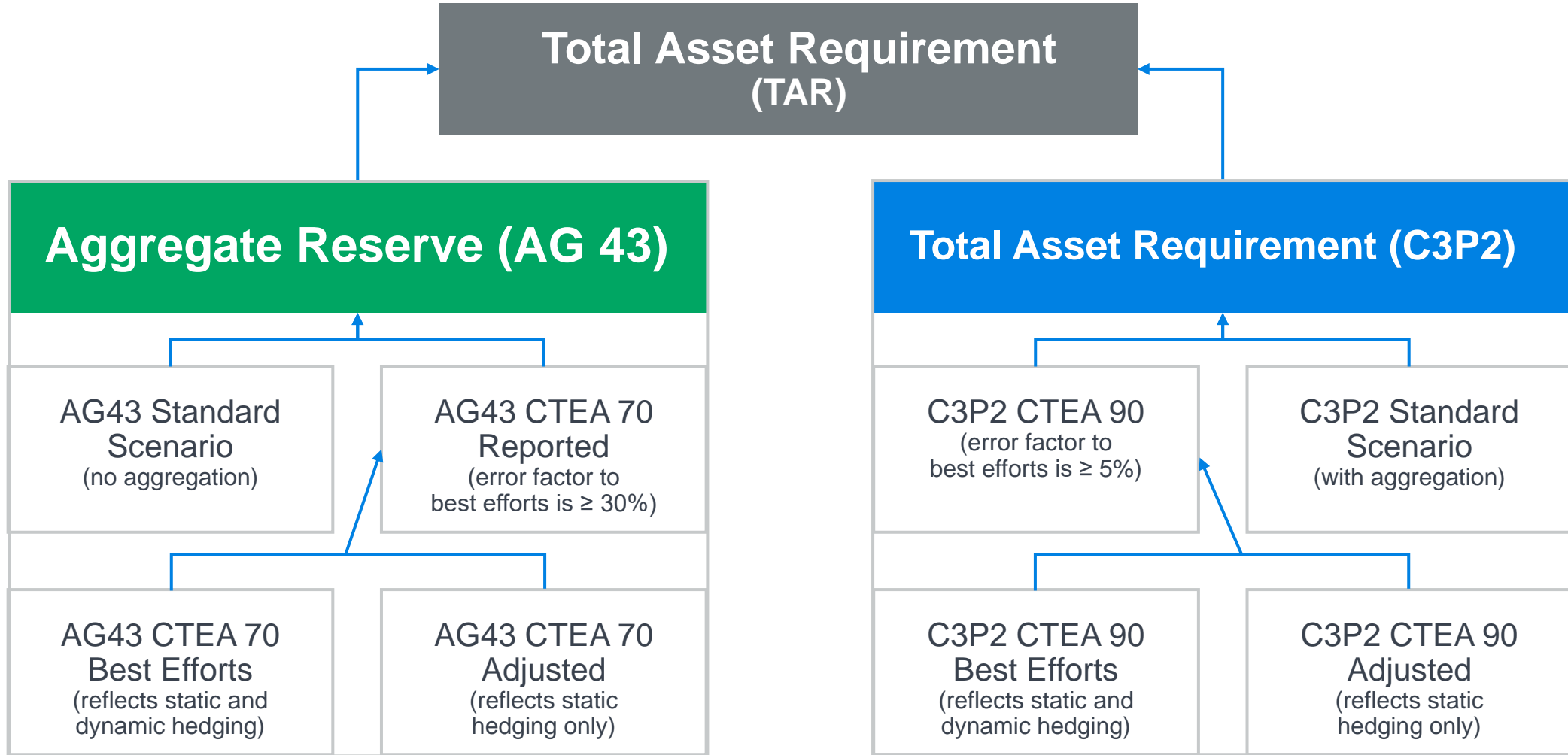# 15 - Update on AG 43 and C3 Phase 2 Revisions

# VM-21 statutory reform for variable annuities – Standard Projection

VALUATION ACTUARY SYMPOSIUM, DENVER

AUGUST 2019

Zohair Motiwalla, FSA, MAAA
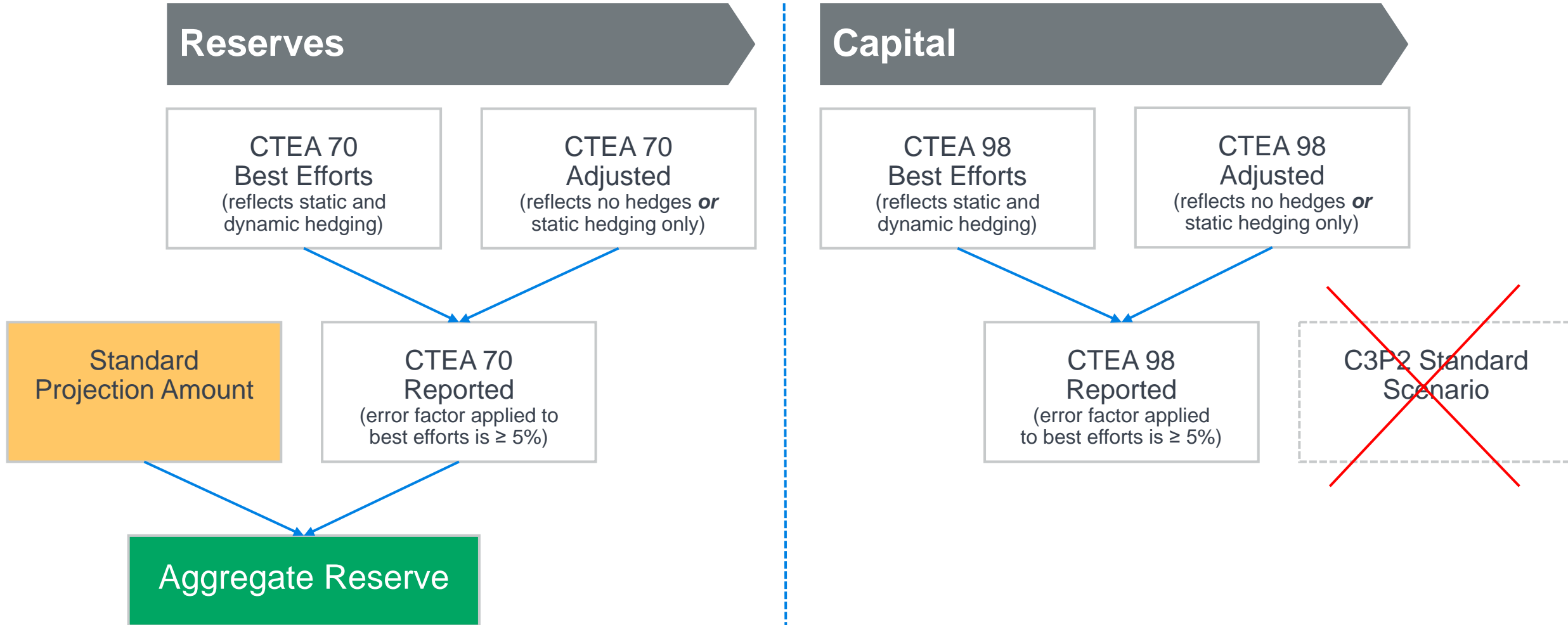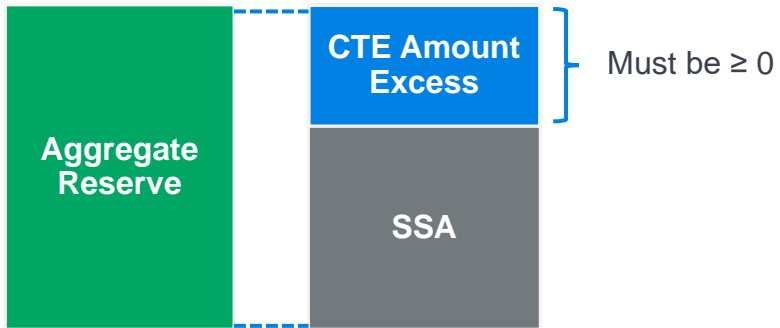
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# Current Statutory Framework – Overview

# Proposed statutory framework – overview



**Reserves**

| CTEA 70 Best Efforts (reflects static and dynamic hedging) | CTEA 70 Adjusted (reflects no hedges *or* static hedging only) |

Standard Projection Amount

CTEA 70 Reported (error factor applied to best efforts is ≥ 5%)

**Aggregate Reserve**

= CTEA 70 Reported + **Additional Reserve**

**Capital**

| CTEA 98 Best Efforts (reflects static and dynamic hedging) | CTEA 98 Adjusted (reflects no hedges *or* static hedging only) |

CTEA 98 Reported (error factor applied to best efforts is ≥ 5%)
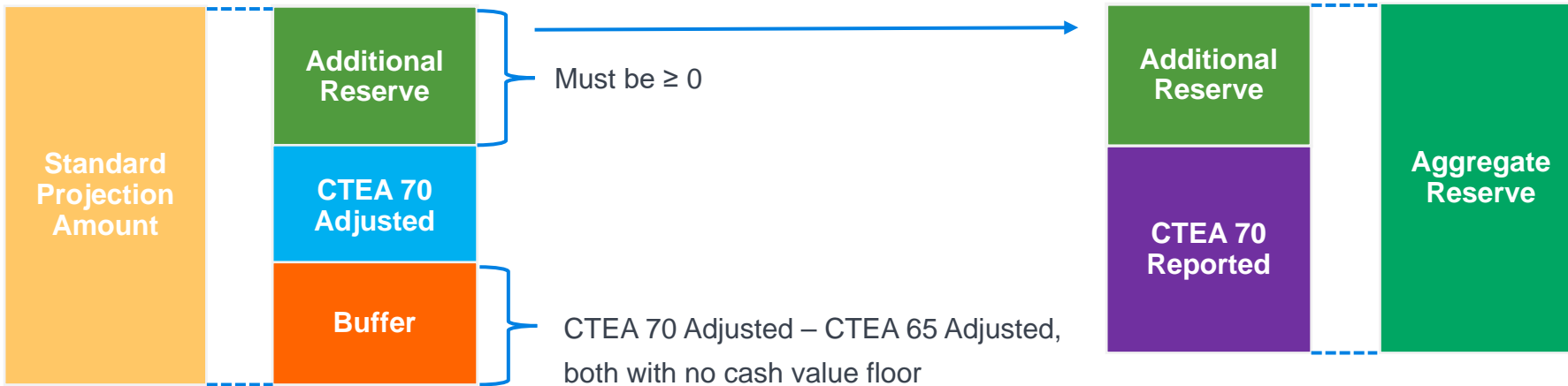
C3P2 Standard Scenario

# Comparison of statutory frameworks - reserves

**Current – AG 43**

**Note: Bar sizes are illustrative only**



**Proposed – VM-21**



Must be ≥ 0

CTEA 70 Adjusted – CTEA 65 Adjusted, both with no cash value floor

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# Standard Projection
# - Key components and differences relative to AG 43

# Standard Projection – Methodology

- AG 43 Standard Scenario referred to as the "Standard Projection"

## Current AG 43 Standard Scenario

- SSR = Max(CSV, BAR + PV(-ANR)) for each contract (no aggregation)
  - BAR = Basic Adjusted Reserve (pseudo-AG 33)
  - ANR = Accumulated Net Revenue (Accumulated prescribed margins less GMxB claims)

- Single drop/recovery market path (varies by asset class)

- Prescribed assumptions

- Discounting uses issue year specific statutory valuation rates (Plan Type A with guaranteed duration > 10 years and ≤ 20 years)

- Only reflect guaranteed revenue sharing in the margins

- Uneconomic in nature with minimal sensitivity to rates, exacerbating balance sheet mismatches (given that the liability is hedged relative to the underlying economics)

## VM-21 Standard Projection

- Now aligned with CTEA 70 (Adjusted)
  - GPVAD and Scenario Reserve calculation
  - All base contract and rider cash flows reflected
  - Aggregation permitted
  - No dynamic hedging
- Companies can choose one of two calculation options:
  - CSMP – Company Specific Market Path Approach
  - CTEPA – Uses a CTEA 70 (Adjusted) approach but with prescribed assumptions
- Provision for periodic refresh of prescribed behavioral assumptions based on industry-wide studies
- More rate sensitivity and therefore less mismatch on the balance sheet

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# Standard Projection – Prescribed assumptions

- Mortality
  - Follows the IAM 2012 Basic Mortality table with indefinite Scale G2 improvement relative to 2012
  - Mortality scalars which vary by presence of VAGLBs and attained age

- Policyholder behavior (PHB) assumptions
  - Refreshed prescribed policyholder behavior assumptions to align with industry experience
  - Applied on the basis of GMxB rider type and ITM
  - Hybrid GMIB ($4$ PWs up to a threshold <u>and</u> guaranteed growth) vs. Traditional GMIB (all else)

- ITM is the GAPV (Guarantee Actuarial Present Value) of the benefit relative to the account value
  - ITM needed at each time step to support setting PHB assumptions
  - Inner loop concept similar to Current Value concept in existing Standard Scenario framework
  - Inner loop mortality improvement applies only through to December 31, 2017 (unlike outer loop)
  - For Hybrid GMIBs, both an Annuitization GAPV and Withdrawal GAPV are calculated

- A withdrawal delay assumption, if applicable, is prescribed by the Withdrawal Delay Cohort Method
  - WDCM process splits existing records into multiple records/cohorts ($\Sigma$ cohorts = original record)
  - Each cohort has a specified timing of deferral

# Standard Projection - Prescribed Partial Withdrawals

## VM-21 Framework

- The VM-21 instructions were revised in May

- Includes wording in Section 6.C.4 that supports the flowchart to the right

- "SPO" refers to systematic withdrawals

- WDCM applies to non-conforming policies, i.e. non-SPO GLWB or Hybrid GMIB policies that have (in the year prior to the valuation date) either

  - Not taken a withdrawal, or

  - Taken an excess withdrawal



SPO / Non-SPO

SPO → Project SPO amount but capped at MAWA

Non-SPO → Contract Type: GMDB, GMAB, Trad GMIB, Hybrid GMIB, GMWB

GMDB, GMAB, Trad GMIB → Follow prescribed partial withdrawal assumptions (% of AV)

Hybrid GMIB and GMWB → Any withdrawals in preceding policy year?

No → Follow prescribed WDCM approach to determine election point. No withdrawals before election.

Yes → Are withdrawals in excess of MAWA?

Yes → Follow prescribed WDCM approach to determine election point. No withdrawals before election.

No → Non-lifetime GMWB: 70% of MAWA until AV exhausted, 100% of MAWA thereafter.

Lifetime GMWB: 90% of MAWA until AV exhausted, 100% of MAWA thereafter.

Hybrid GMIB: 90% of D4D MAWA until AV exhausted.

Once election starts →

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8

# Standard Projection - Withdrawal Delay Cohort Method

▪ The WDCM prescribes the withdrawal timing assumptions for GMWB and Hybrid GMIB riders.

## Current AG 43 Framework

- Current AG 43 Standard Scenario framework assumes immediate WB election at the earliest available opportunity consistent with any contractual provisions.

- WB policies that have not elected in reality (but that could) would be exercised immediately.

## VM-21 Framework

- Withdrawal Delay Cohort Method applies

- For riders with multiple VAGLB features, should assume the more punitive feature for purposes of constructing the withdrawal curve

- Need good in-force data to support determination of non-conforming withdrawers

- Best practice is to integrate the calculation of the withdrawal curve within the production models since similar GAPV calculations are needed for ITM (Removes a layer of cash flow validation and/or the need to modify more than one process)

- Helpful to have an external GAPV and WDCM replication process to satisfy auditor requests

- "Never elect" cohort should be rescaled when discarding withdrawal ages before the valuation date

- Several companies are adopting random sampling to manage runtime - need to test and calibrate this process against the full-blown process
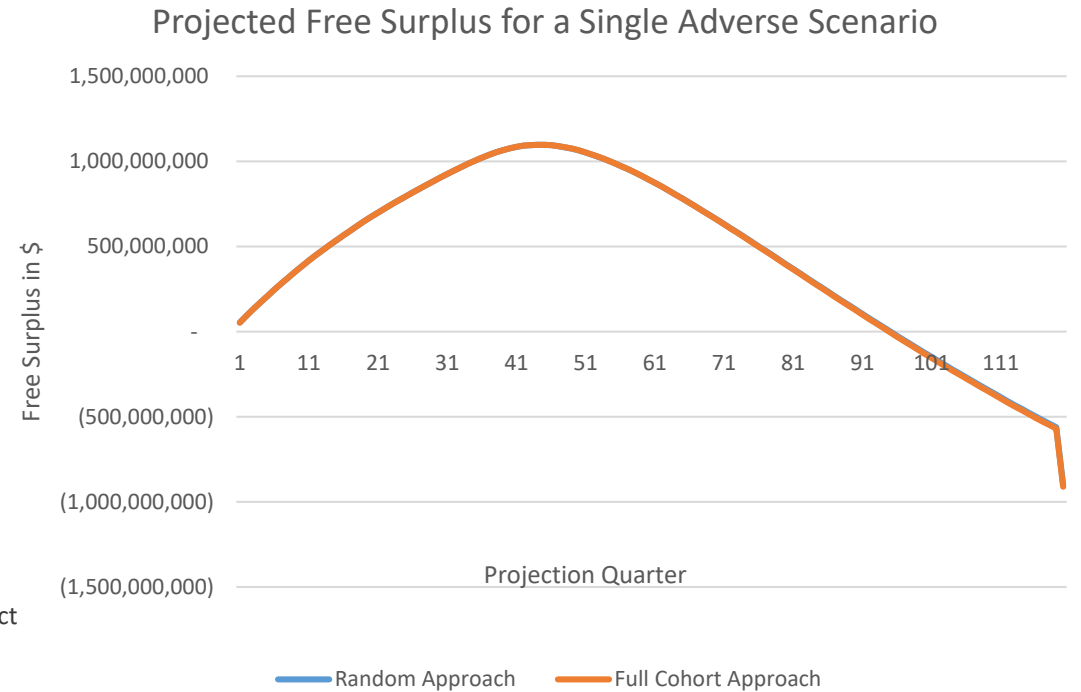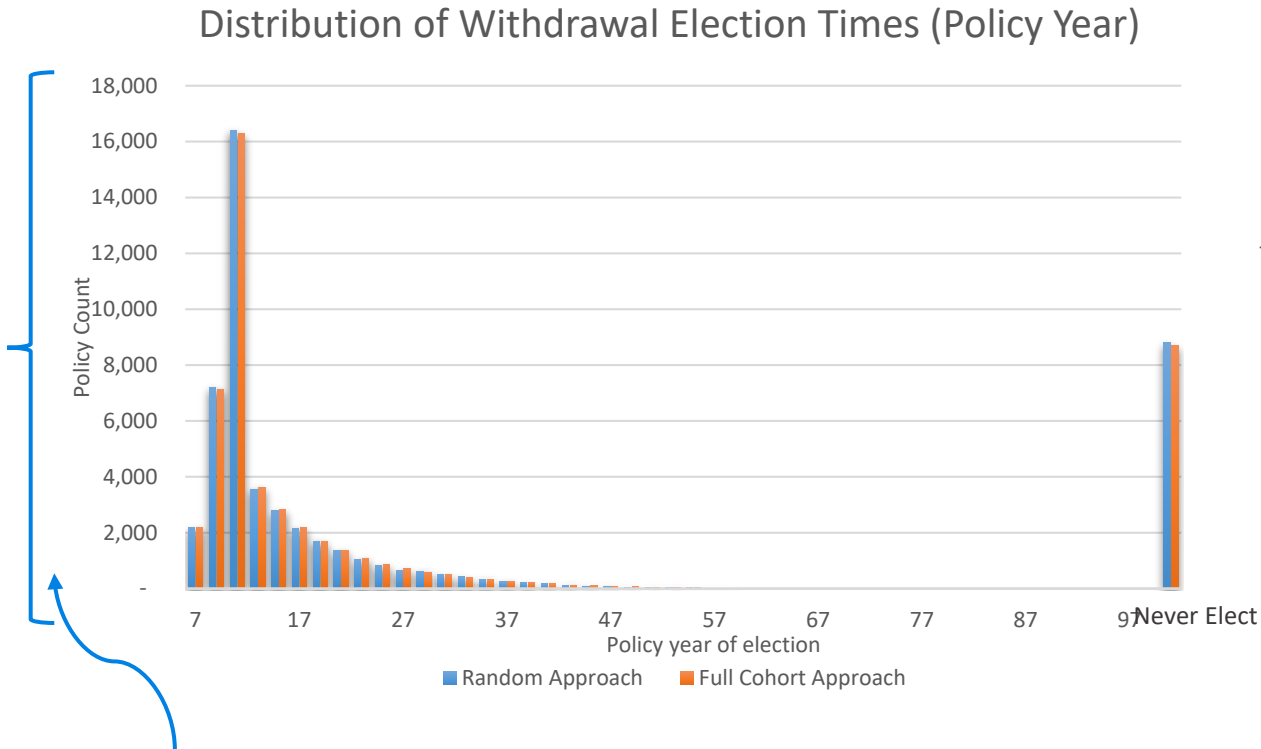
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# Withdrawal Delay Cohort Method

- Applies to GMWB and Hybrid GMIB policies that have either:
    - Not started taking withdrawals ("non-withdrawers"), OR
    - Taken an excess withdrawal in the last policy year ("non-conforming")

- Prescribed approach, with the purpose of splitting existing in-force records into multiple cohorts

- Cohorts simulate each potential age of starting withdrawals (i.e. initial withdrawal ages)

- Calculate a vector of GAPVs from <u>issue age</u> (not attained age on the valuation date) to a120 or end of the projection period, and apply a prescriptive algorithm to determine a CDF of cohort weights

- Prescribed "shocks" apply if the policy is qualified and/or there is guaranteed growth in the benefit

- Also defines a "never withdraw" cohort , whose weight varies by benefit type and tax status

- Any weights before the valuation date are discarded and the remaining CDF is rescaled

- Same GAPV approach as for ITM, but with a 3% discount rate

- **Designed to be a one-time approach for policies with the same issue age, gender, benefit and tax status**

# Withdrawal Delay Cohort Method – Case Study

- Overview of the hypothetical portfolio
  - 50,000 VA policies with GLWBs, comprising $6.5 billion in account value
  - Annual ratchet and 5% compound rollup for the first 10 policy years
  - MAWA% varying between 3 and 6% by attained age

- Perform WDCM cohorting process to:
  - Generate the required cohorts for all policies (~ 600,000 cohorts)
  - Store the weights for each cohort from issue

- For production, the actuary can then choose:
  - The full cohort approach
  - A simplified approach, such as random sampling

- Potential approach for random sampling:
  - Use a random roll to collapse all WDCM cohorts for each actual record to a single cohort (and deferral period)
  - The random roll should be compared to the adjusted weights (i.e. the rescaled weights after discarding issue ages prior to the valuation date)
  - Could opt for a stratified sampling approach by randomly selecting more than one cohort per actual record

# Withdrawal Delay Cohort Method – Case Study

- Comparison of Random Sampling approach to Full Cohort approach:



Distribution of Withdrawal Election Times (Policy Year)

Projected Free Surplus for a Single Adverse Scenario

For the random sampling approach, the y-axis represents the total policy count for each year of election

For the full cohort approach, the y-axis represents the sum of the probability weights across all cohorts assigned for each election time

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# Withdrawal Delay Cohort Method – Case Study

- Stability of random results (change the random seed):

| | GPVAD (POSITIVE VALUES INDICATE DEFICIENCIES) | | |
|---|---|---|---|
| | **85TH PERCENTILE** | **95TH PERCENTILE** | **99TH PERCENTILE** |
| Full Cohort Approach | (513,763,374) | (293,441,348) | 362,313,321 |
| Random Approach Run 1 | (508,157,194) | (286,549,708) | 373,580,935 |
| Random Approach Run 2 | (515,788,554) | (295,226,691) | 360,822,887 |
| Random Approach Run 3 | (512,286,245) | (291,652,102) | 365,459,258 |
| Random Approach Run 4 | (513,587,416) | (292,779,601) | 364,035,113 |
| Random Approach Run 5 | (514,675,793) | (294,887,823) | 358,851,912 |
| Mean for Random Approach | (512,899,041) | (292,219,185) | 364,550,021 |
| Ratio of Standard Deviation over Mean for Random Approach | -1% | -1% | 2% |

- To preserve independence between unique policyholder decisions and to reduce overall bias, the random seeds should be unique to each policyholder (and potentially, each economic scenario)

- The random seeds should be stored for the sake of reproducibility of results

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# Potential challenges with implementation

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# Standard Projection - Potential challenges

- Indefinite mortality improvement in the Standard Projection can be punitive for VAGLBs

- For areas where choice is provided, companies need to determine the optimal approach with respect to:
  - Financial impact
  - Implementation difficulty
  - Operational ease
  - Stability of results over time

- Complexity and runtime concerns with the Withdrawal Delay Cohort Method
  - Particularly so under CTEPA approach, which uses the same stochastic set of scenarios as the CTEA 70 Adjusted
  - These concerns can be mitigated using simplification techniques
  - Random sampling can be effective (and explicitly allowed in the instructions)
  - Any simplification needs to be calibrated and tested against the full blown approach (and re-tested each year in accordance with VM-31 requirements)
  - Important for companies to understand, maintain and be able to easily audit the WDCM and GAPV calculations

# Thank you!

**VA Stat Reform:  Hedging & Implementation Considerations**

**August 26, 2019**

**Steve Tizzoni, Actuarial Regulatory & Methodology**

# Agenda

**1**    **Implications of VA Stat Reform on Hedging**

**2**    **VA Stat Reform:  Implementation Considerations**

**3**    **VA Stat Reform Implementation:  Q&A**

Equitable
Holdings

# VA Stat Reform Encourages Hedging

## Key Change in VM-21/AG-43

## Impact

Increase in maximum allowed hedge credit for CDHS program

- Companies can now reflect up to 95% hedge effectiveness (5% hedge error) when calculating reserves and capital.

- To the extent more hedging is beneficial, companies can capture reserve credit for broader, more comprehensive hedging programs

Removal of uneconomic AG 43 standard scenario requirement

- Under current framework, the AG 43 standard scenario has minimal sensitivity to interest rates due to locked in SVL rates.

- Potential result of this feature is a statutory liability with significantly less interest rate sensitivity vs. underlying economics

- This can create a large, difficult to manage asset-liability mismatch on the balance sheet if economics are fully hedged, which can discourage hedging under current framework

## Key Change in VM-21/AG-43

## Impact

Effective removal of voluntary reserves

- Voluntary reserves based on smoothed C3 Phase 2 requirements typically would exhibit interest rate sensitivity well below the underlying economics
- Similar to AG 43 Std. Scenario, can create a significant gap between Statutory asset and liability interest sensitivity on the balance, resulting in difficult to manage volatility
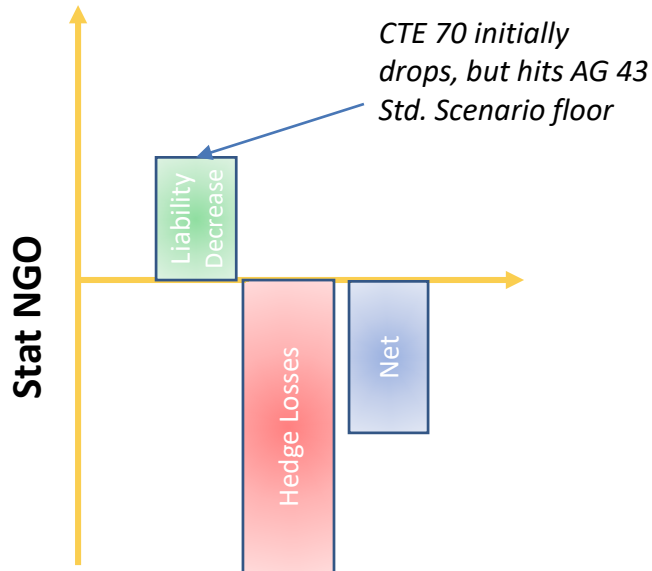
SSAP 108

- More favorable statutory accounting treatment of CDHS interest rate hedges
- For companies hedging to an economic, "fair value" type hedge target, SSAP 108 can help manage mismatch of interest rate risk on the Statutory balance sheet
- Removes statutory mismatch as key impediment to economic hedging

# VA Stat Reform Encourages Hedging: Practical Example

## VM-21 results in economic reserves:

- *Reserve requirement responds proportionally to both interest rate increases and decreases, and is not floored by uneconomic AG 43 standard scenario or smoothed voluntary reserves*
- *More credit for highly effective hedging programs*

## Economic stat reserve encourages more effective/economic first dollar hedging strategy

### Current AG 43: 100bps interest rate increase

*CTE 70 initially drops, but hits AG 43 Std. Scenario floor*

Stat NGO

Liability Decrease

Hedge Losses

Net

***Economic Hedging results in over hedged rate position and large statutory loss which could impair dividend capacity***

### VM-21: 100bps interest rate increase

Stat NGO

Liability Decrease

Hedge Losses

Net
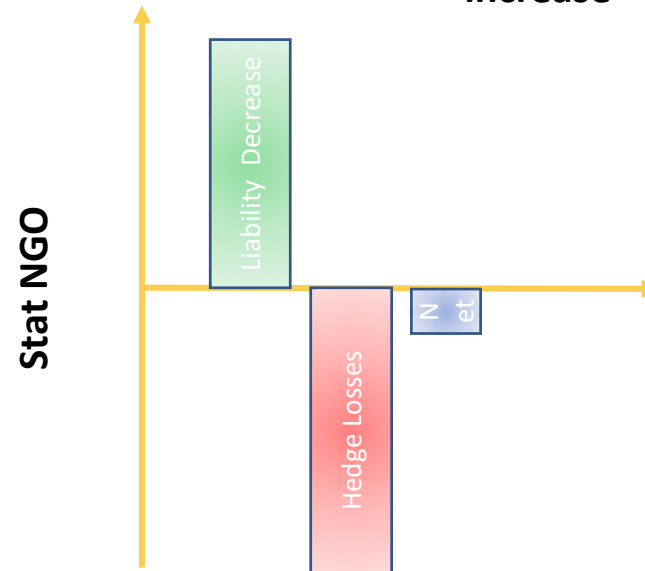
***Economic statutory liability => more rate sensitivity => better asset / liability match on the balance sheet if hedging to economics***

Equitable Holdings

**VM-21 provides for two options to reflect the impact of hedges**

<span style="color:red">**Methodology Choice can have a significant impact on the liability financial profile & operational complexity**</span>

**1) Explicit Hedge Methodology**
- Explicitly model CDHS across each stochastic scenario
- Generally requires stochastic-on-stochastic projections – operationally intensive
- Adjustment for hedging error

**2) Implicit Hedge Methodology**
- Hedged GMxB riders are valued at fair value (generally consistent with GAAP 'fair value' sans adjustment for own credit risk, i.e. risk neutral)
- Reflects "effectiveness" of hedge program relative to fair value
- Resulting liability should move in tandem with economic value with greater market sensitivity relative to explicit methodology
  - Potential for strong asset / liability match on the statutory balance sheet if hedging to the economic value

The Implicit Hedge Methodology was previously available in existing AG43, but can be more impactful now that non-economic portions of AG43/C3P2 are removed

> **=> Companies may want to re-consider methodology to model CDHS in VM-21**

# Agenda

| | |
|---|---|
| **1** | **Implications of VA Stat Reform on Hedging** |

| | |
|---|---|
| **2** | **VA Stat Reform:  Implementation Considerations** |

| | |
|---|---|
| **3** | **VA Stat Reform Implementation:  Q&A** |

Equitable
Holdings

## Challenge / New Element

## Impact

Standard Projection

- Alternate set of NAIC stipulated assumptions
- Complex implementation **require significant 1st line and 2nd line reviews to ensure accuracy** – esp. withdrawal & GAPV calculations
- Need to assess Company annual assumption updates relative to Standard Projection
  - Increase gap vs. NAIC or decrease gap?

Methodology

- VM-21 contains several significant methodology decisions that companies will need elect:
  - Std. Projection Methodology (CSMP, CTEPA)
  - C3P2 tax methodology
  - Hedge Methodology (implicit, explicit)
  - GMLB claims:  model cash or model payout annuity reserve (now VM-22)
  - Methodology for calculating GPVAD (scenario iteration etc.)
- Should assess methodology choices across various market conditions to fully understand impact to liability

# Implementation Considerations

## Challenge / New Element

## Impact

### Early Adoption

Key reasons to consider early adoption:
- Better alignment of assets and liabilities on the balance sheet
- Potential favorable impact to Stat surplus / dividend capacity
- Instill confidence in market Company is ready for VA Reform

Early adopt certain aspects of VM-21?

### Disclosures!

- Don't let required disclosures & sensitivities needed for VM-21 memo catch your implementation team by surprise.
- Consider overlap with LDTI type disclosure and movement analysis

### Governance

- Expect significant model and assumption governance requirements
- Allow for ample time for documentation and review by governance team

## Challenge / New Element

## Impact

### Additional Requirements for NY Insurance Companies

- NY DFS has released 4 drafts of proposed NY PBR legislation
- Most recent drafts show a bifurcated NY-specific reserve requirement, on top of NAIC's VM-21 requirement

**Inforce Business**: AG 43 Standard Scenario with limited modifications

**New Business:** NY Objective floor with significant conservatism added to policyholder behavior assumptions and mortality relative to VM-21, as well as conservative economic assumptions
- Potential for option value requirement as well
- There will be a full exposure period on NY's draft regulation
- Will result in extremely complex model to analyze & govern

### Modernization

- VM-21 increases the complexity of the model
  - Standard Projections
  - Scenario Iteration methodology
  - NY Specific Requirements
- Will want to fold VM-21 process into broader Actuarial Modernization efforts

# Agenda

| | |
|---|---|
| **1** | **Implications of VA Stat Reform on Hedging** |

| | |
|---|---|
| **2** | **VA Stat Reform:  Implementation Considerations** |

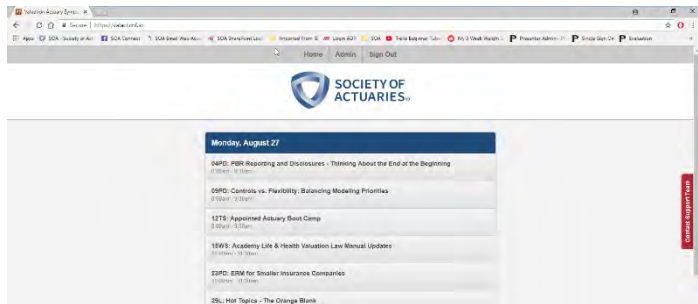| | |
|---|---|
| **3** | **VA Stat Reform Implementation:  Q&A** |

**Equitable**
Holdings

# To Participate, look for Polls in the SOA Event App or visit **valact.cnf.io** in your browser

Find The Polls Feature Under **More** In The Event App
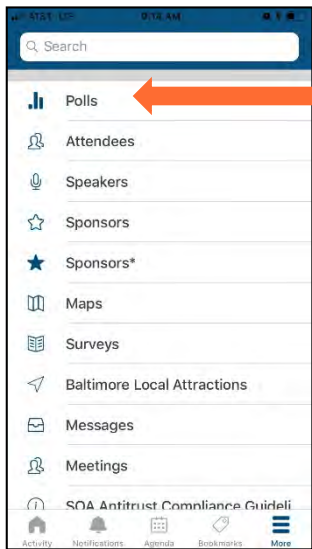
Type **valact.cnf.io** In Your Browser
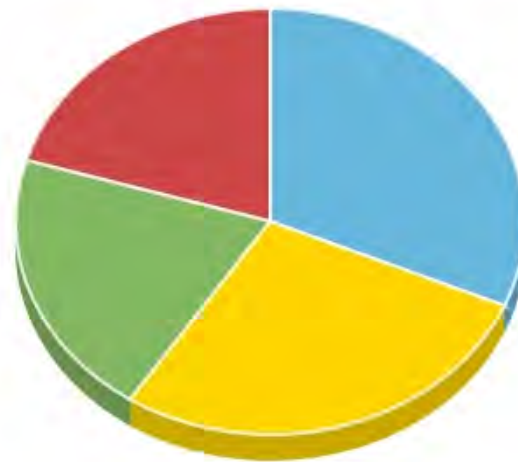
**Choose your session (15)**

**or**

**Respond to Polls when they appear**

# Social Q&A

# Poll: Under VM-21, how do you plan to model your CDHS?



| | | |
|---|---|---|
| 🔵 | No CDHS | 31.48% |
| 🟡 | Explicit Methodology | 27.78% |
| 🟢 | Implicit Methodology | 20.37% |
| 🔴 | Undecided | 20.37% |

# Poll: Under the VM‑ 21 framework, there is now a lower minimum allowable hedge error factor.  What level of error factor do you plan on using?

| | | |
|---|---|---|
| Less than 10% | 26.32% | |
| Between 10% and 29.9% | 10.53% | |
| Between 30% and 49.9% | 3.51% | |
| 50%+ | 7.02% | |
| No CDHS | 36.84% | |
| Undecided | 15.79% | |

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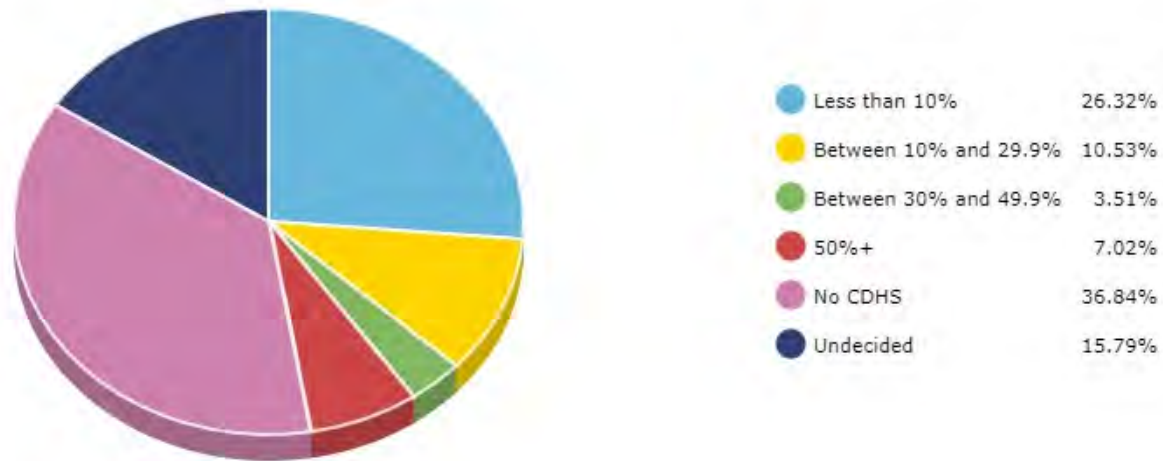
**Poll: For the Standard Projection calculation, companies can adopt one of the following two approaches: Company Specific Market Path Approach (CSMPA) or CTE with prescribed assumptions (CTEPA). Which method do you expect your Company to use?**



| | |
|---|---|
| Company Specific Market Path Approach (CSMPA) | 5.36% |
| CTE with Prescribed Assumptions | 75.00% |
| Undecided | 19.64% |

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16
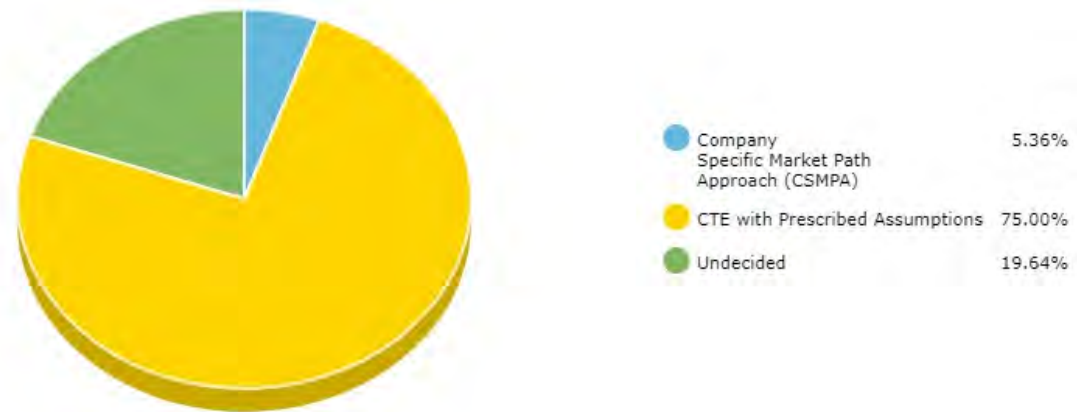
# Poll: For the RBC C3 Phase 2 calculation, companies can apply either of the following approachs:  Macro Tax Adjustment (reflect taxes as an adjustment to pre-tax results) or Specific Tax Recognition (explicitly model taxes in the model).  Which methodology



| | | |
|---|---|---|
| Macro Tax Adjustment | | 64.81% |
| Specific Tax Recognition | | 5.56% |
| Undecided | | 29.63% |

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Holdings
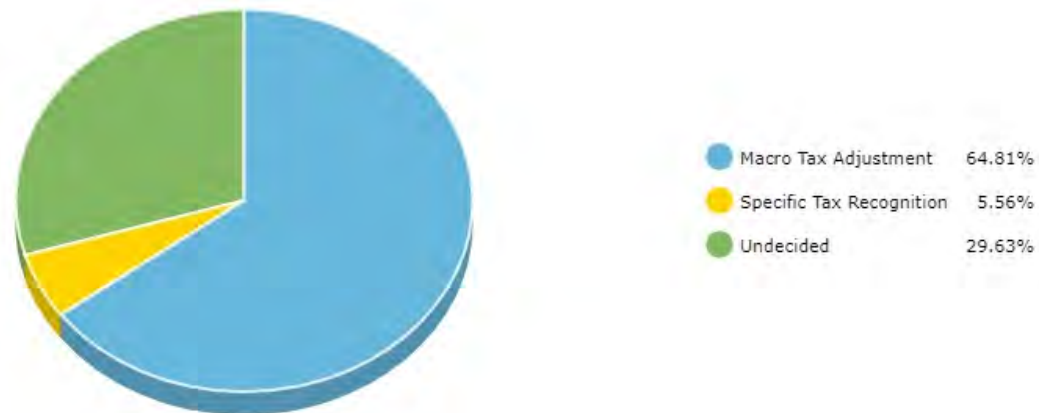
# Poll: Under the VM-21 framework, companies are allowed to smooth the C3 Phase 2 RBC charge. Do you plan on performing smoothing on the C3 Phase 2 RBC charge?



| | | |
|---|---|---|
| 🔵 | Yes | 26.92% |
| 🟡 | No | 21.15% |
| 🟢 | Undecided | 51.92% |
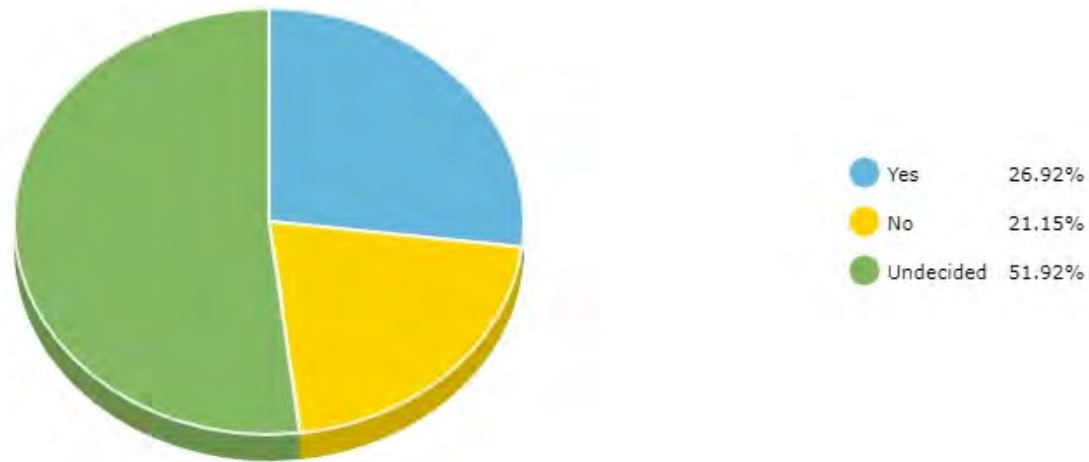
# Poll: What methodology do you expect to use to calculate GMIB claims?
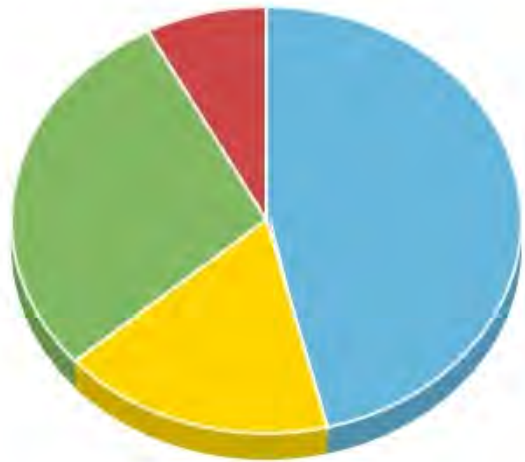


| | | |
|---|---|---|
| ● | Fully model GMIB/GMWB cash flows | 46.15% |
| ● | Model anticipated payout annuity statutory reserve | 17.31% |
| ● | Not applicable (my company does not offer any GMIB contracts) | 28.85% |
| ● | Undecided | 7.69% |

Equitable Holdings

# Poll: Do you expect your company will early adopt the VM-21 methodology before 1/1/2020?



| | | |
|---|---|---|
| ● Yes | 14.55% |
| ● No | 78.18% |
| ● May early adopt certain targeted elements | 3.64% |
| ● Undecided | 3.64% |

Equitable Holdings
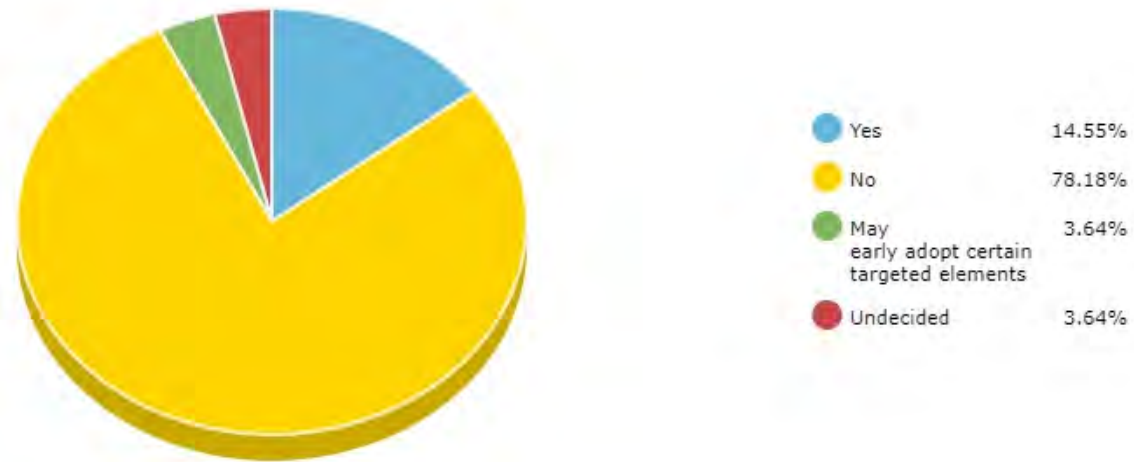
# Poll: As part of VM-21 implementation, are you planning to utilize SSAP 108 hedge accounting?



| | | |
|---|---|---|
| Yes | 15.38% |
| No | 19.23% |
| Undecided | 23.08% |
| What is SSAP 108 again? | 42.31% |

Equitable
Holdings
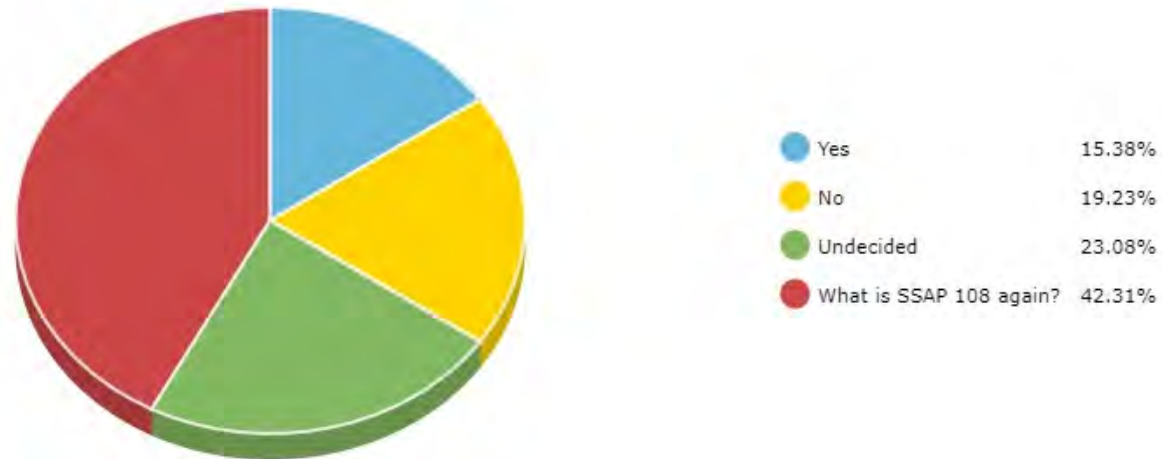
# SESSION 15 – UPDATES ON AG 43 AND C3 PHASE II REVISIONS (VA STATUTORY REFORM)

2019 SOA VALUATION ACTUARY SYMPOSIUM
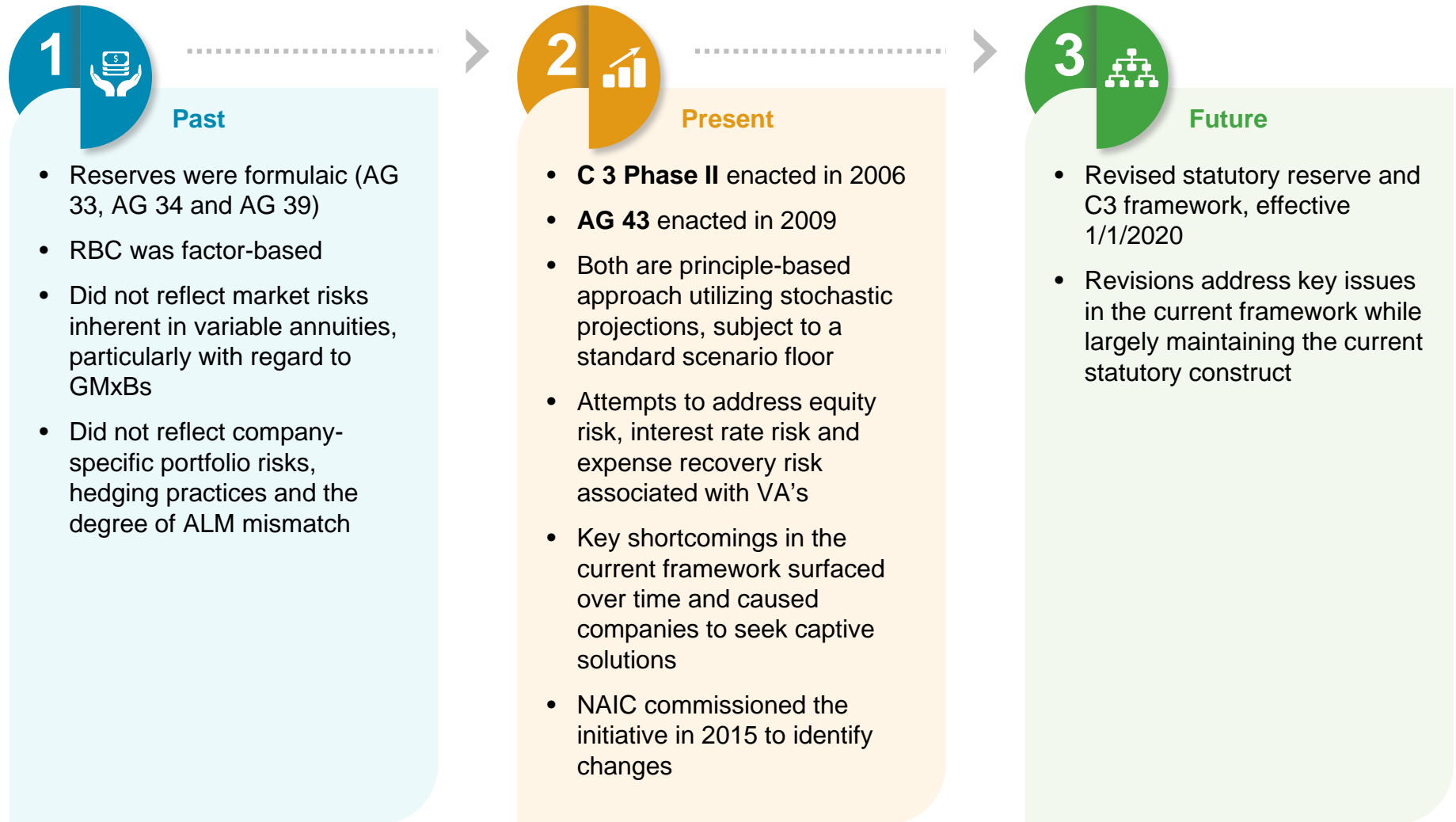DENVER, AUGUST 26, 2019

Yuan Tao, FSA, MAAA, CFA

MARSH & McLENNAN
COMPANIES

# Agenda

**1**  **Background and timeline**

**2**  **Overview**

**3**  **Stochastic CTE**

**4**  **Key takeaways**

# VA statutory reform background
## Evolution of VA statutory requirements

**1** **Past**

- Reserves were formulaic (AG 33, AG 34 and AG 39)
- RBC was factor-based
- Did not reflect market risks inherent in variable annuities, particularly with regard to GMxBs
- Did not reflect company-specific portfolio risks, hedging practices and the degree of ALM mismatch

**2** **Present**

- **C 3 Phase II** enacted in 2006
- **AG 43** enacted in 2009
- Both are principle-based approach utilizing stochastic projections, subject to a standard scenario floor
- Attempts to address equity risk, interest rate risk and expense recovery risk associated with VA's
- Key shortcomings in the current framework surfaced over time and caused companies to seek captive solutions
- NAIC commissioned the initiative in 2015 to identify changes

**3** **Future**

- Revised statutory reserve and C3 framework, effective 1/1/2020
- Revisions address key issues in the current framework while largely maintaining the current statutory construct

# VA statutory reform timeline
## The reform is the result of a multi-year NAIC initiative to improve VA statutory accounting

**January 1, 2020**
**Effective date**
**optional early adoption YE 2019**

**August 2019**
**NAIC adopted revised AG43 and VM-21**

**Mid 2018:**
**VAIWG proposed framework revisions**

**Feb – July 2016**
**NAIC conducted Quantitative Impact Study**

**Feb – Sept 2017**
**NAIC conducted second Quantitative Impact Study**

**Mid 2015**
**NAIC commissioned VA reform initiative**
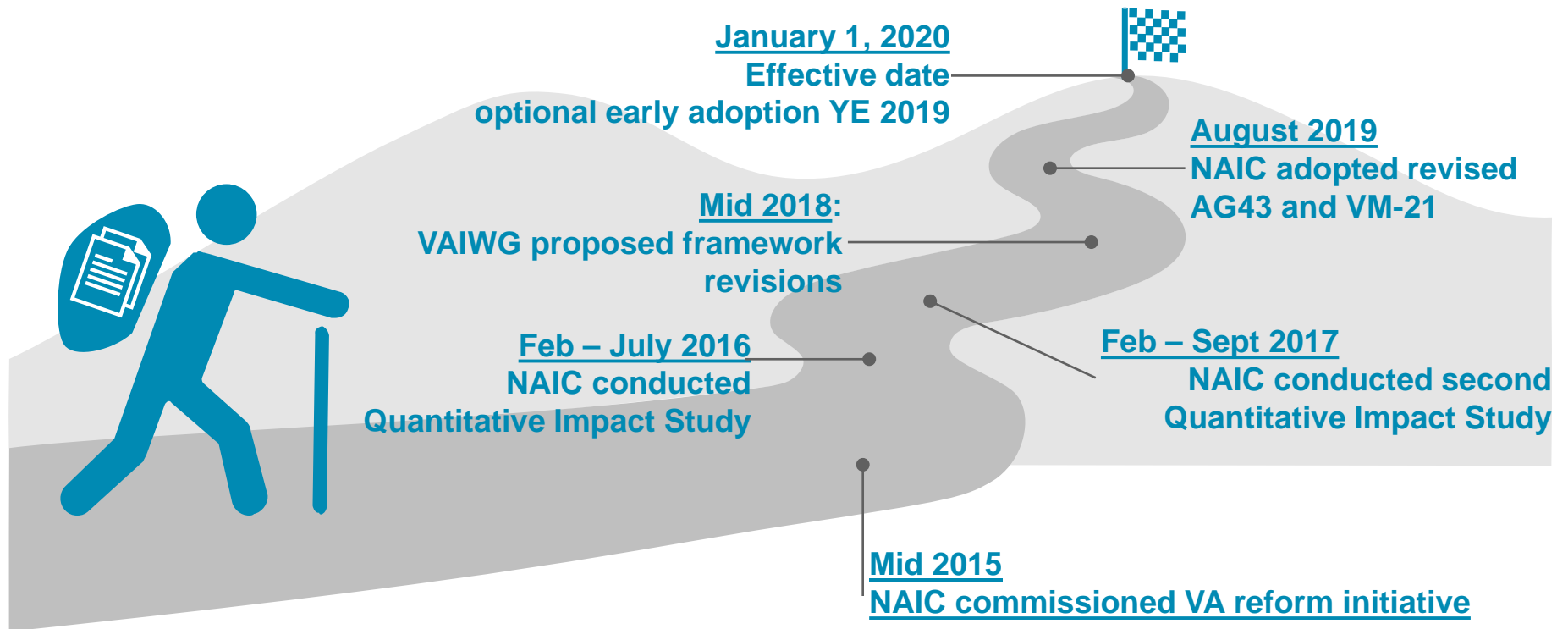
The revised AG43 and VM-21 have been formally adopted at the 2019 NAIC Summer National Meeting

# VA statutory reform
## At a glance

## Goals

- **Target properties**: ensure robustness of funding requirements for liabilities, promote sound risk management, promote comparability across insurers and products

- **Design choices**: preserve current statutory construct where feasible, minimize implementation complexity

## Scope & timeline

- **Scope:** apply retrospectively to contracts issued after 1/1/1981, optionally for contracts issued prior to 1981

- **Effective date:** 1/1/2020, optional early adoption (YE 19)

- **Phase-in**: optional three-year phase-in period, can be up to 7-year with regulatory approval
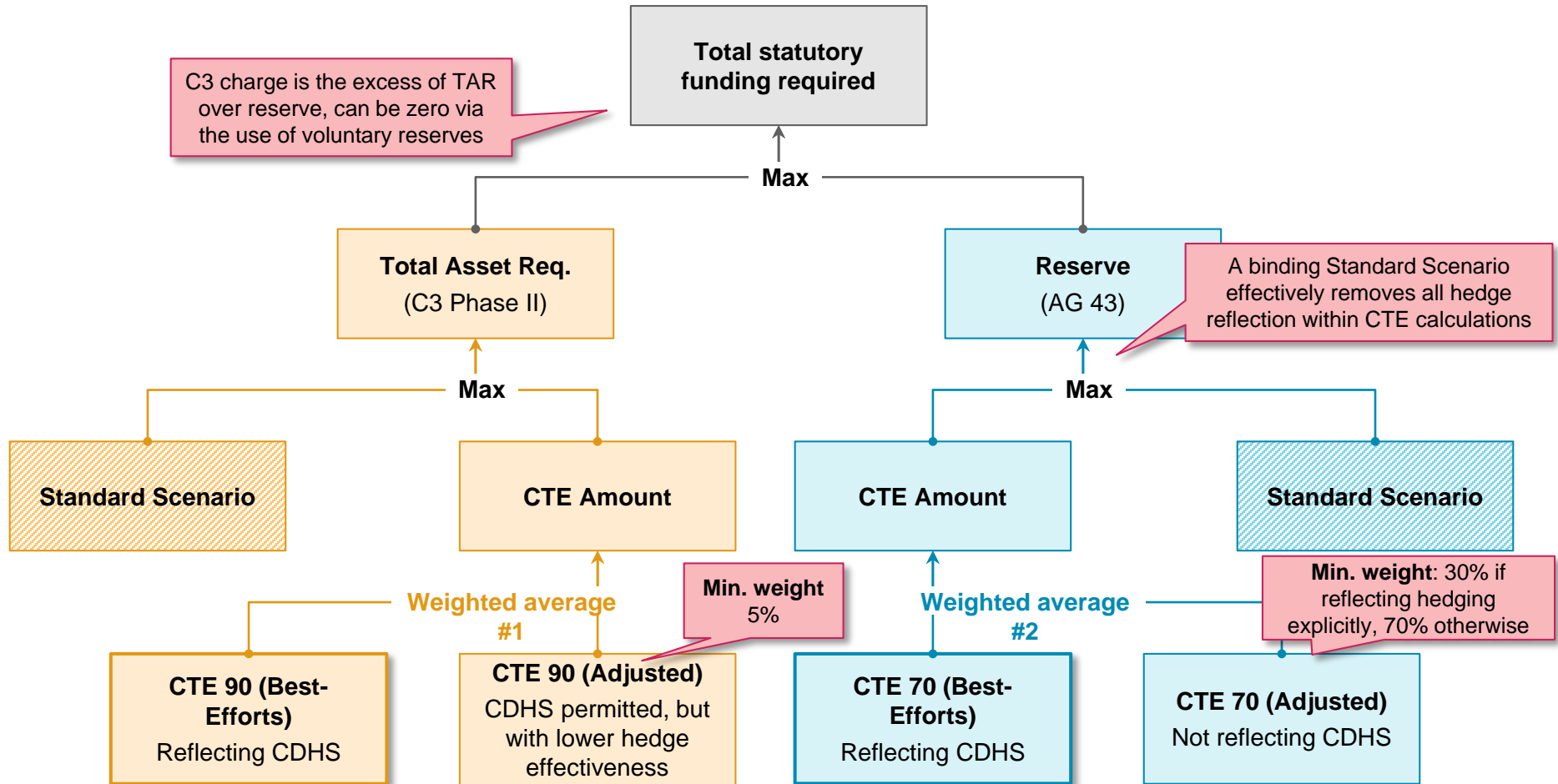
## Key changes

- **Stochastic:** alignment of scenarios and asset projections with VM-20, methodology updates to remove non-economic volatility, and alignment of reserve and capital calculations

- **Standard Projection:** replacement of Standard Scenario with Standard Projection, requiring prudent assumption management

# Current VA statutory framework
## The stochastic and standard scenario, AG 43 and C3 Phase II are structurally misaligned and produce unintended results



**Total statutory funding required**

C3 charge is the excess of TAR over reserve, can be zero via the use of voluntary reserves

**Max**

**Total Asset Req.**
(C3 Phase II)

**Reserve**
(AG 43)

A binding Standard Scenario effectively removes all hedge reflection within CTE calculations

**Max**

**Max**

**Standard Scenario**

**CTE Amount**

**CTE Amount**

**Standard Scenario**

**Weighted average #1**

Min. weight 5%

**Weighted average #2**

**Min. weight**: 30% if reflecting hedging explicitly, 70% otherwise

**CTE 90 (Best-Efforts)**
Reflecting CDHS

**CTE 90 (Adjusted)**
CDHS permitted, but with lower hedge effectiveness

**CTE 70 (Best-Efforts)**
Reflecting CDHS

**CTE 70 (Adjusted)**
Not reflecting CDHS

# Revised statutory framework
## Standard projection is aligned with CTE adjusted; reserve and TAR follow the same stochastic distribution
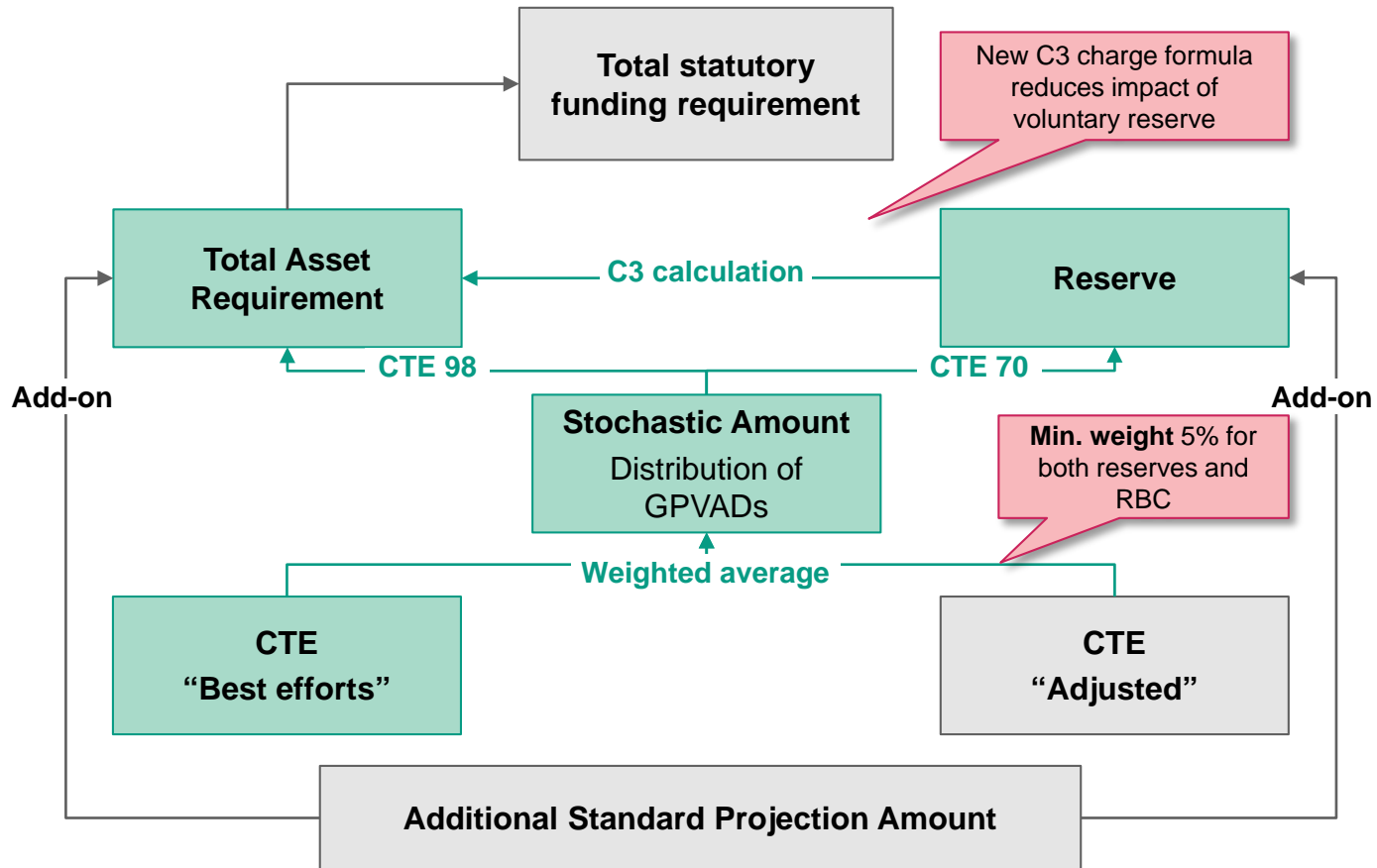


Revised framework reduces disincentive to hedging and lowers balance sheet volatility with better alignment between asset and liability

# Summary of key revisions

**◄──────────────── High level categories ────────────────►**

| Stochastic (CTE) | Standard scenario (SS) | C3 & other topics |
|---|---|---|
| **1** Remove working reserves when calculating scenario GPVAD | Align AG43/VM-21 SS calculations with CTE "adjusted" | Calculate C3 as difference between total statutory reserve and CTE 98 on same distribution |
| **2** Discount deficiencies at net asset earned rate on additional assets | Remove C3 Phase II standard scenario | Permit smoothing to be conducted on the C3 charge, but not on TAR |
| **3** Use VM-20 scenario generator for interest rate and separate account returns; only allow proprietary scenario generator when it does not materially reduce TAR | Refresh prescribed PH behavior assumptions to align with industry experience | Increase admissibility limit for designated VA hedges |
| Introduce principles to govern implied volatility scenario generation, with a prescribed "safe harbor" approach | Use SS construct to govern model choices & actuarial assumptions only, via a reserve "add-on" | Endorse hedge accounting for interest rate derivatives that are part of VA hedge programs |
| **4** Follow VM-20 guidance on general account asset projections | Project SS on an aggregated basis, but with disclosure of aggregation benefit | Allocate aggregate reserve to seriatim level based on Present Value of Accumulated Product Cash Flows |
| Permit immediate liquidation of current hedges in CTE "adjusted" and non-reflection of MTM hedge gains or losses | Calculate SS based on company-specific market paths, select from a panel of standardized paths | Various disclosure requirement changes |
| Reduce minimum allowable CDHS "error factor" but require back-testing to support chosen factor | Allow SS amount to be calculated as a CTE amount with prescribed assumptions | |
| Align conservatism margin for reflecting non-guaranteed revenue sharing income with historical experience | | |

# **1** Remove Working Reserve (WR) from the GPVAD calculation
## Under the current framework, changes in the market conditions result in B/S volatility as hedge gains and losses are not offset by change in WR

| Balance sheet at time 0 | Balance sheet at time 1<br>Favorable market conditions | Balance sheet at time 2<br>Return to *time 0* market conditions |
|---|---|---|

**Projected balance sheet under the existing framework**
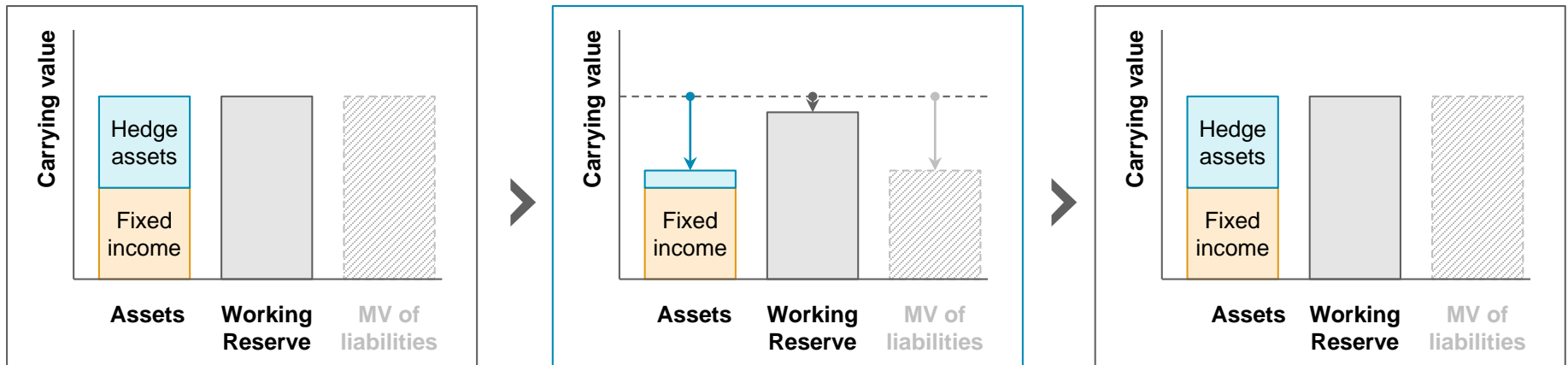


- Insurer hedges on a FV basis; hedge losses offset decrease in FV of liabilities

- Statutory reserves are less market-sensitive and respond more slowly

- Creates a large deficiency in market conditions favorable to the liability

- Carrying value of assets and liabilities return to levels close to time-0 values

- However, point of greatest accumulated deficiency may have already been reached by previous hedge cash flows

## The revision removes the Working Reserve from the projection and aligns more closely with other statutory frameworks such as VM-20 and Cash Flow Testing

# ② Discount rates for accumulated deficiencies
## Net asset earned rate (NAER) on additional assets is used to calculate the greatest present value of accumulated deficiency (GPVAD)

### Current framework

- Current AG 43 guidance is relatively ambiguous with respect to the starting asset amount and the discount rate for deficiencies

- As a result, two different practices are observed in industry:

| Approach | Implied assets backing reserves |
|---|---|
| **A** Set starting assets as CSV or prior quarter's reserves, then add the CTE 70 of GPVADs | Starting assets included in projection, plus cash available for immediate reinvestment |
| **B** Iteratively solve for starting assets such that the CTE 70 of GPVADs is zero | Assets modeled in the final iteration of starting assets |

### Revised framework

- Allow both approaches, but require accumulated deficiencies to be discounted at the **Net Asset Earned Rate** (NAER) on Additional Assets

- NAER is defined as earned rate on a "closed portfolio" of general account assets available on the valuation date that do not constitute a part of starting assets

- Intended to capture reinvestment, in line with the company's investment policy, of coupon and maturity payments of the initial additional asset portfolio

- NAER provides an approximation of approach B without requiring computationally-intensive starting asset iterations

New methodology promotes more accurate reflection of ALM and yield characteristics of assets, and aligns practices across the industry and with VM-20

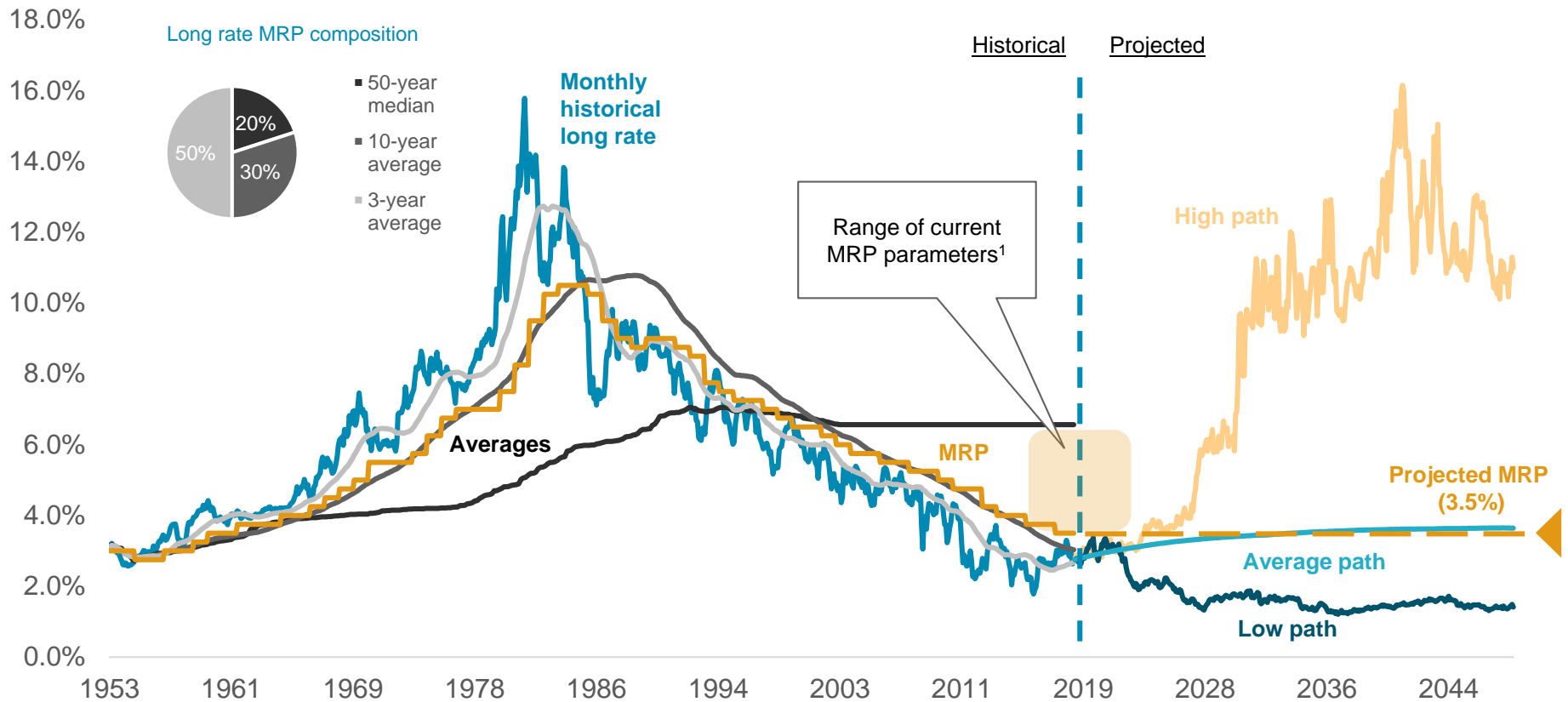# ③ Changes to scenario generation (1 / 2)
## New framework promotes greater consistency and comparability for market participants

| | Proposed changes | Details | Outcomes / implications |
|---|---|---|---|
| **1** | Use VM-20 generator for interest rates | • VM-20 scenario generator (ESG) and mean reversion parameter (MRP) are prescribed | • Interest rate scenarios are not prescribed under the current framework |
| **2** | Use VM-20 generator for separate account returns | • VM-20 scenario generator is prescribed, using the same parameters as those used in VM-20<br><br>• Require separate account funds to be mapped to a combination of funds from VM-20 generator | • Long-term interest assumption varied significantly between participants; prescribing an ESG and MRP promotes consistency across companies<br><br>• The VM-20 MRP is informed by prevailing conditions and reacts to historical changes in interest rates |
| **3** | Allow proprietary ESG if and only if they do not materially reduce TAR | • Proprietary generator allowed if – and only if – on an annual basis, the company can demonstrate that use of the proprietary generator produces a TAR not materially less than that produced using prescribed generator | • Limiting use of other ESGs promotes greater consistency and comparability across companies<br><br>• Requirement for testing ensures robust funding |
| **4** | Introduce principles to govern implied volatility, with a prescribed "safe harbor" approach | • Projected implied volatility surface must be arbitrage-free<br><br>• Relationships between implied volatility, realized volatility, and short-term asset performance should be consistent with historical data<br><br>• TAR should be not reduced by assumptions of any realized "spread" between implied and realized volatility<br><br>• Prescribe a "safe harbor" approach for CDHS reflection, where modeled hedge assets comprise only linear instruments not sensitive to implied volatility | • Current framework does not provide adequate guidance on projecting implied volatility<br><br>• New framework prevents inappropriate scenario generation from producing unrealizable hedge benefits in tail scenarios |

# 3 Changes to scenario generation (2 / 2)
## A wide variety of MRP levels are currently used; adopting the MRP calculation logic prescribed under VM-20 promotes consistency across companies



**Historical and projected long (20-year) rate**

Long rate MRP composition

- 50-year median — 20%
- 10-year average — 30%
- 3-year average — 50%

Monthly historical long rate

Historical | Projected

Range of current MRP parameters[1]

Averages

MRP

High path

Projected MRP (3.5%)

Average path

Low path

1. Source: "Revisions to AG 43/VM-21 and C3 Phase II, VIAWG Proposal, May 31, 2018

# ④ Changes to asset and liability projections (1 / 2)

| Proposed changes | Details | Outcomes / implications |
|---|---|---|
| **1** Follow VM-20 guidance on general account assets | • Net investment income on reinvestment assets and defaults on general account invested assets follow assumptions prescribed under VM-20 | • Net reinvestment spreads are effectively capped at 50/50 A/AA |
| **2** Permit simplified reflection of hedging | • Permit immediate liquidation of currently-held hedge assets in the CTE (adjusted) run<br>• Permit non-reflection of hedge accounting and unrealized hedge gains or losses in all projections | • Allowing hedge liquidation in the CTE (adjusted) run mitigates penalty on long-dated hedges<br>• Reduces high computational burden of continuously calculating derivatives fair values |
| **3** Reduce minimum CDHS "error factor", but require back-testing to support chosen "error factor" | • Replace the current AG 43 "effectiveness factor" calculation for weighting CTE (best-efforts) and CTE (adjusted) with the C3 Phase II "error factor" calculation<br>• Allow "error factor" to reach as low as 5%<br>• Require formal back-testing to assess how well the model is able to replicate the hedging strategy to support the "error factor" | • Allowing a lower "error factor" better aligns Statutory liability with economic, enabling fair value hedging<br>• Avoids "double-counting" hedge ineffectiveness, as many insurers already reflect hedge ineffectiveness within the best-efforts run itself |
| **4** Align conservatism margin for reflecting non-guaranteed revenue sharing income with historical experience | • Replace current AG43 multipliers with new multipliers that linearly grade from 100% of best-estimate in year 1 to 80% in years 5+<br>• Remove the 0.25% cap currently within AG43/VM-21 after the sixth projection year | • New margin allows for more revenue sharing to be reflected and is more aligned with historical industry revenue sharing experience |

# ④ Changes to asset and liability projections (2 / 2)
## Reduce minimum CDHS "error factor", but require back-testing to support chosen "error factor"

Stochastic Reserves = CTE70(best efforts) + E x max[0, CTE70(adjusted) – CTE70(best efforts)]

| Includes current & future hedges | | Includes only current hedges[1] |
|---|---|---|

Company to specify a value for $E$ (the "error factor") in the range from 5% to 100%

**Higher ability of stochastic model to capture all risks** ➔ **Lower value of E**

Formal back testing is required on at least the most recent 12 months

| **Explicit method** (for companies that model hedge CFs directly) | **Implicit method** (model hedge implicitly by quantifying the cost/benefit of hedging) |
|---|---|

## The change eliminates existing misalignment on error factor between reserve and RBC, and allows for more credit from CDHS

1. Allowed to reflect no hedge positions, in which case hedge positions held at valuation date are replaced with cash and invested using company's investment strategy

# Key takeaways

**1**   VA statutory reform is effective January 1, 2020

**2**   The reform addresses issues in the existing framework by removing non-economic volatility, encouraging economic hedging, and increasing comparability across companies

**3**   Stochastic CTE calculation changes mostly leverage current stat model functionality

**4**   The degree of impact will vary across the industry, depending on each company's specific situations