



Principle-Based Reserves for Fixed Annuities

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Who's in Charge for VM-22?

- ▶ NAIC will make final decision
- ▶ Will be advised by its LATF, which will make its own decision
 - ▶ LATF has requested assistance from the American Academy of Actuaries
- ▶ Academy has agreed to provide assistance and advice
 - ▶ Annuity Reserve Work Group (ARWG) charged with providing assistance
 - ▶ Academy structure below the Board level:
 - ▶ Life Practice Council
 - ▶ Life Valuation Committee
 - ▶ ARWG

Products within VM-22 Scope

- ▶ Non-variable individual and group annuities
 - ▶ Deferred annuities
 - ▶ Payout annuities
 - ▶ Deposit fund products

Products within VM-22 Scope

- Payout Annuities
- Longevity Insurance
- Structured Settlement Annuities
- Traditional Deferred Annuities
- Two-tiered Annuities
- Market Value Adjusted Annuities
- Equity Indexed Annuities
- Bond Indexed Annuities
- Modified Guaranteed Annuities
- “CD” Annuities
- Gen Acct Bond Allocated Annuities
- Multi-bucket Annuities
- Directed Annuities
- Charitable Annuities
- Interest Indexed Annuities
- GICs
- Synthetic GICs
- Funding Agreements
- Terminated Pension Plan Annuities
- Qualified Plans (e.g., 401(k))
- Life & Annuity Combinations & Annuity Riders

Goals for VM-22

- ✓ Right-size reserves
- ✓ Recognize current and future product features
- ✓ Increase auditability of reserves
- ✓ Produce meaningful results that can be used by Management

What Is Being Considered?

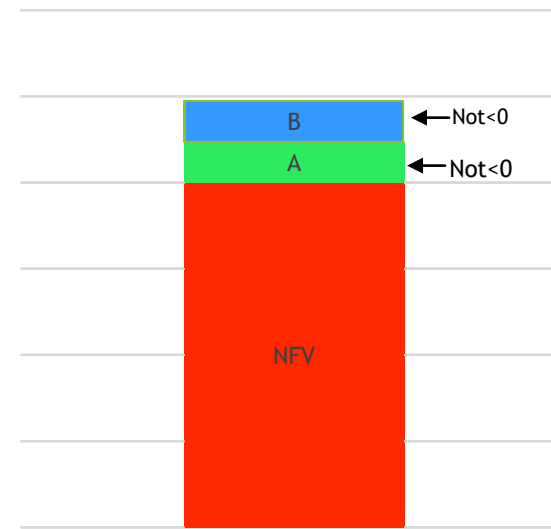
- ▶ Not simply an annuity version of VM-20; don't simply expand scope of VM-21 (a.k.a., VACARVM, AG43)
- ▶ Retain concept of a deterministic reserve (based on a set of prescribed assumptions) and another “modeled” reserve based on current assumptions
- ▶ New paradigm for the Modeled Reserve

The Reserve Definition

$$\left(\begin{array}{c} \text{Minimum} \\ \text{Reserve} \end{array} \right) = \sum_{\text{pols}} \text{NFV}_{\text{pol}} + A + B, \text{ where}$$

$$A = \max \left\{ \begin{array}{l} 0 \\ \sum_{\text{pols}} \left(\begin{array}{c} \text{Floor} \\ \text{Reserve} \end{array} \right)_{\text{pol}} - \sum_{\text{pols}} \text{NFV}_{\text{pol}} \end{array} \right\}$$

$$B = \max \left\{ \begin{array}{l} 0 \\ \text{Modeled Reserve} - \left(\sum_{\text{pols}} \text{NFV}_{\text{pol}} + A \right) \end{array} \right\}$$



Modeled Reserve Paradigm

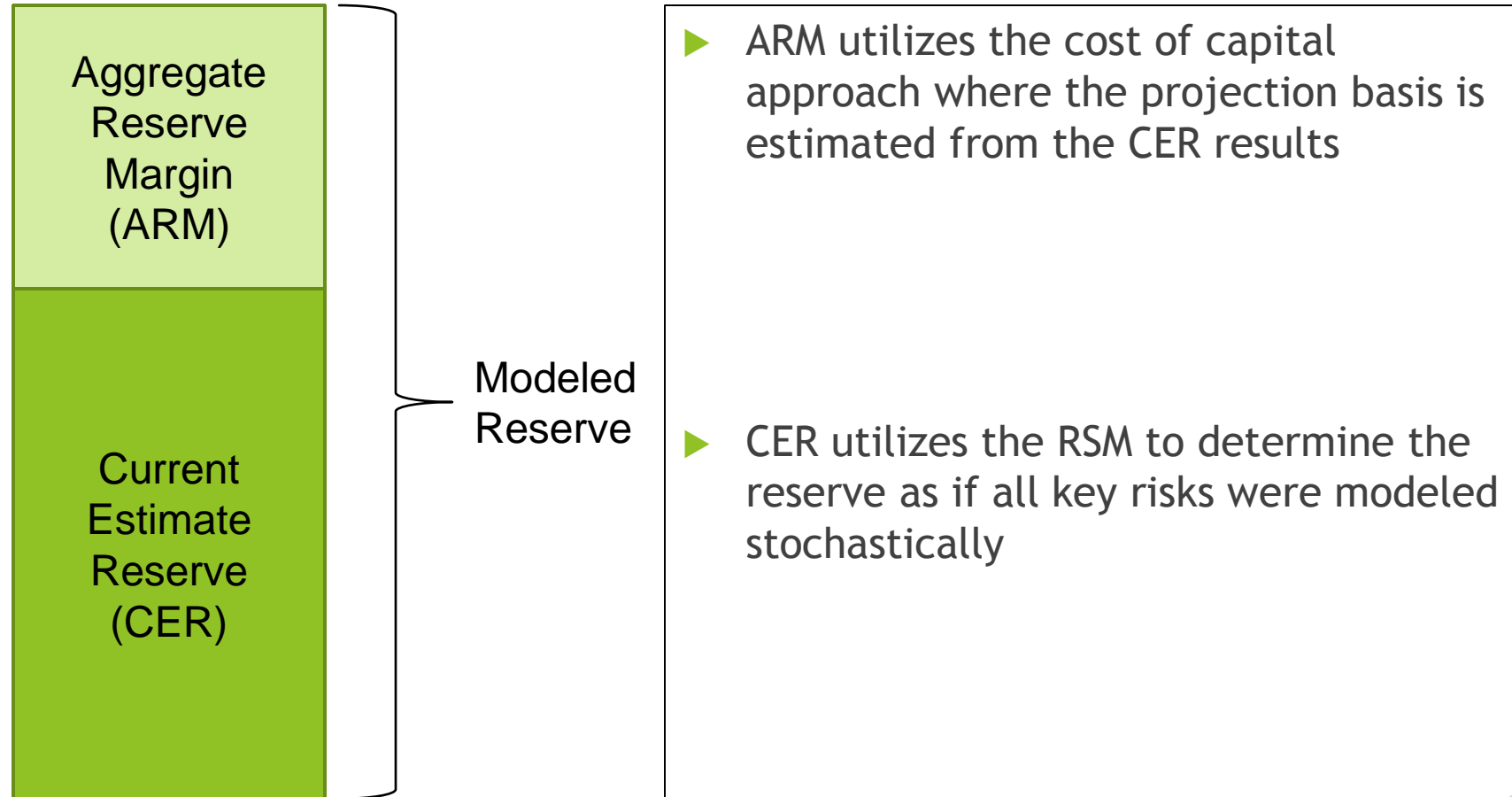
Modeled Reserve =

▶ Current Estimate Reserve

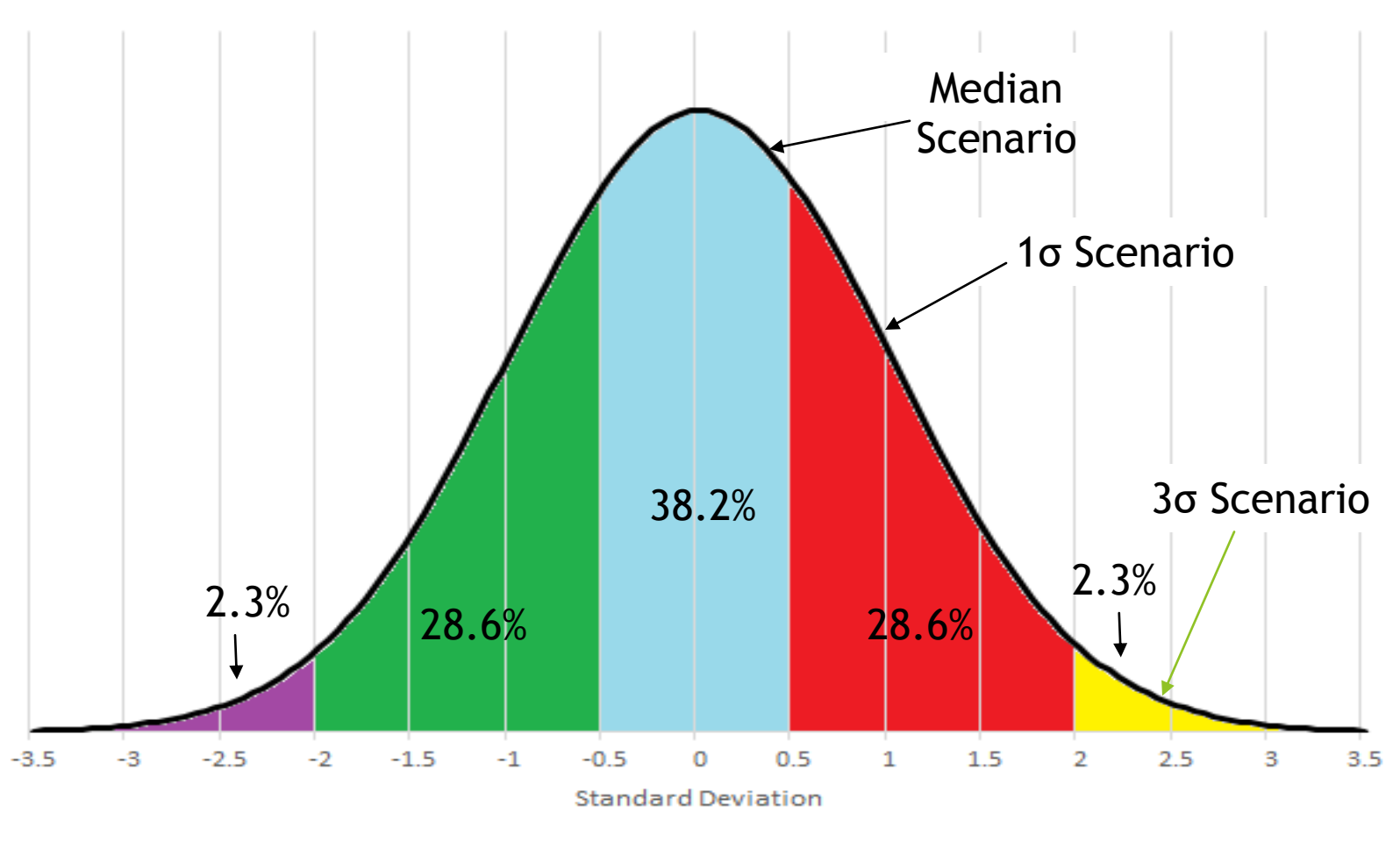
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▶ Aggregate Reserve Margin

Modeled Reserve



Scenario Probabilities



Modeled Reserve will Use a *Representative Scenarios Method*

- ▶ Generalized, Multi-Risk
- ▶ Model separated into Model Segments
- ▶ Blocks of business with similar risk profiles for both liabilities & assets
- ▶ Each Model Segment Reflects its **Key Risk Drivers**
- ▶ Modeled Reserve \approx Reserve as if all KRDs were modeled stochastically
- ▶ More practical to calculate & easier to audit

Current Estimate Reserve Components

Key Risk Driver	Scenario	Pattern	Scenario Reserve	Key Risk Driver Reserve	Current Estimate Reserve
Interest	3 σ	Pop Up	1,036,960,111	845,489,813	859,223,596
	σ	Pop Up	864,518,765		
	Median	Median	806,084,471		
	- σ	Pop Down	850,905,931		
	-3 σ	Pop Down	1,004,521,721		
Lapse	3 σ	Pop Up	810,379,648	806,138,600	859,223,596
	σ	Pop Up	807,784,580		
	Median	Median	806,084,471		
	- σ	Pop Down	804,670,130		
	-3 σ	Pop Down	800,589,276		

Actuary Must Be a Responsible Professional

Expertise & Professionalism of the Actuary is Crucial in

- ▶ Identification of the **KRDs** for each Model Segment
- ▶ Quantification of
 - Current Estimate Assumptions
 - Estimated Probability Distribution Points for the KRDs

The Current Estimate Reserve

Seven Steps to determining the Current Estimate Reserve

1. Identify Model Segments
2. Identify Current Estimate Assumptions
3. Identify **KRDs**
4. Generate 5 Representative Scenarios for each Model Segment:
 - Anticipated; +/-1 std. dev.; +/-3 std. dev.
5. Determine cash flows for each scenario for each Model Segment
 - Central estimate is weighted average by scenario probabilities
6. Aggregate the Scenario Reserves using **KRD** probabilities
 - Weighted by the range of scenarios within that KRD
7. Aggregate the **KRD** reserves

ARM uses Cost of Capital Approach

1. Determine KRD **T**otal **C**apital **A**mt for each Key Risk, Model Segment, year
 - For each KRD, the excess of the greatest scenario reserve over the central estimate
 - Add capital across all risk drivers using RBC-style square root formula to reflect non-correlation
2. Identify **S**pread **O**ver **T**reasuries = CoC - risk-free rate
3. Identify **FIT** factor, i.e., 35%
4. **COC** factor:
$$\text{CoCf} = \frac{\text{SOT}}{1 - \text{FITf}} \approx 6\% \text{ now}$$
5. ARM for a Model Segment = Sum of (PV for each yr's TCA) x CoCF discount
6. ARM = Sum over all Model Segments of ARM for those Model Segments

Disclaimer

The methodology outlined in this presentation represents the current direction of the Annuity Reserve Work Group (ARWG) for VM-22. As it is a work in progress, certain aspects are certain to change.