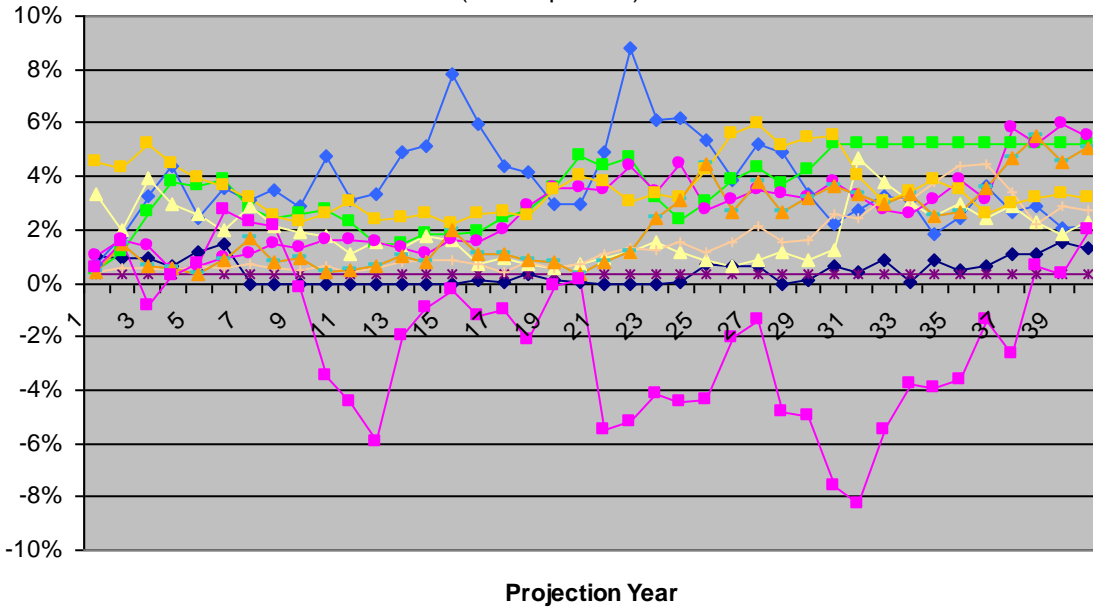
Tail Scenario by Insurer -- 7 yr Treasury
(11 Responses)

Projection Year

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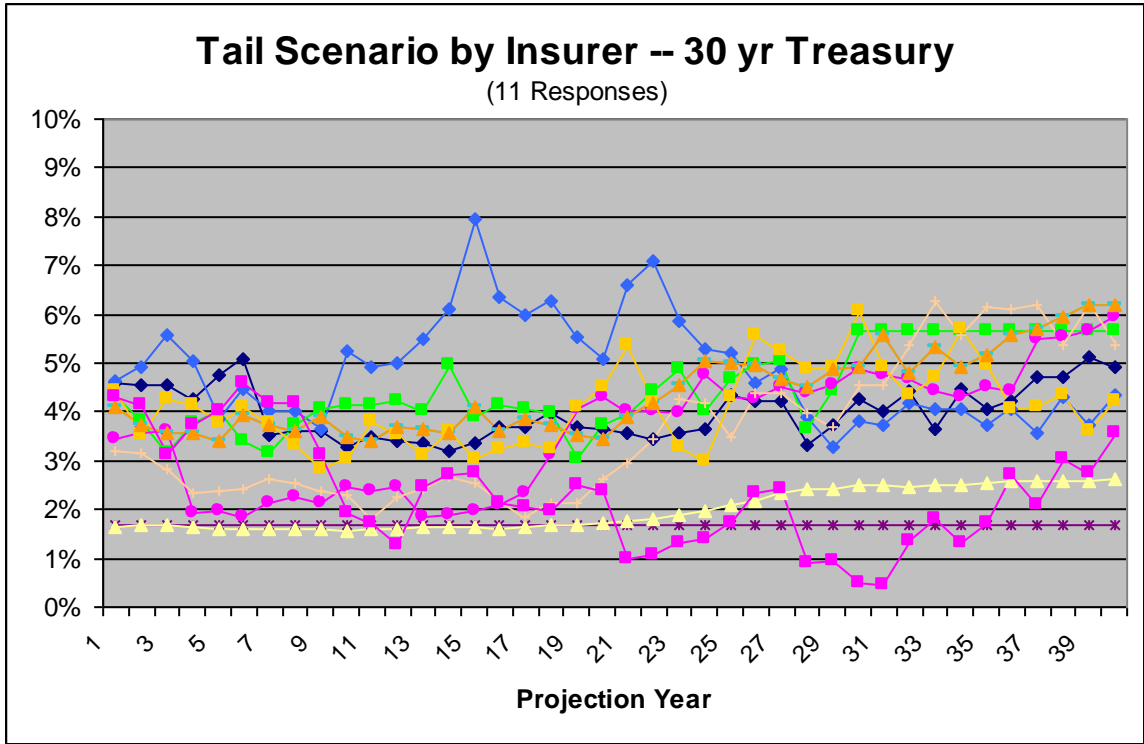
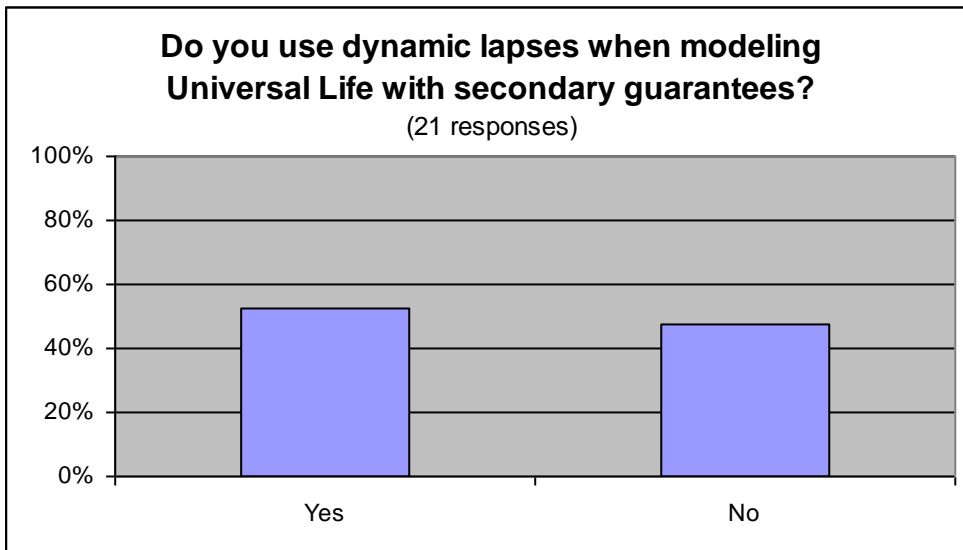**Tail Scenario by Insurer -- 30 yr Treasury**
(11 Responses)

Note that for one respondent the 1 year and 7 year treasury rates become negative during the tail scenario.
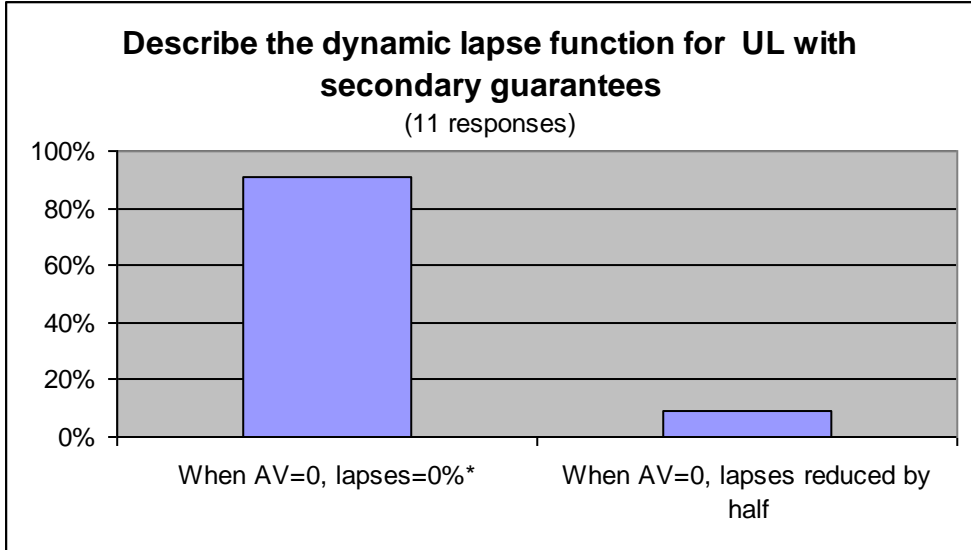
The following graph shows the median reported value across insurers for each of the three maturities for each projected year. It should be noted that these lines do not represent any one company's response, but rather the median rates at each duration, across all companies' responses.

Median Tail Scenario Across Insurers
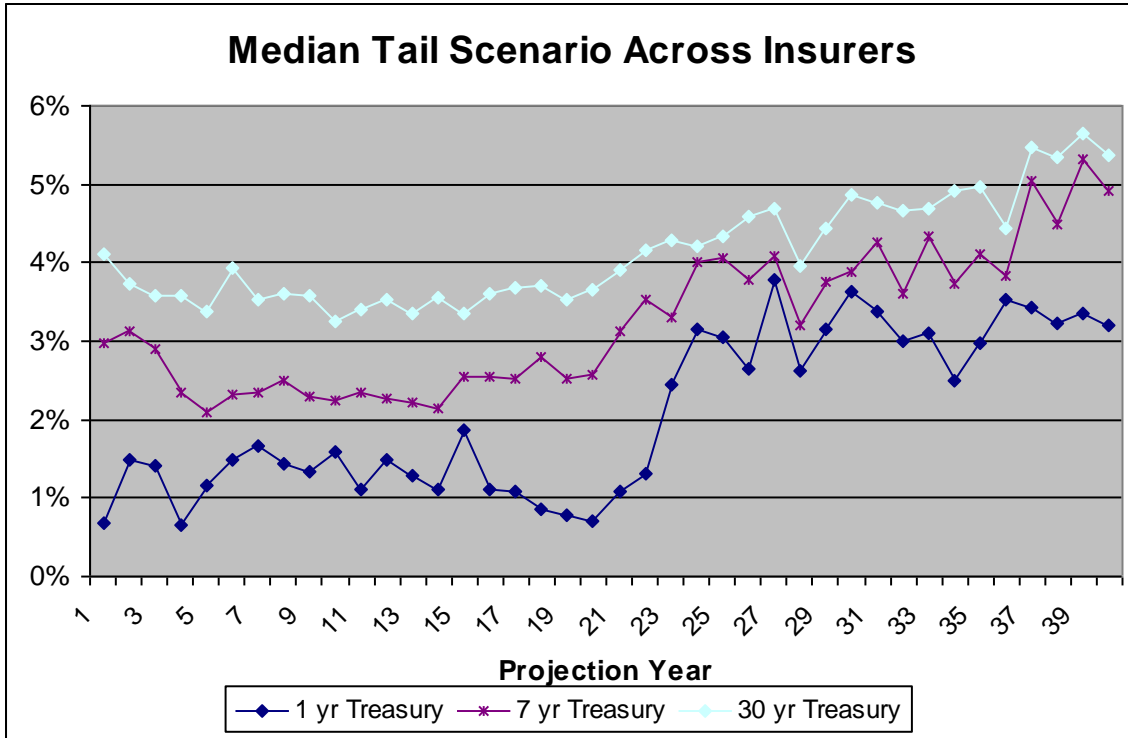
Lapse Assumptions

The following chart shows the percentage of insurers who use dynamic lapse functions for policies with secondary guarantees. More than half of insurers use some kind of dynamic lapse function for policies with secondary guarantees. Of those that do so, 91% set the lapse rate to 0% for years where the guarantee is in-the-money and there is no additional premium required.

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

(21 responses)

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Describe the dynamic lapse function for UL with secondary guarantees

(11 responses)

* these 10 insurers have 0 lapse if the AV=0 and no further premium is required. Four of the ten stated that lapses were reduced to between 0% and 1% if the AV=0 but additional premium was required, while two stated that the assumed lapse rate would be 0% in such circumstances.

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. Each issue age group is presented in a different graph. The responses of 13 insurers were used in these graphs.
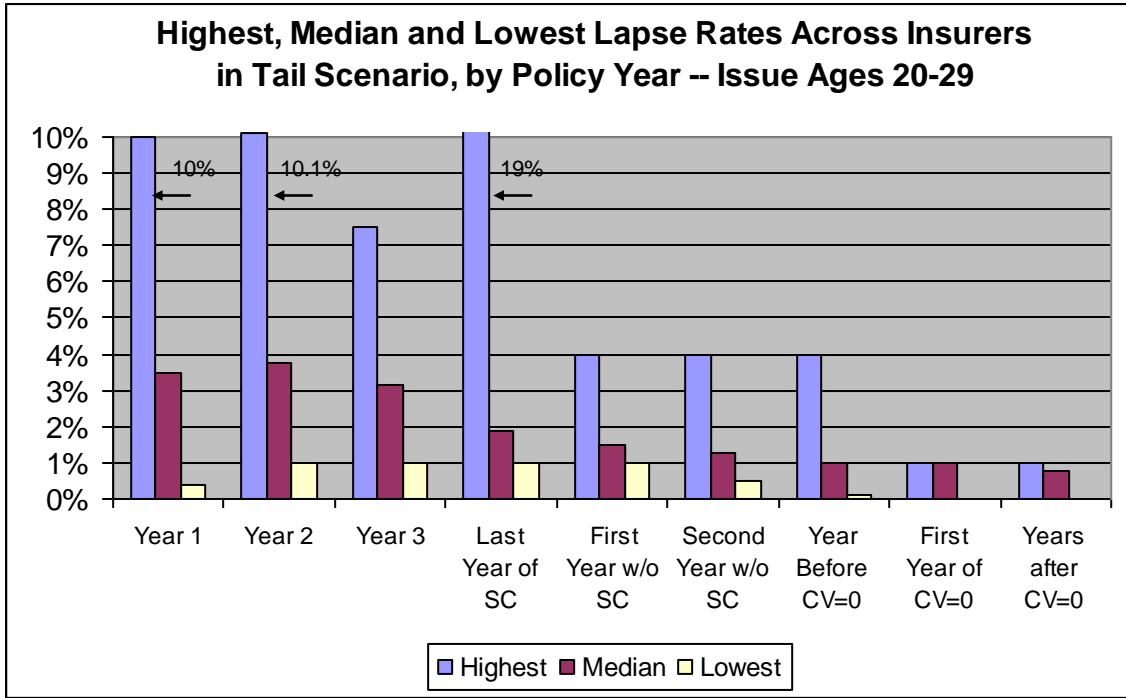
Highest, Median and Lowest Lapse Rates Across Insurers in Tail Scenario, by Policy Year -- Issue Ages 20-29

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Highest, Median and Lowest Lapse Rates Across Insurers in Tail Scenario, by Policy Year -- Issue Ages 30-39
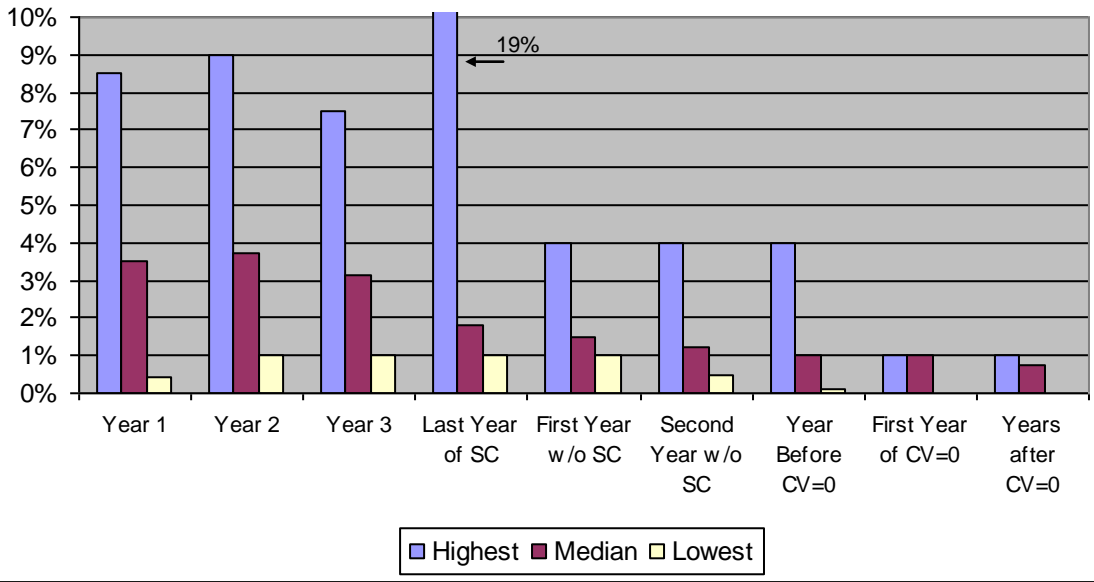
Highest, Median and Lowest Lapse Rates Across Insurers in Tail Scenario, by Policy Year -- Issue Ages 40-49
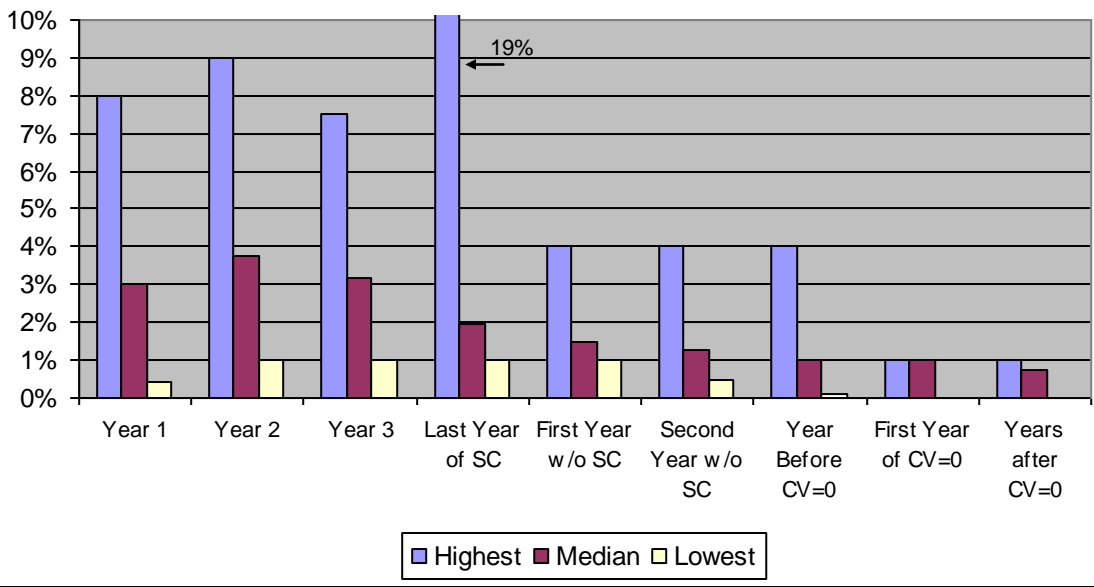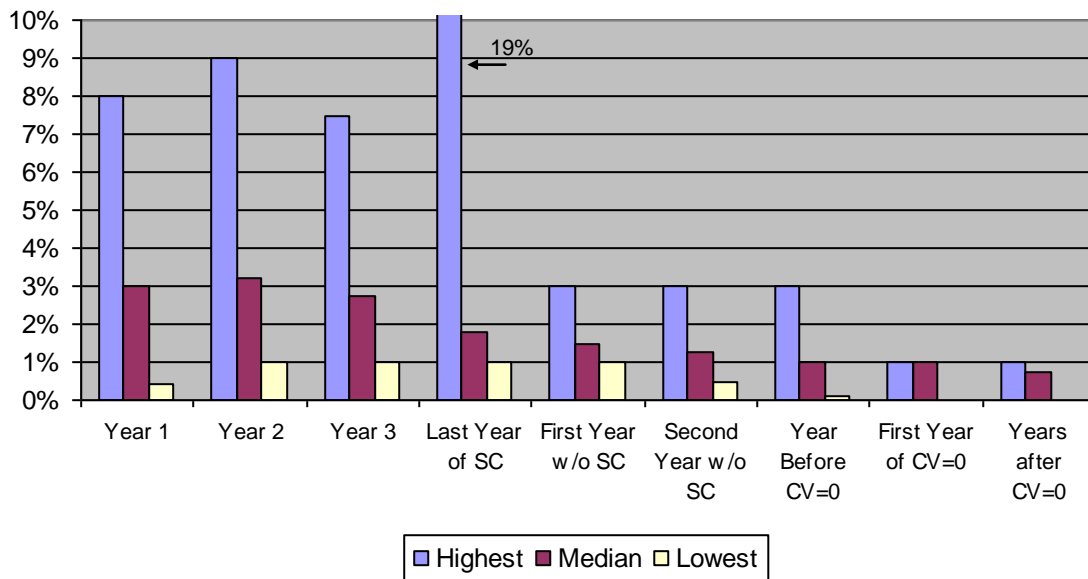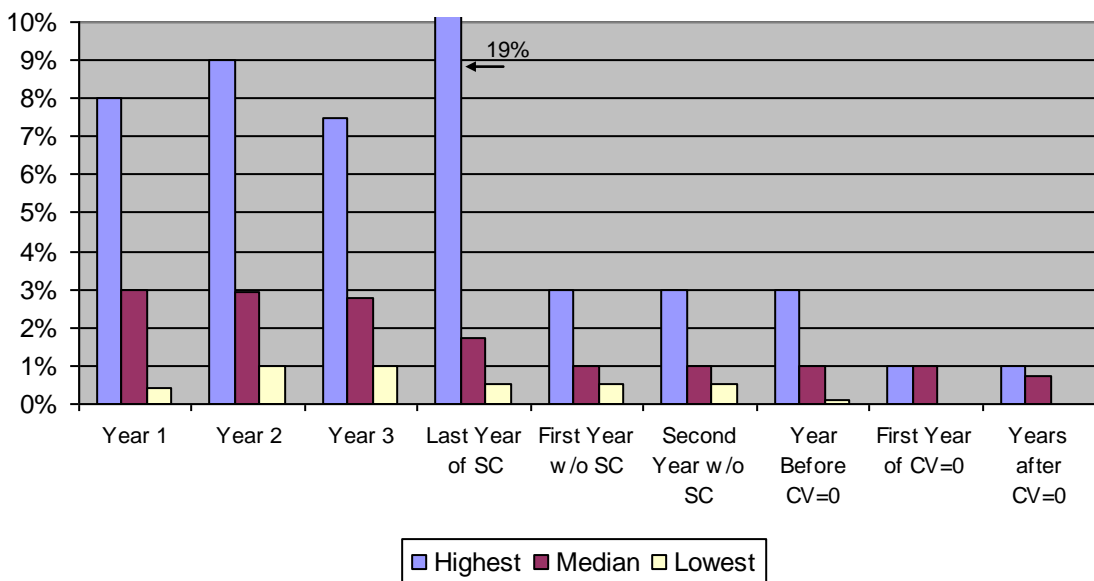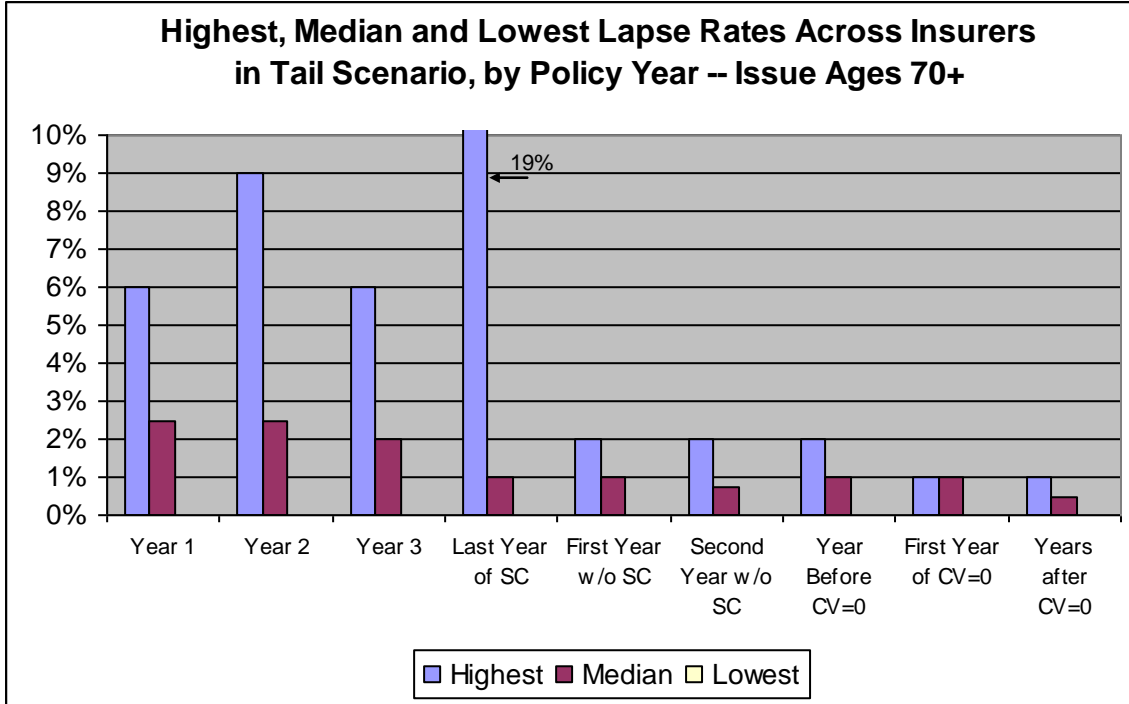
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Highest, Median and Lowest Lapse Rates Across Insurers in Tail Scenario, by Policy Year -- Issue Ages 50-59

Highest, Median and Lowest Lapse Rates Across Insurers in Tail Scenario, by Policy Year -- Issue Ages 60-69

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

At issue ages 70+, the lowest lapse rates were 0% at all durations.

Next the insurers were asked, out of 10,000 newly issued policies in the given issue age range, how many would first have a zero cash surrender value but be kept in force by the secondary guarantee at a given duration. Three insurers responded.

**In the tail, how many policies first run out of AV at
the indicated duration -- Issue Ages <20**

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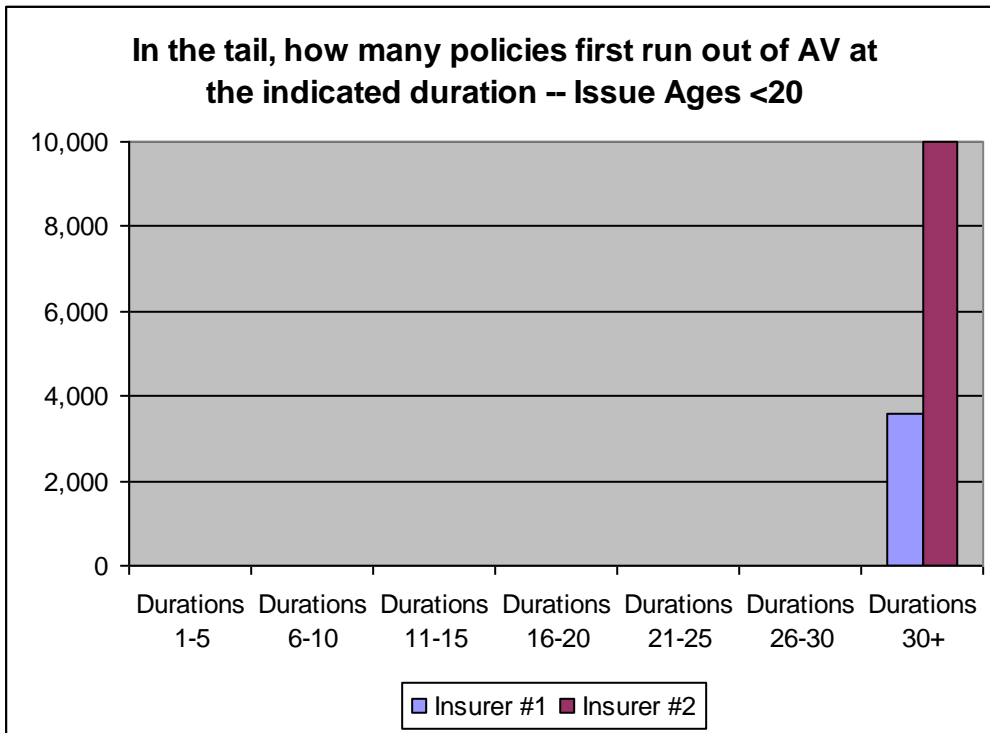
Insurer #3 did not include data on issue ages less than 20 years old.

In the tail, how many policies first run out of AV at the indicated duration -- Issue Ages 20-29

In the tail, how many policies first run out of AV at the indicated duration -- Issue Ages 30-39

In the tail, how many policies first run out of AV at the indicated duration -- Issue Ages 40-49

Legend: ■ Insurer #1 ■ Insurer #2 □ Insurer #3

In the tail, how many policies first run out of AV at the indicated duration -- Issue Ages 50-59

Legend: ■ Insurer #1 ■ Insurer #2 □ Insurer #3

In the tail, how many policies first run out of AV at the indicated duration -- Issue Ages 60-69

☐ Insurer #1 ■ Insurer #2 ☐ Insurer #3

In the tail, how many policies first run out of AV at the indicated duration -- Issue Ages 70+

☐ Insurer #1 ■ Insurer #2 ☐ Insurer #3

The survey asked insurers if their lapses varied by distribution system, by market, or by premium assumption. Two of 21 respondents indicated that their lapse rates varied by distribution (one insurer stated that lapse rates were different for Agency and Brokerage distributions). Only one of 21 respondents indicated that their lapse rates varied by market.
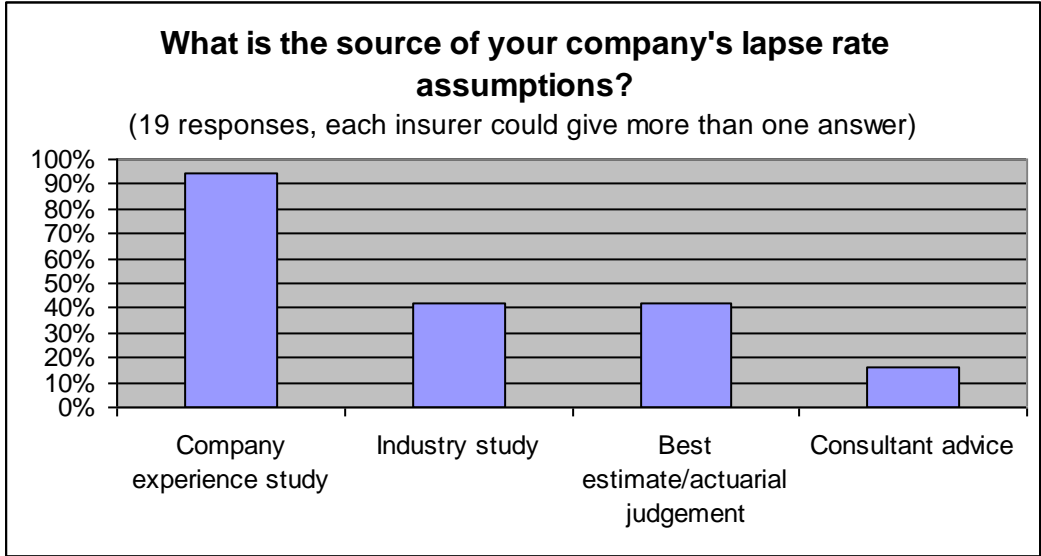
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**Do lapse rates vary by premium assumption?**
(21 responses)
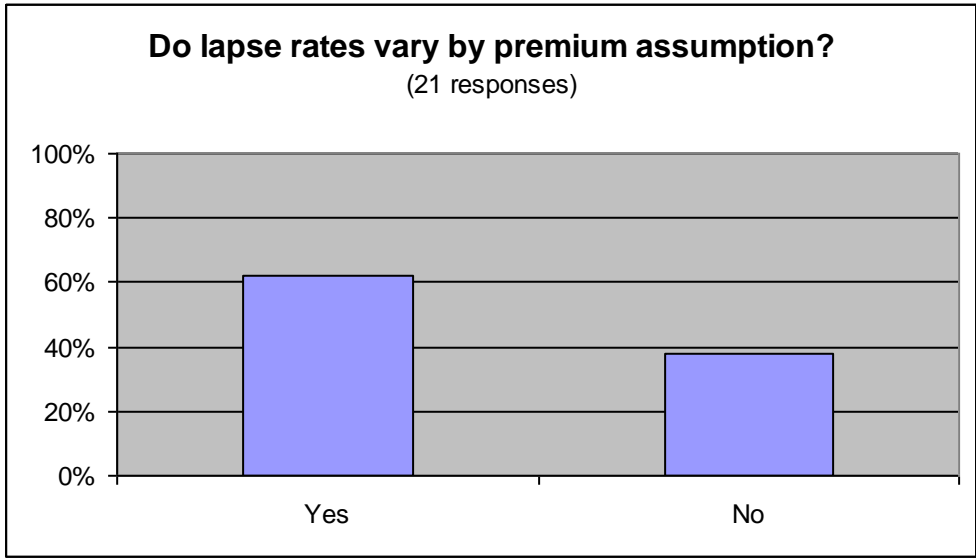
Thirteen respondents indicated that lapse rates vary by premium assumption. There was considerable variation in how these differences were modeled, but six of the thirteen respondents indicated that single-premium policies were modeled with substantially lower lapse rates than level premium policies.

Insurers were asked about the source of their assumptions. Respondents could include more than one source, and 18 of 19 respondents included "Company study" among their answers. "Best estimate" and "Industry study" were the next most popular answers, selected by 42% of respondents. We assume those companies that indicated "Company experience study" or "Industry study" are using these studies to set expected lapse assumptions rather than assumptions for policyholder behavior in tail scenarios. We intend to ask a clarifying question in the next edition of this survey.

What is the source of your company's lapse rate assumptions?
(19 responses, each insurer could give more than one answer)


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The survey then asked if companies perform lapse studies for UL policies with secondary guarantees, and if so, how frequently. The vast majority (90%) perform such lapse studies, most commonly on an annual basis. (One of the two companies that responded that they do not do such studies indicated that it intends to do so in the future.) Only one company indicated more often than annually (quarterly), and one other indicated that they were performed less often (every three years).

Companies were asked how many years of experience data were used in their latest study. Answers varied from one year to six years.

How many years of experience data were used in your latest study?
(17 responses)
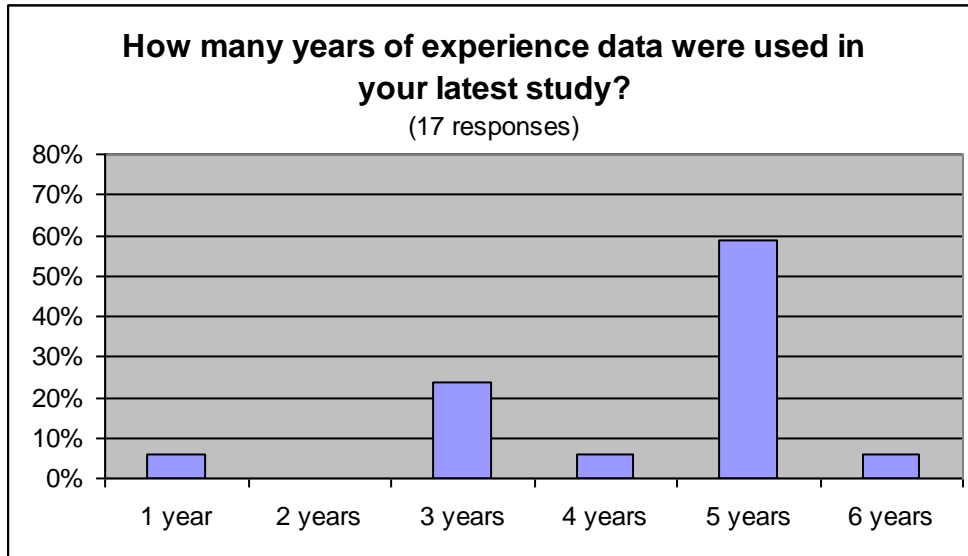
Companies were then asked about their mortality assumptions in the tail.

What reference mortality table do you use?
(17 responses)
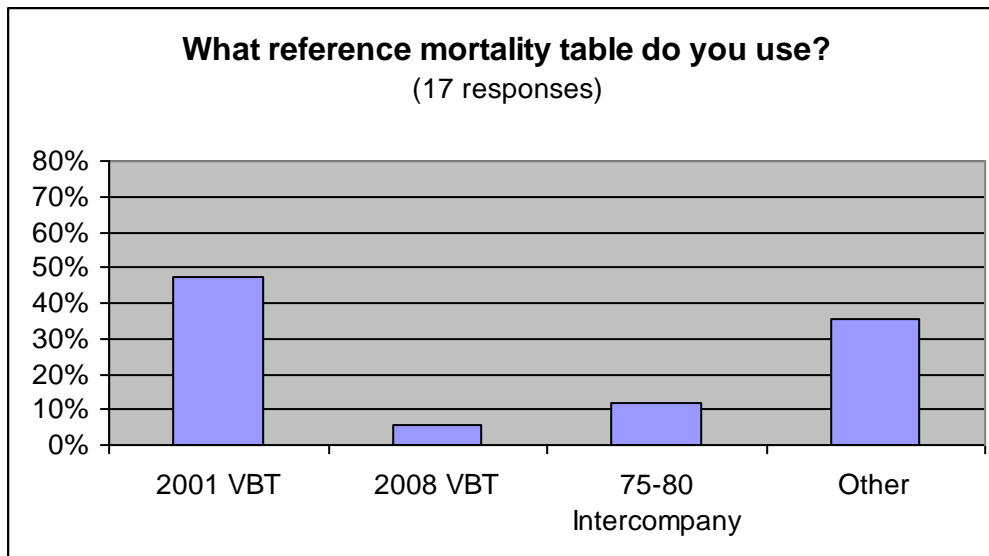
Five of the six companies that responded "Other" based their mortality reference table at least in part upon company experience; the other used the 2001 CSO table.

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How many non-smoker underwriting classes are used?
(19 responses)

[Bar chart showing percentages by number of non-smoker underwriting classes:
- 2: approximately 10%
- 3: approximately 68%
- 4: approximately 21%
Y-axis ranges from 0% to 80%]

How many smoker underwriting classes are used?
(19 responses)

[Bar chart showing percentages by number of smoker underwriting classes:
- 1: approximately 5%
- 2: approximately 95%
Y-axis ranges from 0% to 100%]

Ten of twenty respondents included future mortality improvements in their modeling. Improvements assumptions varied by company, but most reported using improvement schedules that differed by gender and applied to a maximum attained age of 85-90.

Nineteen companies responded to a question about whether mortality assumptions change when the Secondary guarantee is in-the-money, and 100% said that this assumption did not change under those circumstances.

The survey then asked for other assumptions that the companies considered critical to analyzing experience in the tail. A company could indicate more than one response.

What have you found to be the most critical risk assumptions for analyzing experience in the tail?
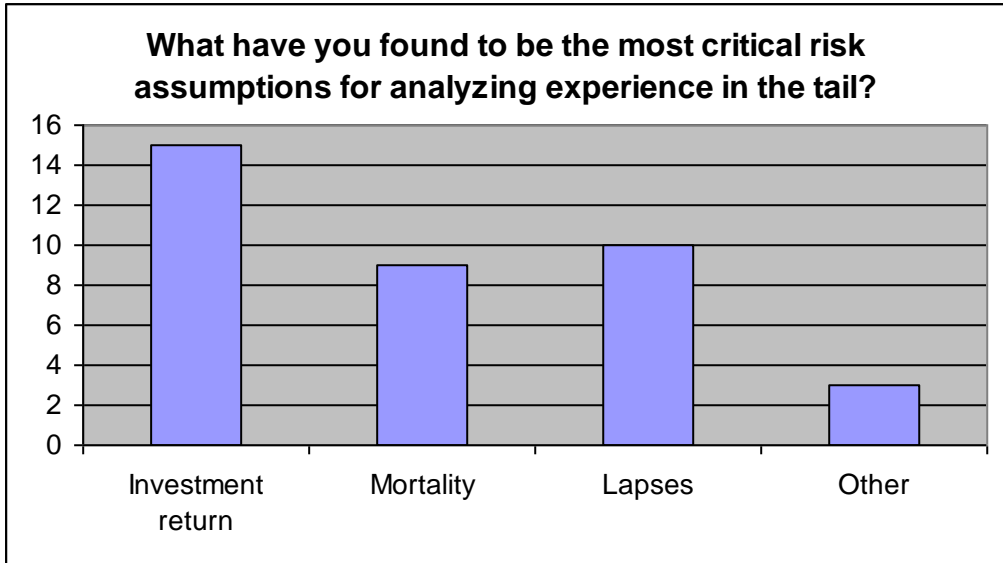
Companies indicating "other" cited reinsurance and premium pattern as critical assumptions.

Eighteen companies indicated that one or more of these assumptions were critical for analyzing experience in the tail.

Respondents Profile

Total Face Amount of Universal Life Policies with Secondary Guarantees
(23 respondents)
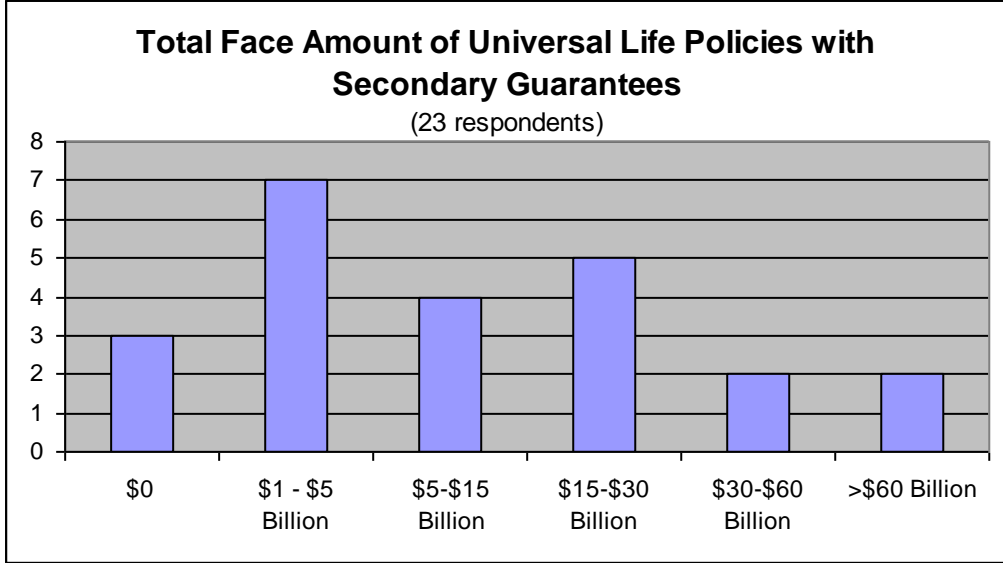
APPENDIX – COMPLETE SURVEY QUESTIONS

Policyholder Behavior in the Tail
Universal Life with Secondary Guarantees Survey

The Society of Actuaries is trying to develop better estimates of policyholder behavior in the tail (PBITT) because there is an increasing need for actuaries to assist companies, regulators and others to evaluate required surplus. Our mission is to examine and ultimately give guidance to actuaries on how to set policyholder assumptions in extreme scenarios. We are not focused on more probable scenarios which reserves should cover.

This brief questionnaire is designed to confidentially gather the range of assumptions actuaries use in pricing, setting surplus targets, and risk management of secondary guarantees on general account universal life products. Such "UL with Secondary Guarantee" products provide the policyholder with a guarantee that the death benefit will remain in force under specified circumstances even if the policy's account value is depleted.

Please report the assumptions used for policyholder behavior in the tail, whether or not data are available. Please respond even if you are unable to answer all questions. Partial responses are both acceptable and helpful.

Since efforts are being considered to place more reliance on actuarial judgement, surveys such as this one will help guide those efforts and provide useful background information. Obviously, a greater number of survey participants will enhance the value and usefulness of the survey results. As an added incentive for participants, the results will be provided to them in advance of their availability on the SOA website.

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.

We respect the proprietary nature of each company's models, and we can assure you the results will be reported anonymously and that your specific results will be held under the strictest confidence.

Please submit responses to the survey by **October 16, 2009.**

If there is any additional information that you would like to add, please feel free to email it to: bscott@soa.org.

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Question 1: BACKGROUND

Secondary Guarantee Benefits on Universal Life Policies
List the approximate size of your company's current total UL book with secondary guarantees.

Type of Secondary Guarantee

	Yr. began writing	Net Premiums ($ millions)	Face Amount ($ millions)	Policy Count (1000s)
Long-term guarantee using **Shadow Account** Design				
Long-term guarantee using **Cumulative Premium** Design				
Long-term guarantee using **Other** Design Shorter term no-lapse guarantee, up to approx. 10 years				
All other UL with Secondary Guarantees				
TOTAL				

If you would consider your secondary guarantee as non-standard in the industry, please provide further description or unique formulae below or email it to: bscott@soa.org.

Do you have more than one version of secondary guarantee that is material to your company?
If so, please describe any material secondary guarantees not described above. If not, leave blank.

Question 2: TAIL SCENARIO for Universal Life 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 and/or analyze capital levels (i.e., required surplus) for these guarantees?

Yes

No

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

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

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2d. If you are performing stochastic modeling on this product, please list the scenario that triggers the largest present value loss (i.e., the greatest amount of death benefits paid in years in which no COI is collected.) If you are not currently using stochastic modeling, please list the deterministic tail scenario.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
1 year Treasury Rate										
7 year Treasury Rate										
30 year Treasury Rate										

	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
1 year Treasury Rate										
7 year Treasury Rate										
30 year Treasury Rate										

	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30
1 year										

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	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30
Treasury Rate 7 year Treasury Rate										
30 year Treasury Rate										

	Year 31	Year 32	Year 33	Year 34	Year 35	Year 36	Year 37	Year 38	Year 39	Year 40
1 year Treasury Rate										
7 year Treasury Rate										
30 year Treasury Rate										

Question 3: LAPSE ASSUMPTIONS for Universal Life Secondary Guarantees

3a. Do you use dynamic lapses when modeling Universal Life with secondary guarantees?

Yes   No

3b. If so, please describe the dynamic lapse functions you are using for each product design with a secondary guarantee benefit on universal life policies.

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Question 4: LAPSE RATES IN THE TAIL for Universal Life Secondary Guarantees

4a. Please enter the lapse rate assumed in the tail scenario listed in Question 2d.

	Issue ages 20-29	Issue ages 30-39	Issue ages 40-49	Issue ages 50-59	Issue ages 60-69	Issue ages 70+
Year 1						
Year 2						
Year 3						
Last year with surrender charge						
At end of surrender charge period						
First year after end of surrender charge period						
Last year before zero cash surrender value						
First year of zero cash surrender value						
For later years with zero cash surrender values						

4b. If there are any other occurrences or product features than those listed in 4a that would significantly affect the lapse rate assumptions and patterns, please desribe:

Question 5: In the tail scenario listed in 2d, how many of 10,000 new policies issued in these age groupings reach a zero cash surrender value for the first time in the following durations but maintain coverage because of secondary guarantees?

	Issue ages under 20	Issue ages 20-29	Issue ages 30-39	Issue ages 40-49	Issue ages 50-59	Issue ages 60-69	Issue ages 70+
Durations 1-5							
Durations 6-10							
Durations 11-15							
Durations 16-20							

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	Issue ages under 20	Issue ages 20-29	Issue ages 30-39	Issue ages 40-49	Issue ages 50-59	Issue ages 60-69	Issue ages 70+
Durations 21-25							
Durations 26-30							
Durations 30+							

Question 6: LAPSE RATES BY DISTRIBUTION SYSTEM for UL Secondary Guarantee Benefits

6a. Do your lapse assumptions differ by Distribution System?
Yes   No

6b. If so, please describe the Distribution Systems and differences in lapse assumptions.

Question 7: LAPSE RATES BY MARKET for UL Secondary Guarantee Benefits

7a. Do your lapse assumptions differ by Market?
Yes   No

7b. If so, please describe the Markets and differences in lapse assumptions.

Question 8: LAPSE RATES BY PREMIUM PATTERN for UL Secondary Guarantee Benefits

8a. Do your lapses vary by premium pattern, e.g., level premium vs. paid up?
Yes   No
8b. If so, please describe the premium patterns and differences in lapse assumptions.

Question 9: SOURCES of Universal Life Secondary Guarantee Lapse Rate Assumptions

9a. What is the source of your assumptions? (e.g. company study, best estimate)

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9b. Does your company perform lapse studies of this product and benefit?
Yes   No

9c. If so, how often?

9d. How many years of experience data were used in your latest study?

9e. If your company doesn't perform lapse studies of this product and benefit, does it contemplate doing so in the future?
Yes   No

Question 10: MORTALITY RATES IN THE TAIL for UL Secondary Guarantees

10a. As a basis for answering question 9b that follows, what reference mortality table do you use?

2001 VBT
2008 vbt
75-80 Intercompany
Other. Please describe:

10b. Please enter the ultimate mortality rates in the tail scenario described in question 2d expressed as a percent of the table indicated in 9a. Note that "Std" in the table below refers to the worst mortality that is not table rated. "Smoker" class willl include "Tobacco" class, and "Non-Smoker" class will include "Non-Tobacco" class.

	Male - Best Class Non-Smoker	Male - Std Non-Smoker	Male - Std Smoker	Female - Best Class Non-Smoker	Female - Std Non-Smoker	Female - Std Smoker
Age 80						
85						
90						
95						
100						
105						
110						

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	Male - Best Class Non-Smoker	Male - Std Non-Smoker	Male - Std Smoker	Female - Best Class Non-Smoker	Female - Std Non-Smoker	Female - Std Smoker
115						
120						

10c. How many Non-Smoker Underwriting Classes are used?

10d. How many Smoker Underwriting Classes are used?

10e. Are mortality improvements modeled?
Yes   No

10f. If so, please describe your improvement schedule.

10g. Does your mortality assumption change when the Secondary Guarantee is in-the-money (i.e., account value = 0, but policy is still inforce)?
Yes   No

10h. If so, please describe the change.

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Question 11: CRITICAL ASSUMPTIONS

11. Considering all the assumptions covered in the previous questions, as well as any other assumptions that are tested for your product, what have you found to be the most critical risk assumption for analyzing experience in the tail? (Multiple responses are allowed.)

Investment return
Mortality
Lapses
Other. Please describe:

Question 12: COMMENTS

Please add any additional explanatory comments or clarifications.

Question 13:

Please provide us with a primary and secondary contact in case we need to follow-up with you on your submission.

Primary Contact Name
Primary Contact Telephone
Primary Contact Email

Secondary Contact Name
Secondary Contact Telephone
Secondary Contact Email