Mortality Experience and Modeling Practical Applications

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Session Goal

- Share the sensitivity of results to different levels of knowledge
- Show how the selection of the mortality assumption could potentially result in under-pricing/over-pricing
- Show results that can be used to help answer the question posed in the VA Mortality experience presentation “Who Cares”

Modeling Assumptions for Death and Living Benefits

Key assumptions for future inforce:

1. Mortality
2. Lapse
3. Benefit utilization

Mortality Assumption

Considerations for setting VA mortality assumption:

- Table: 94 MGDB, A2000, Other
- Adjustments to Table:
  - Single factor adjustment
  - Separate Male & Female factor adjustments
  - M/F and Age Specific factor adjustments

Mortality Sensitivity Results

Census Type: "Average" demographics

Rider Type: GMDB 5% Roll-Up

	80% of 94 MGDB	62% of 94 MGDB	Male/Female 56% / 71% of 94 MGDB	Ruark Table
pvDB clms/pv AV in basis points *	25	20	20	19
% of Ruark Table	132%	105%	105%	100%

* represents the average of the 2,000 runs

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Mortality Sensitivity Results

Census Type: "Older", 100% Female
Rider Type: GMDB 5% Roll-Up

	62% of 94 MGDB	Male/Female 56% / 71% of 94 MGDB	Ruark Table
pvDB clms/pv AV in basis points *	31	36	34
% of Ruark Table	91%	106%	100%

* represents the average of the 2,000 runs

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Study Results Guidance

Death Benefit

	Company A	Company B
Mortality Study	No	Yes
Single Rates	70%	70% (a)
Male / Female Rates	unknown	64% / 80% (a)
Female Sale Distrib	100%	100%
Census	Ave Age	Ave Age
DBClaims/AV in bps	18.7	21.2

(a) represents Company B experience

Potential Underpricing by Company A: 12%

Study Results Guidance

Living Benefit

	Company A	Company B	
Mortality Study	No	Yes	
Single Rates	70%	70%	(a)
Male / Female Rates	unknown	64% / 80%	(a)
Female Sale Distrib	100%	100%	
Census	Ave Age	Ave Age	
WBClaims in Millions	$6.1	$5.3	

(a) represents Company B experience

Potential Overpricing by Company A: 15%

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Mortality Assumption

- Other Considerations
  - Richness of Death Benefit
  - Death Benefit verse Living Benefit
  - Qualified verse Non-Qualified

Mortality Sensitivity Results

Richness of Death Benefit
Census: "Average" Demographics
Mort Adj: Single Rate

Rider Type	ROP	Ratchet	5% Roll-up	Combo
% of 94 GMDB	**62%**	**62%**	**62%**	**62%**
pvDB clms/pv AV *	3.6	10.2	20.3	23.3

Rider Type	ROP	Ratchet	5% Roll-up	Combo
% of 94 GMDB	**56%**	**58%**	**63%**	**76%**
pvDB clms/pv AV *	3.3	9.6	20.6	27.8
Aggreg / Rider Spec	109%	106%	99%	84%

* in basis points, average of the 2,000 runs

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Mortality Sensitivity Results

Mortality Experience with WB

Census Type: "Average" demographics

Rider Type: WB for Life, annual ratchet, R-U bonus

	62% of 94 MGDB	51% of 94 MGDB	Adjusted Ruark Table
pvDB clms/pv AV in millions *	$7.1	$8.5	$7.6
% of Adjusted Ruark Table	93%	112%	100%

Adjusted Ruark Table = 51 / 62 x Ruark Table

* represents the average of the 2,000 runs

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Mortality Sensitivity Results

Qualified Block of Business

Census Type: "Average" demographics, 100% Qualified

Rider Type: GMDB 5% Roll-Up

	62% of 94 MGDB	51% of 94 MGDB	Adjusted Ruark Table
pvDB clms/pv AV in basis points *	16.5	13.8	12.8
% of Ruark Table	129%	108%	100%

Adjusted Ruark Table = 51 / 62 x Ruark Table

* represents the average of the 2,000 runs

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Lapse Assumption

- Considerations for setting Variable Annuity lapse assumption
  - Baseline duration assumptions relative to CDSC schedule
  - Adjustments to Table:
    - Attained Age (AA) adjustment
    - In-the-money (ITM) adjustment

Lapse Assumption

- Forms of Dynamic Lapse Formulas
  - None
  - Baseline x (1 – AA factor x ITM factor x Max Reduction)
  - Baseline x (1 – AA factor x (1 – ITM%^3), with a minimum lapse rate

Lapse Sensitivity Results

Census Type: Female IA 70
Rider Type: 5% Roll-up
Mortality Assumption: 62% of 94 MGDB
Results below : pvDB clms / pv AV in basis points

Investment Scenario Percentile	Baseline Lapse	RIA Dynamic Lapse	Other Dynamic Lapse
75th	45	48	67
95th	108	122	175
100th	231	268	403
% of Baseline @ 95th	100%	113%	162%

100th Percentile represents the scenario that produced the greatest amount of DB claims

Conclusion

- There are a lot of factors that can influence your Mortality experience.
- Although it is probably not feasible to have all these factors as modeling points, it is important to at least consider their impact when modeling/pricing.
- Given some of the sensitivity of results illustrated for Mortality, a similar understanding of lapse experience could further help to minimize the risk of under-pricing or over-pricing.