

## VA CARVM Lessons Learned

A presentation to Actuaries' Club Of Hartford  
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DATE: June 7, 2010

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### Agenda: Lessons Learned

- | AG 43 requirements and implications
- | Review of December 31, 2009 implementation experiences
- | AG 43 challenges
  - | Standard scenario calculations
  - | Dynamic policyholder assumptions
  - | Hedging
- | Final comments

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## Recap of AG 43 requirements

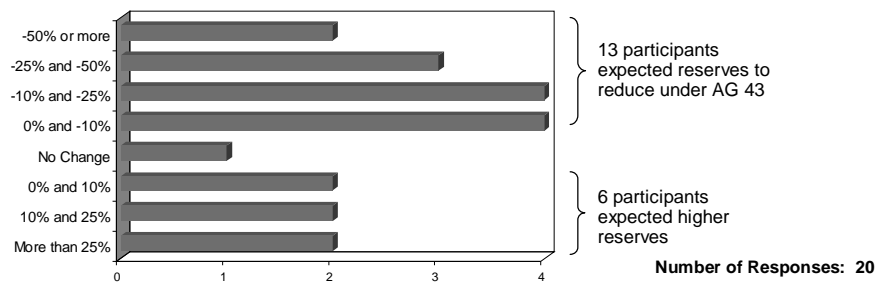
- | Statutory reserves equal
  - | Standard Scenario Amount (SSA), plus
  - | Excess, if any, of Conditional Tail Expectation Amount (CTEA) over the SSA
- | Reported reserves reflect impact of hedging
  - | Existing hedge assets, plus
  - | Future hedges, if following a Clearly Defined Hedging Strategy
- | Final reserve is net of reinsurance
  - | Gross of reinsurance amounts required for reporting needs

## AG 43 Implementation

- | We made it! Reserves were reported on time, using actual year-end in-force data
- | Successful implementations were multi-month efforts
  - | Interpret requirements for company specific circumstances
  - | Develop position papers on key methodology issues
  - | Monthly 'dry runs'
  - | Review, modify and enhance
  - | Sensitivity test
  - | Document
- | AG 43 framework can produce unexpected results
  - | Adequate time for analysis, review and revision was key

## AG 43 Implications: Expected Impact on Reserve Levels

- | Towers Watson surveyed companies in January 2010 on a variety of AG 43 implementation issues
- | Many companies expected lower reserves under AG 43 (compared to previous rules-based methods)
  - | Wide variation by company though:



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## AG 43 Challenges: Calculation of Standard Scenario Amount

- | Not always easy to apply prescriptive approach to 'snowflake' guarantee designs
- | Example:
  - | Consider a GMWB design where withdrawals are allowed at any time, but withdrawals prior to age 65 result in the loss of the lifetime guarantee, or
  - | Withdrawals are allowed at any time, but policyholder will receive richer benefit by delaying exercise (e.g., larger withdrawal rate, additional roll-ups)
- | How should 'earliest exercise' be interpreted for current value?
- | When do withdrawals begin for purposes of calculating the benefit cost?

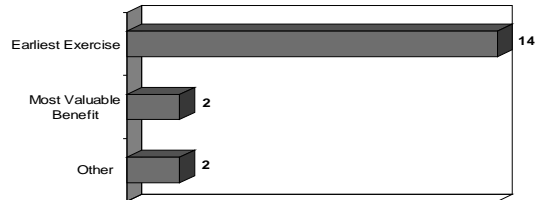
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## Our Survey found that Practice was Varied on these Issues

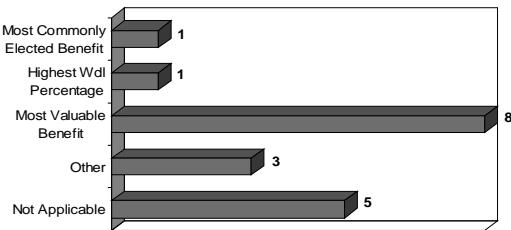
**How are you modeling withdrawal behavior where earliest exercise may not be the most valuable benefit to the policyholder?**

**Number of Responses: 18**



**How are you modeling contracts with multiple benefit guarantees? Assuming exercise of:**

**Number of Responses: 18**



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## SSA: Base Contract Reinsurance - Implications

- | 100% reinsurance of the base contract; no guaranteed rider reinsurance
- | Should direct writer's net accumulated net revenue change because of base contract reinsurance?
- | The impact of base contract reinsurance is to increase the component of reserve held for guaranteed riders

Gross of Reinsurance	Net of Reinsurance
Net Revenue <sup>1</sup> = 0.55%	Net Revenue = -0.15% (exclude M&E, revenue sharing)
Guaranteed rider component of SSA = 0 (since net revenue is positive)	Guaranteed rider component of SSA > 0 (since net revenue is negative)

| Direct writer with base contract reinsurance penalized, compared to another writer without reinsurance, all else being equal

1. Definition of Net Revenue = Prescribed Margin – Benefit Cost, refer Appendix 3 of AG 43

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## SSA: Individual versus Aggregate Reinsurance - Implications

- | Reinsurance treaties with aggregate provisions which do not 'bite' as of valuation date under prescribed assumptions
  - | How will modeling the reinsurance at seriatim level versus in aggregate affect the total SSA?
- | Difference in methodologies:
  - | Individual reinsurance uses the 'greatest present value of accumulated deficiency' approach
  - | Aggregate reinsurance is calculated separately as a present value of cash flows over the lifetime of the contract
- | Potentially little difference if business is homogenous, or very in-the-money
- | Potentially large differences as guarantees move out-of-the-money

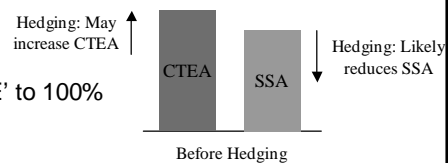
## Example: Individual versus Aggregate Reinsurance

Policy Reserve (in excess of CSV)	Gross of Reinsurance	Individual Reinsurance <sup>1</sup>	Aggregate Reinsurance <sup>2</sup>
Policy # 1 (Profitable)	0	0	0
Policy # 2 (Unprofitable)	40	25	40
Serialim Reserve for Total Block	40	25	40
Aggregate Reinsurance	n/a	n/a	(30)
<b>Total SSA (in excess of CSV)</b>	<b>40</b>	<b>25</b>	<b>10</b>
<b>Reinsurance reserve ceded</b>		<b>15</b>	<b>30</b>

1. Assume if reinsurance was determined on individual basis, PV reinsurance cash flows equals 15 for each policy
2. Aggregate reinsurance cash flows cannot be determined at seriatim level, e.g., because of aggregate calendar year limits in reinsurance treaty, refer AG 43 A3.3)C)2)

## AG43 Challenges: Hedging

- Can introduce significant model complexity, as well as communication challenges
- Many companies did not reflect hedging in their 2009 results
  - Only 6 of the 20 companies in our AG 43 survey included future hedging in the AG 43 calculation
- Hedging will reduce the SSA, but can increase or decrease the CTEA
  - Depends on strategy
  - Depends on instruments
- 'E' is capped at 70% under AG 43
  - If hedging increases the reserves, set 'E' to 100%



## AG 43 Challenges: Dynamic policyholder assumptions

- Towers Watson performed another survey in October 2009 on the key assumptions implemented for C-3 Phase II and VA CARVM
- Dynamic assumptions on GMWB, GMIB, and GMDB vary greatly among the participants
  - The functions utilized include Linear, quadratic, exponential, logistic...
  - Different floors and caps
  - Size of the prudent estimate margin often not well defined
- Reliable policyholder behavior assumptions are important as more policies are in the money due to the recent financial crisis
- As experience materializes, expect industry practice to evolve over the assumption setting

Questions?