

Life Reserve Work Group Initial Modeling Results 20-year Term Product

To the
Life and Health Actuarial Task Force
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Objectives for today's discussion

- Extension of modeling results to the 20 year term product
- Aggregate quantification of margins that have been applied to all assumptions on deterministic reserve
 - Mortality
 - Interest Rates
 - Persistency (lapse/withdrawal)
- Comparison of proposed methodology to current formulaic reserve levels



20 year term – General characteristics

- Product is “typical” of one found in the marketplace. Premiums are at a competitive level.
- Policy expires at age 95.
- Premiums beyond the level term period are YRT premiums that are two times the 2001 CSO table.
- No cash surrender values are available in this product.



20 year term – Assumptions used

- Providing results for 2 individual cells (issue ages 45 and 65) in a 20 year term product
 - Shadow Fund UL and Accumulation UL products will be included in the upcoming months
- All results provided are on a gross of reinsurance basis
- Margins are applied for each assumption.
 - Including all cashflows for the life of the contract
 - Deterioration Mortality for adverse selection beyond the level term period has been assumed
 - Separate handout has the summary of best estimate and padded assumptions used in deriving these modeling results



20 year term – Assumption considerations

- Mortality assumption used in these results is based upon a prudent best estimate table with margin loads consistent with the 2001 CSO table
 - Current proposal suggests using an industry standard table approved by the NAIC for statutory reserves with an appropriate valuation margin.
- Treasury rate scenario for deterministic portfolio rate derivation
 - Results were derived grading the treasury curve linearly over 20 years to a 65 CTE level of treasury rates
 - Currently discussing the length of the grading period and the 65CTE level of treasury rates.



Aggregate quantification of margins that have been applied to all assumptions



Numeric Summary - impact of all margins on deterministic reserve gross of reinsurance
20 year Term Issue Age 45, Male Best class, \$1M face

Policy Duration	Deterministic Reserve			
	No Margins on assumptions	Margins on all assumptions	Dollar Margin impact	% Increase
1	869	9,636	8,767	1008.8%
2	1,921	11,112	9,191	478.5%
3	3,117	12,716	9,599	307.9%
4	4,352	14,272	9,921	228.0%
5	5,630	15,844	10,214	181.4%
10	10,835	21,487	10,651	98.3%
15	11,211	20,150	8,940	79.7%
20	-	-	-	0.0%
30	-	-	-	0.0%
40	-	-	-	0.0%
50	-	-	-	0.0%



**Numeric Summary - impact of all margins on deterministic reserve gross of reinsurance
20 year Term Issue Age 65, Male Best class, \$1M face**

Policy Duration	Deterministic Reserve			
	No Margins on assumptions	Margins on all assumptions	Dollar Margin impact	% Increase
1	-	30,965	30,965	0.0%
2	5,883	41,722	35,838	609.1%
3	15,454	53,234	37,780	244.5%
4	25,438	64,787	39,349	154.7%
5	35,587	76,149	40,562	114.0%
10	85,106	128,211	43,104	50.6%
15	101,224	139,556	38,332	37.9%
20	-	-	-	0.0%
30	-	-	-	0.0%



Comparison of Deterministic Reserve to Current Formulaic Reserves for individual cells

Pol Dur	Issue Age 45			Issue Age 65		
	Deterministic Reserve w/ Margins	Current Formulaic	% Increase	Deterministic Reserve w/ Margins	Current Formulaic	% Increase
1	9,636	-		30,965	-	
2	11,112	4,365	-60.7%	41,722	27,874	-33.2%
3	12,716	8,646	-32.0%	53,234	55,200	3.7%
4	14,272	12,822	-10.2%	64,787	81,895	26.4%
5	15,844	16,850	6.3%	76,149	107,823	41.6%
6	17,260	20,704	20.0%	86,977	132,724	52.6%
7	18,592	24,308	30.7%	97,839	155,723	59.2%
8	19,815	27,583	39.2%	108,704	177,423	63.2%
9	20,742	30,454	46.8%	118,628	196,770	65.9%
10	21,487	32,814	52.7%	128,211	213,191	66.3%
11	22,005	34,569	57.1%	137,336	226,208	64.7%
12	22,155	35,608	60.7%	142,778	235,255	64.8%
13	21,932	35,844	63.4%	145,614	239,677	64.6%
14	21,317	35,163	65.0%	144,952	238,701	64.7%
15	20,150	33,390	65.7%	139,556	231,168	65.6%
16	18,129	30,336	67.3%	127,944	215,317	68.3%
17	15,172	25,788	70.0%	109,921	188,650	71.6%
18	11,091	19,456	75.4%	83,707	147,566	76.3%
19	5,686	10,992	93.3%	46,195	86,986	88.3%
20	-	-		-	-	

Note that the comparison above using only deterministic reserves is **not** representative of a comparison to the full proposed reserve methodology. The stochastic reserve must also be considered, which isn't calculated at a cellular level.



Comparison of deterministic reserve to stochastic reserve



Stochastic Reserve Calculations

- Calculation of the stochastic reserve must be done using an aggregate inforce block of business.
- In this model, an aged 20 year inforce block of business was used
- Interest rate risk is the only assumption that was stochastically modeled



Distribution of Stochastic Results

- 200 scenarios were run
- For the inforce block of policies at the valuation date, the stochastic CTE (65) is held as the aggregate reserve (figures in 000)

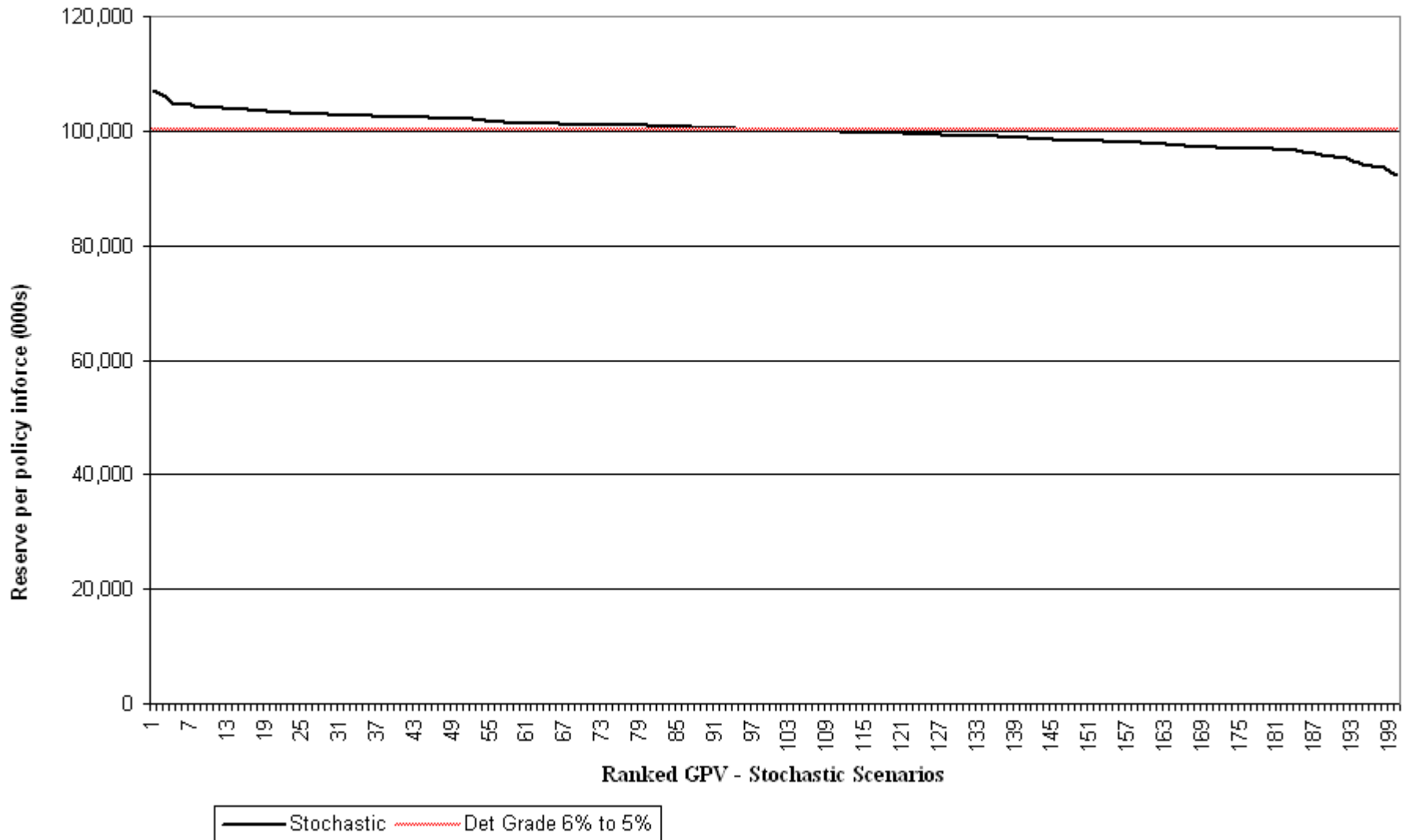
Deterministic Reserve = \$100,345

Stochastic Reserve (65 CTE) = \$102,809

Stochastic/Deterministic 2.5%



Distribution of Deterministic/Stochastic GPV Results
 Robust 20 year inforce file of 20 Year Term Product



Comparison of proposed methodology to current formulaic reserve levels



Comparison to Current Formulaic Reserves

Current formulaic reserves are higher at the valuation date for the inforce block

- Mortality – Current reserve using 80 CSO with an ultimate mortality age of 100. Proposed methodology using ultimate mortality of age 120
- Interest – Current reserve using flat 4.5% for all years. Proposed methodology is using actual company asset strategies and interest scenarios
- Lapses – Current reserve assumes no lapses. Proposed methodology is using padded lapse rates
- X-factors used in formulaic calculations were based on best estimate mortality and were the lowest level allowed



Reserve comparison for 20 year inforce at valuation date

	Current Formulaic Reserve	Proposed Reserve
Reserve (000s)	\$154,511	\$102,809
Decrease in dollars		\$51,702
Decrease as percent		33.5%

