VM-22: Introduction and Impact Analysis

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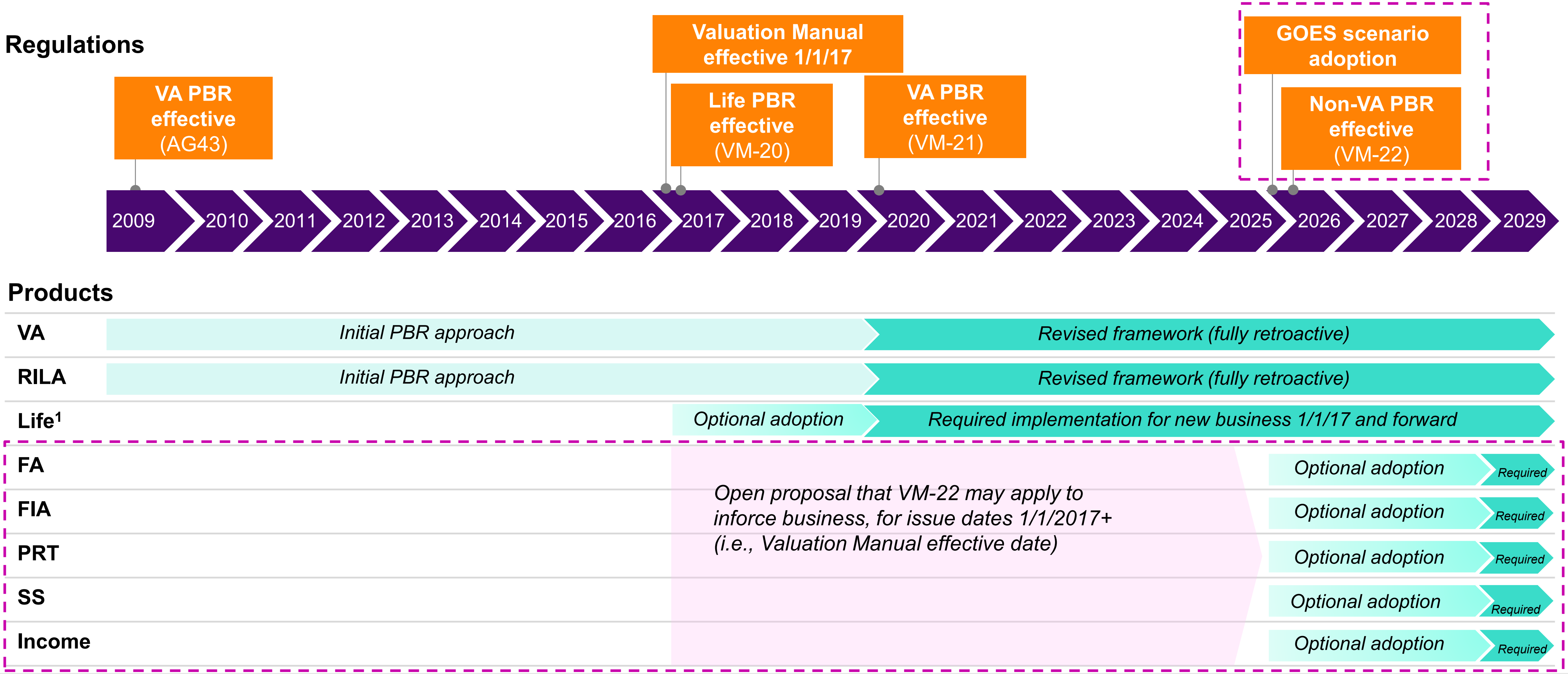
November 20, 2025

Agenda

Principles Based Reserving Timeline

Non-VA PBR implementation can be adopted as early as 1/1/26 and required by 1/1/29



1. Life includes all life insurance products except pre-need and funeral expense product

VM-20 change history (1/2)

2019 changes were substantially greater than prior years

2018

Clarifying Starting Asset Language
APF 2018-03

Ordinary life definition
APF 2018-06

Mortality aggregation
APF 2018-17

2018

Reference consistency
APF 2018-49

Substandard NPR
APF 2018-52

SERT details
APF 2018-11

2019

YRT & riders
APF 2018-48

Modified Definitions
APF 2018-15

IUL DR
APF 2018-44

Annual Lapse Rate
APF 2018-63

ULSG expense allowance
APF 2019-04

Clarifies Gross of YRT
APF 2019-10

PIMR clarity
APF 2019-12

SERT numerator
APF 2019-13

Delete Section 2.D
APF 2018-66

Face cap
APF 2018-42

Credibility tweaks
APF 2019-16

Revenue sharing
APF 2019-18

A/E & lapses
APF 2019-11

Expense spreading
APF 2019-19

VBT date
APF 2019-21

Anti-selection modeling
APF 2019-22

DR/SR excess
APF 2019-32

Alt invest params
APF 2018-53

Pre-Ceded Minimum
APF 2018-56

2012 | 2013 - 2016 | 2017 | 2018 | 2019

2012

Life PBR adopted (VM-20)

2017

Life PBR Operational

Expense governance
APF 2019-06

Material-risk edits
APF 2019-23

VAWG #32 Edits
APF 2019-43

Mortality adjustments
APF 2018-45

CDHS alignment
APF 2019-29

VAWG #2 Reporting
APF 2019-54

NPR Mortality Adjust
APF 2018-57

DET-Conservative Policies
APF 2019-01

Remove CHDS Criterion
APF 2019-55

$\boxed{\text{YRT Interim Solution APF 2019-39}}$

APF: Amendment Proposal Form

Indicates Field Test or Study

VM-20 change history (2/2)

Changes have persisted to the present and are likely to keep evolving

2020
Life PBR Fully Required

2020
NPR Clarification APF 2020-03
Process Boundaries APF 2020-02

2021
Asset Collar APF 2020-13
Alt Strategy Check APF 2021-05

2022
Mortality Improvement APF 2020-10
ULSG NPR Clarify APF 2021-07
Individually Underwritten APF 2019-33

2023
CDHS Consistency APF 2020-12
LIBOR→SOFR APF 2022-04

2024
Negative IMR Allocation APF 2023-08
Requires HMI APF 2023-09

2024
RBC Reference Removal APF 2023-11

2024
Non-U.S. Tables APF 2023-13

2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026

2020
Experience Rates Technique APF 2020-08

2021
Life/LTC margins update APF 2021-13

2022
YRT Retrocession Treatment APF 2022-01
VM-21 Consistency APF 2022-03

2023
NPR Mortality Adjustment APF 2022-07
SG Materiality APF 2022-10
VM-20 Updates 2023 APF 2023-03

2024
ULSG Lapse Table APF 2024-04

2026
GOES Adoption APF 2025-04

APF: Amendment Proposal Form

Indicates Field Test or Study

VM-22 Introduction: Key Considerations

Reserves will be impacted materially with significant work required to go live

Consideration	Details
Applicability	Applies to FA, FIA, SPIA, Structured Settlements, and PRT
Timing	**Effective 1/1/26** (earliest adoption), with option to begin as late as 1/1/29
Scenarios (ESG)	GOES scenarios will be applied to VM-22. The scenarios have not been finalized. There is **uncertainty on what scenarios will be released, in particular sensitivities**. The ESG is expected to remain closed source, requiring purchase from Conning
Complexity	Similar to VA (i.e., VM-21), **new models will need to be developed**, potentially leveraging existing CFT
Apply retroactively	There has been discussion of VM-22 being applied retroactively back to 1/1/17. This **could impact existing reinsurance agreements**. Dependent on required vs optional
Product Design implications	**Product designs may need to be altered to reflect the product risk**. Example: stacking rollup products will have higher reserves than under current AG33
New considerations	**Asset allocation and investments will impact the reserve levels**. Current AG33 reserves are independent of assets (though CFT would capture any large mismatches)

VM-22 Introduction: Reserve Components and Categories

Components

	Component	Detail
A	**Stochastic reserve**	Stochastic reserve = CTE 70 of Greatest Present Value of Accumulated Deficiencies (GPVAD)
B	**Deterministic reserve**	Applies to contracts that pass the Single Scenario Test (SST)
C	**Stochastic Exclusion Test (SET)**	Some companies / products / investment approach may allow them to pass the test and use current reserving calculations
D	**Single Projection A (SPA)**	Single scenario – disclosure only
E	**Reinsurance**	Calculations completed pre- and post-reinsurance
F	**Scenarios**	GOES: 10,000 scenarios provided and scenario picker tool
G	**Initial assets**	Leverages companies' assets with a “gross excess default” that limits the spread above treasury in the first year and grades to zero over 4 years
H	**Reinvestment assets**	Guard railed at 5% UST / 15% AA/ 80% A
I	**Assumptions**	Based on best estimate + prudent margin
J	**Hedging**	Two options for hedging: AV index hedging or holistic; holistic approach is consistent with VM-21
K	**Business covered**	New business (retroactive back to 1/1/17 proposed)

Reserve categories

Includes GLWB products

Accumulation	Payout Annuity
Fixed Index Annuities (FIA)	Income annuities (SPIA / DIA)
Both single premium and flexible premium Fixed Deferred Annuities (FDA)	Pension Risk Transfer (PRT)
Multi-Year Guarantee Annuities (MYGA)	Structured Settlement (SS)

Aggregation

Results can be aggregated across reserving categories provided that the assets and risks are managed consistently

VM-22 Introduction: Reserve approach comparison

VM-22 leverages most of the VM-21 framework with some small modifications

	Component	VM-22	VM-21	AG33	Commentary
A	**Stochastic reserve (SR)**	CTE70 of GPVAD	CTE70 of GPVAD	Single scenario	VM-21 / VM-22 aligned
B	**Deterministic reserve (DR)**	DR for a group of contracts using a single scenario, subject to test in Section 7E	NA	Single scenario	Applicable if predictable & stable cash flows and policyholder behavior
C	**Stochastic Exclusion Test (SET)**	Simpler / less risky products / asset strategies can maintain existing reserves	NA	NA	Added for simpler fixed annuity products
D	**Standard Projection Amount (SPA)**	Disclosure only	Reserve floor	NA	Disclosure for VM-21
E	**Reinsurance**	Pre- and post-reinsurance	Pre- and post-reinsurance	NA	VM-21 / VM-22 aligned
F	**Scenarios**	GOES	GOES (moving from AIRG)	Single scenario	VM-21 / VM-22 aligned
G	**Initial assets**	Net spread adjustment factor	Net spread adjustment factor	Prescribed discount rate	VM-21 / VM-22 aligned
H	**Reinvestment assets**	5/15/80 UST/AA/A reinvestment guardrail	50/50 AA/A reinvestment guardrail	Prescribed discount rate	VM-22 is more conservative
I	**Assumptions**	Best estimate + prudent margin	Best estimate + prudent margin	Worst case GPV	VM-21 / VM-22 aligned
J	**Hedging**	Two options for hedging: AV index hedging or holistic; holistic approach is consistent with VM-21	Benefits from being hedged appropriately	Not considered	Similar treatment when hedging on a holistic basis
K	**Business covered**	New business (retro to 1/1/17 considered)	Issues since 1981	All business	Valuation manual limits further retroactive applicability
L	**Aggregation**	Limited to reserving category	All VA /RILA aggregated	NA	Less ability to offset products

Differences between VM-22 and VM-21   Soon to be updated

Reinvestment Guardrail

VM-22 may change investment approach due to reserve sensitivity from changes in rates

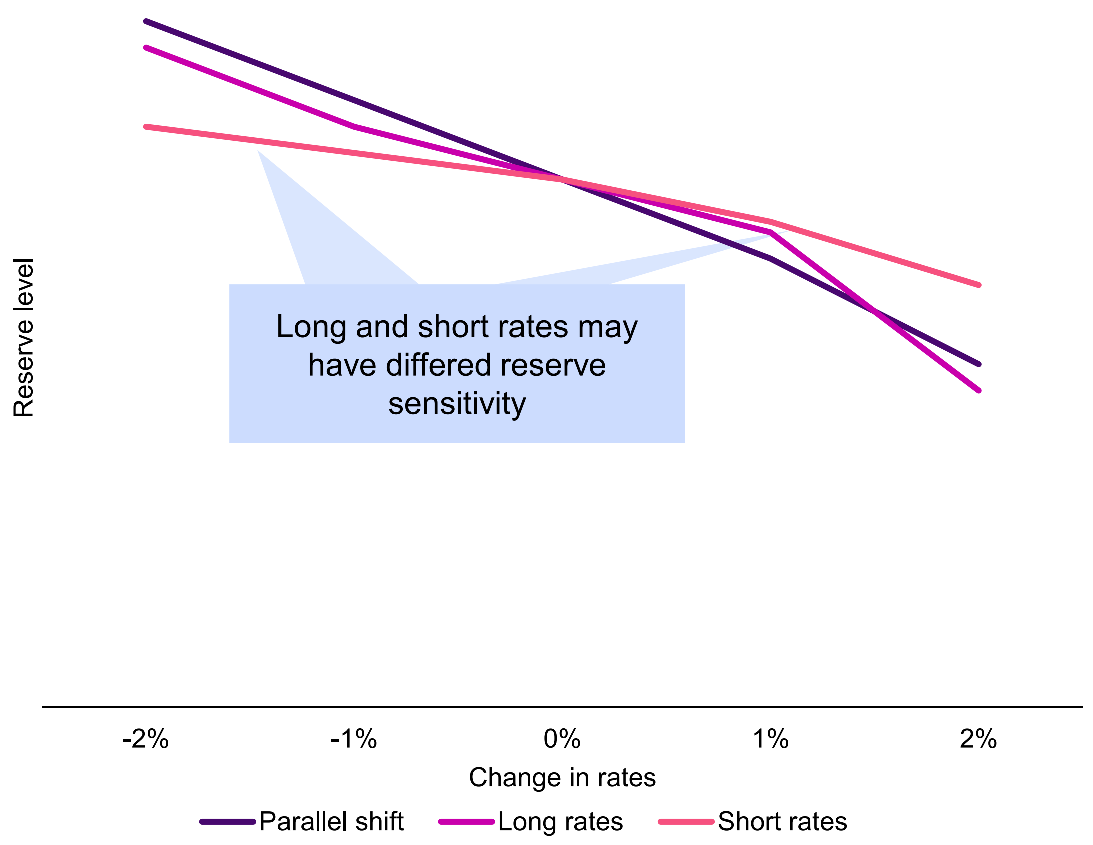
Reinvestment guardrail

Credit rating	Allocation	Spread above UST as of 12/31/24
UST	5%	0.0%
AA	15%	0.39% - 1.34%
A	80%	0.62% - 1.53%

Key considerations

	Consideration	Detail
1	ALM mismatch	Asset shorter than the liability can lead to significant swings in reserves due to interest rate changes
2	Leveraging swaps	Swap could be used to offset reserve swings due to interest rates. Changes in credit spread will create volatility
3	Revising investment approach	Consider tighter ALM for long duration liabilities
4	GOES scenario ALM	Reserve change may not always be economic and understanding the reserve change due to rates will be helpful to explain results

Illustrative Reserve change, long liability and short asset duration



Hedging Implications

Index credit hedging is differentiated from other future hedging strategies

Hedging approaches for VM-22

Option 1: AV Index credit hedging

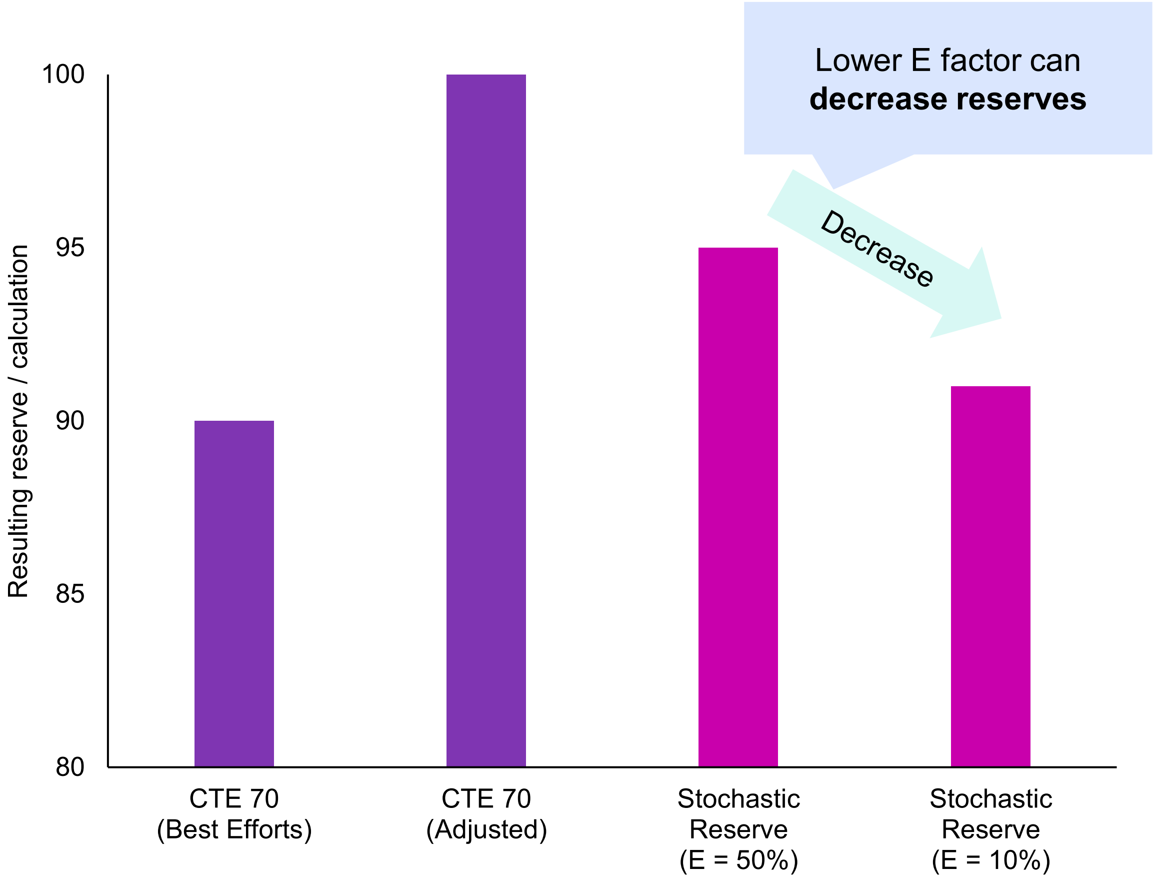
- Hedge margin is applied in both the Best Efforts (BE) and Adjusted (A) runs that reduces the hedge payoff
- Hedge margin can be no lower than 1.5%
- If the company has insufficient or non-credible experience, the margin is set to 20%
- Hedge Margin is not capped if experience is worse than 20%

Option 2: Holistic hedging approach

- Determine a value for E (the "error factor") in the range of 5-100% to reflect the company's view of the potential error resulting from the level of sophistication of the model and ability to reflect the hedging strategy parameters
- Requires important back-testing, similar to VM-21 requirements

Stochastic Reserve (SR) equals:
CTE70 (BE) + E x max [0, CTE70 (A) – CTE70 (BE)]

Holistic Hedging – Error Factor (E) impacts to reserve level



Initial Assets: Maximum Net Spread Adjustment factor

Gross excess defaults significantly limit the benefits of portfolios with yields greater than BBB

Illustrative example:

3-year MYGA with WAL of 3 and initial asset spread of 250bps (Item A) above UST

Investment expense = 10bps (Item E)

3-year UST = 4.0%; Total asset yield (pre-defaults = 6.50%); assumed net yield 6.05%

Step 1: Retrieve current and long term PBR spreads using NAIC tables

Use the WAL and PBR credit rating of 9 (S&P BBB rating)

PBR Current spread = 50bps (Item B)

PBR Long term spread = 130bps (Item C)

Step 2: Retrieve PBR default assumptions

Baseline default = 35bps per year (Item D)

Step 3: Calculate net spread adjustment factor in year 1

Factor = (Current spread (A) – Long term spread (C)) /4 [4-year grade in period]

Factor = (50 -130) /4 = -20bps

Hypothetical portfolio spread =

Current spread (B) – Investment expense (E) – Baseline defaults (D) – Factor

Hypothetical portfolio spread = 50 – 10 – 35 – (-20)= 25

Gross excess defaults in year 1 =

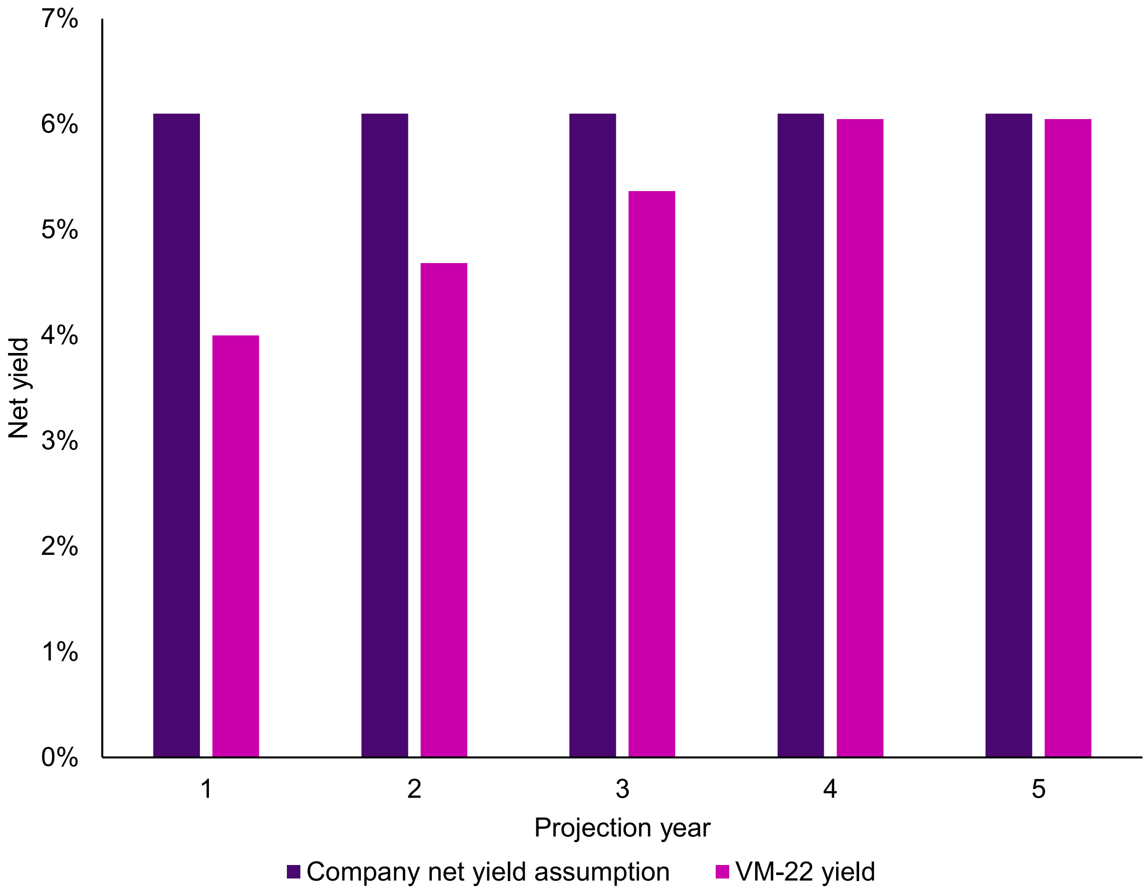
Current asset spread over UST (A) – Hypothetical portfolio spread

Gross excess defaults in year 1 = 250 – 25 = 225bps

Step 4: Calculate PBR yield in year 1

PBR modeled yield = Total asset yield – Baseline defaults (based on Bond)

Yield in the years 1 through 5



PBR Considerations

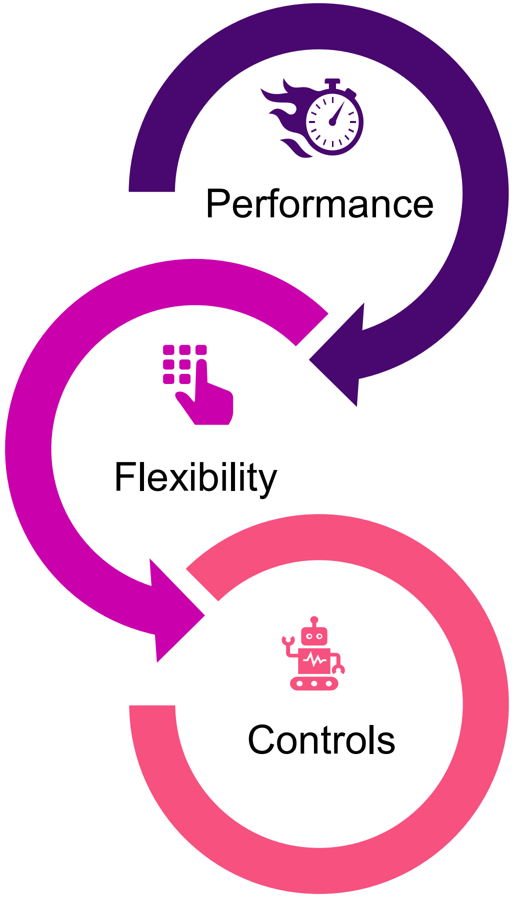
Implementation will require assessing capabilities and potentially enhancing them

	Considerations
1	Technology and Tools
2	Experience and Assumptions
3	Governance, Documentation and Controls
4	Strategic Analysis

1

Technology and Tools

VM-22 will be impetuous for companies to reconsider their modeling platform



Performance

- Runtime efficiency can be achieved with distribution of inner and outer loops
- Optimize engine and cores - GPU is faster for some run types, but can be significantly more expensive
- Performance per dollar *is key*

Flexibility

- Ability to reflect segment-specific investment / reinvestment strategies
- Ability to analyze scenario specific results and perform attribution analysis
  - Seamless assumption set or data file input setup and changes to develop waterfalls

Controls

- Transparent and auditable output
- Ability to audit loop mechanics and not just total results
- Automation of manual touchpoints

2 Experience and Assumptions

Experience studies matter! Company experience can decrease reserves under VM-22

	Key areas to consider
1	Refine experience study processes and frequency
2	Leverage industry data to supplement lack of experience, when needed
3	Margin levels will depend on credibility
4	No binding SPA in VM-22, so assumptions matter when achieving reserve relief
5	Harmonized reinvestment strategy assumptions will be key to aggregation benefits
6	All of this subject to additional regulator / auditor scrutiny

3 Governance, Documentation and Controls

Modeling and documentation complexity emphasizes controls

	Key areas to consider
1	Have you produced a VM-31 report before? Not to be underestimated **(Session 2E focuses on VM-31)**
2	What type of validation have models undergone? Will this be revisited on a frequent basis?
3	Do models have documentation and governance processes in place?
4	PBR Documentation production strain is alleviated with process automation and tools

4 Strategic Analysis

When and what products do we want to implement first?

Key questions being asked by most companies is:

When should we implement?

Should we implement certain products earlier and others later?

	Key areas to help assess implementation
1	Asset allocation approach: Should a new approach be taken to minimize reserve volatility? Will more companies leverage swaps for longer liabilities?
2	ALM approach: Duration management will become more important especially with reinvestments being guard railed
3	Reserve volatility
4	Comparison of existing US statutory reserves and potential offshore solutions
5	AG55 impacts / considerations
6	Results compared to existing Fin-Re agreements
7	Will some products pass the SET?

VM-22 At Issue Reserve Analysis

Analysis powered by RiskAgility FM (RAFM)

Background of analysis:
WTW performed an independent analysis for a representative set of new business MYGA, FIA accumulation, FIA income and SPIA products. The analysis used current AG33/35 reserving methodology. The VM-22 results were produced using WTW Risk Agility FM (RAFM) software. The results are as of 12/31/2024. The investment portfolio is based on a simple asset allocation with an initial investment portfolio assumed to support product pricing. The tenor is based on the surrender charge period and liability duration.

Product	Premium	CSV	AG33 reserve	VM-22 reserve	% Change in reserve	FT model office	FT part. avg.
MYGA 3	200.0	184.0	200.8	201.3	0.3%	0.3%	2.6%
MYGA 5	150.0	138.0	152.1	150.0	-1.4%	0.3%	2.6%
MYGA 7	150.0	138.1	154.4	148.8	-3.6%	0.3%	2.6%
FIA accumulation	250.0	226.6	229.7	226.6	-1.3%	4.6%	6.3%
FIA Income	250.0	227.3	266.2	239.6	-10.0%	-16.7%	-4.5%
SPIA	500.0	NA	516.8	472.8	-8.5%	-3.4%	-3.3%

Reserve Impacts: Background

Analysis powered by RiskAgility FM (RAFM)

Industry will receive a series of updates in the coming months

Background:

WTW has analyzed the impact of moving from AG33 to VM-22 time zero reserves using out of the box **Risk Agility FM functionality**. We will be providing the industry updates to this analysis over the next 6 months.

November 2025
Baseline: standalone results as of 12/31/2024 for each of MYGA 3, 5, and 7, FIA accumulation, FIA GLWB, PRT and SPIA

December 2025
Asset Impacts: Initial asset and reinvestment allocation sensitivities to better understand the impact to VM-22 reserves

January 2026
Volatility / time view: Results as of 3/31/2025 and 6/30/2025 will be provided to get an initial view of volatility expected

February 2026
Bermuda EBS comparison: Results compared to Bermuda EBS as of at least one time period

March 2026
Exclusion testing: Analysis of the exclusion test applicability to base FIA and MYGA products

April 2026
FIA hedging: Account value compared to "whole contract" hedging for Income. Inclusion / exclusion of decrements

May 2026
Aggregation: Combinations and allocations of various products will be analyzed to determine aggregation offsets

MYGA

VM-22 reserve is driven by shifts in the 5-year UST over the projection

Results

Product	Premium	CSV	AG33 reserve	VM-22 reserve	% Change in reserve
MYGA 3	200.0	184.0	200.8	201.3	0.3%
MYGA 5	150.0	138.0	152.1	150.0	-1.4%
MYGA 7	150.0	138.1	154.4	148.8	-3.6%

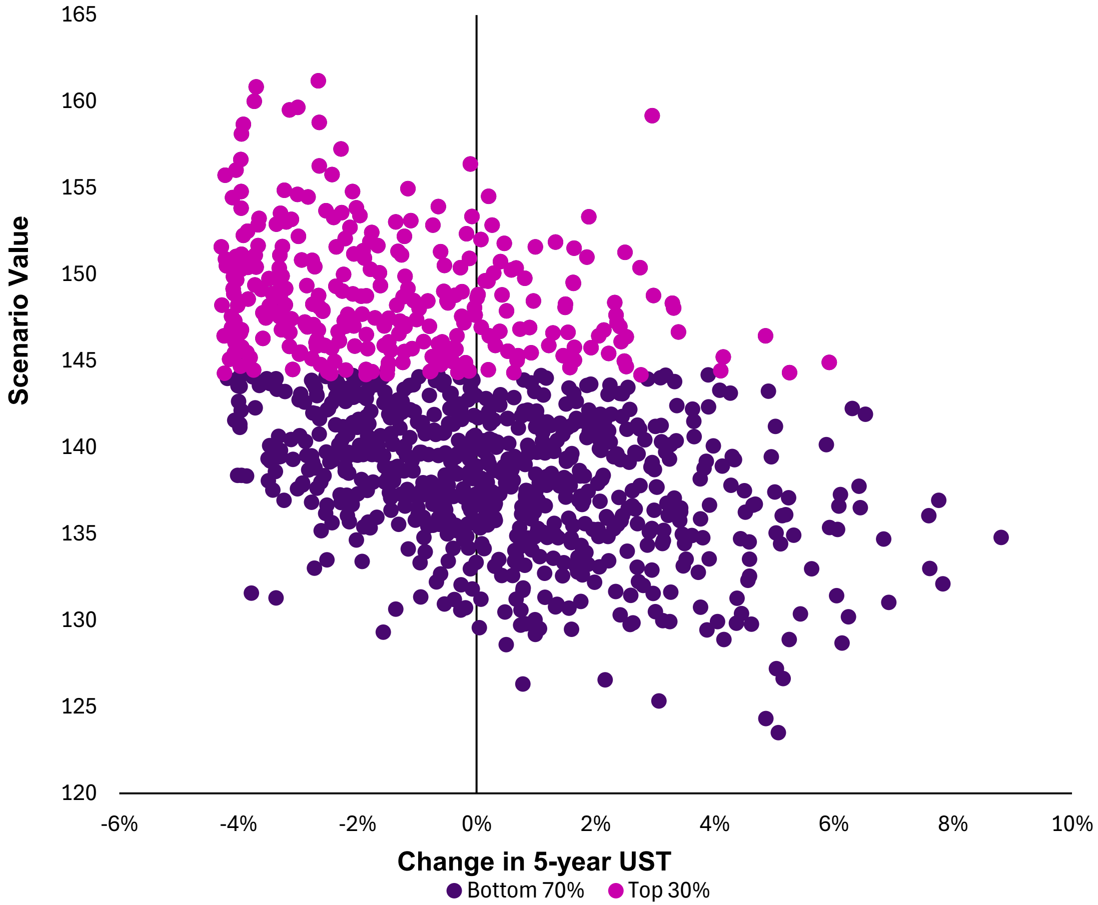
Observations

Renewal rate strategies and persistency are key drivers

CTE 70 results are skewed towards a drop in rates - when product spread is squeezed

Longer MYGA terms less impacted by maximum net spread adjustment (MNSA) grade-in more so than shorter MYGA terms

7-Year MYGA: Change in 5-year UST (at issue to year 5)



FIA Accumulation

Equity returns are a key contributor to the VM-22 reserve level

Results

Product	Premium	CSV	AG33 reserve	VM-22 reserve	% Change in reserve
FIA Accumulation	250.0	226.6	229.7	226.6	-1.3%

CTE 70: 217.9

Observations

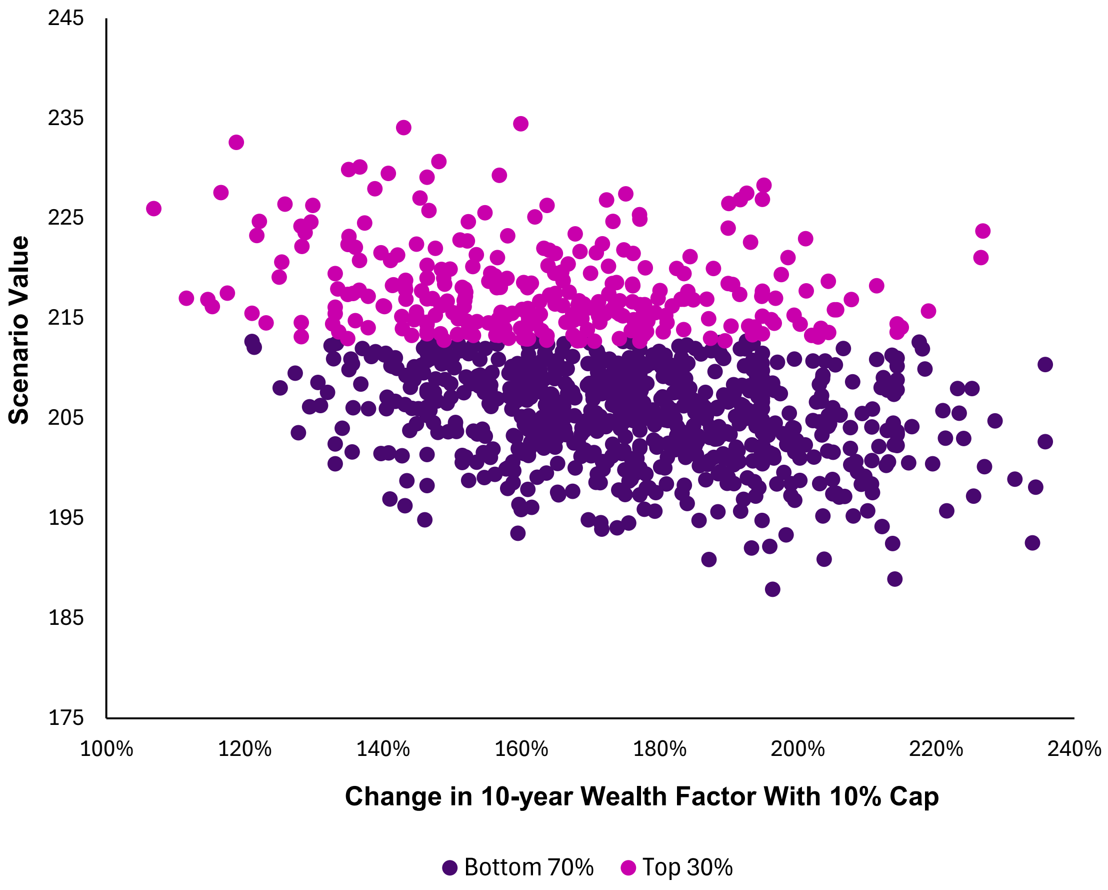
Reserve is driven by equity and interest rate changes, which requires additional analysis compared to MYGA

Downside interest rate: During low-interest rate scenarios the product spread can be squeezed, leading to higher GPVAD

Downside equity: Lower equity performance exposes the company to Guaranteed Minimum Surrender Value (GMSV) requirements

ALM and understanding policyholder behavior assumptions and dynamics are key to achieving reserve optimization

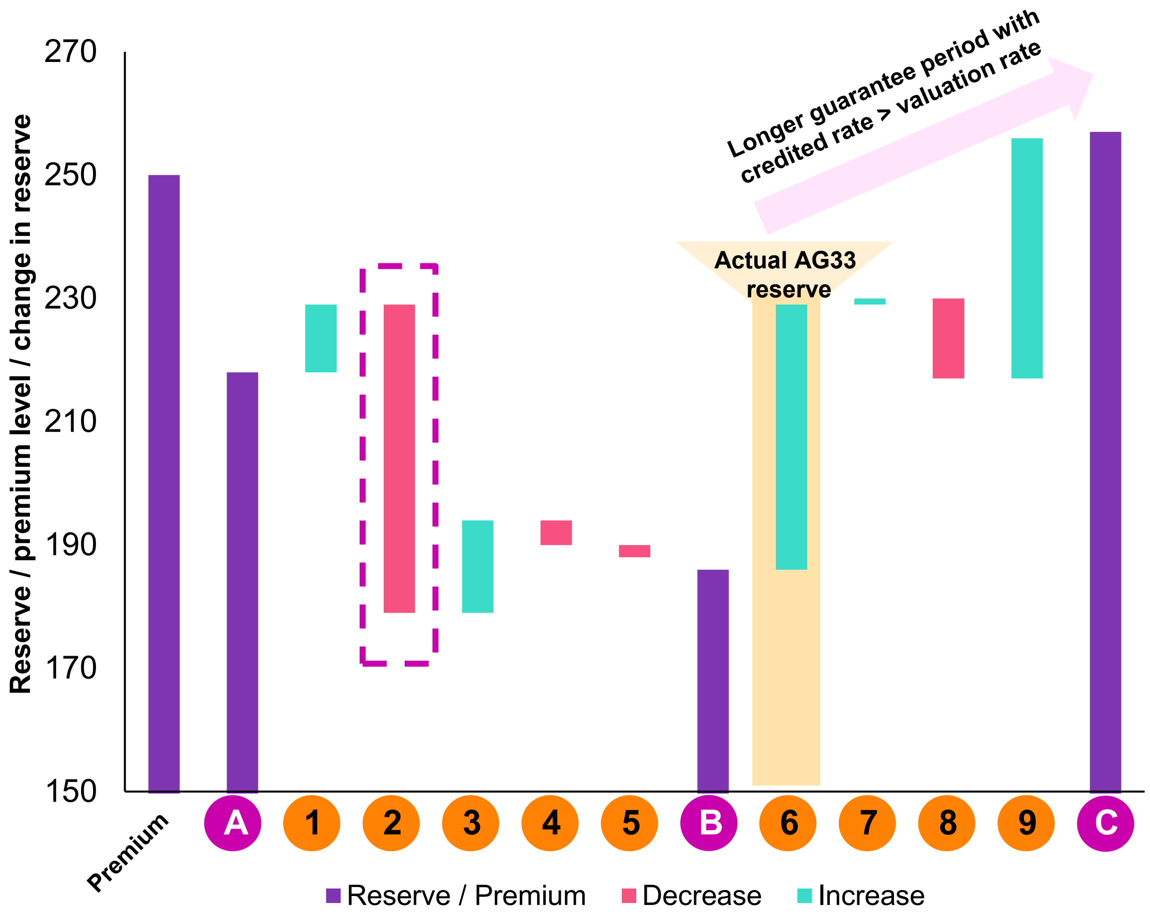
Year 10 Wealth Factor with S&P 500 10% cap index account



Waterfall: FIA Accumulation AG33 to VM-22

FIA accumulation has a lower reserve than MYGA due to lower future guarantees

Aggregate



Waterfall steps

	Step	
A	FIA Accumulation - VM-22 Reserve	
1	100% lapse at end of surrender charge period	▲
2	0% Equity and 0% option budget	▼
3	AG33 valuation rate	▲
4	Removal of expenses	▼
5	No partial withdrawals	▼
B	AG33 No PW, Surrender at end of surrender charge period	
6	AG33 end of year 1 lapse **(Actual FIA Accumulation AG33 reserve)**	▲
7	FA 7-year SCP w/ 1-year resets – Lapse end of year 1	▲
8	FA with 7-year SCP – lapse at of end of year 7	▼
9	Update FA to MYGA with guarantee for 7-year SCP	▲
C	MYGA 7 with surrender at end of year 7	

FIA Income

Reinvestment and equity returns are key drivers of reserves

Results

Product	Premium	CSV	AG33 reserve	VM-22 reserve	% Change in reserve
FIA Income	250.0	227.3	266.2	239.6	-10%

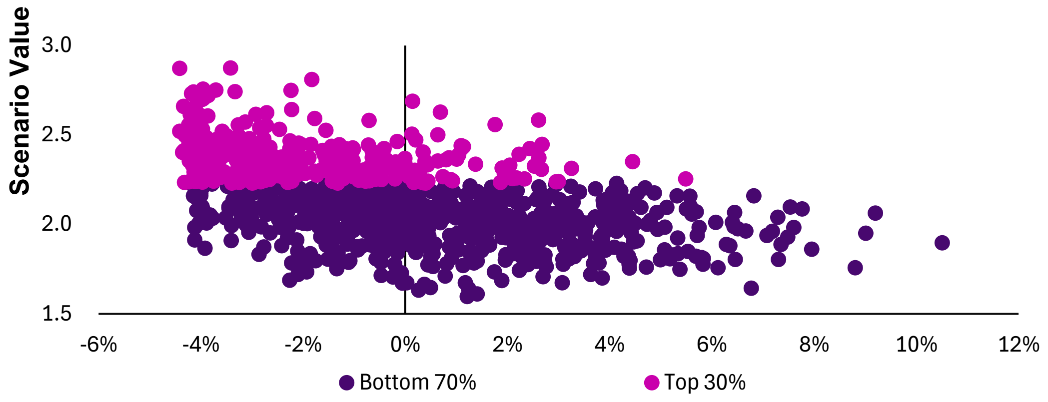
Observations

1) Hedging approach: reserve level is driven by **equity movement since analysis is hedging AV index credits** and not a holistic GLWB approach

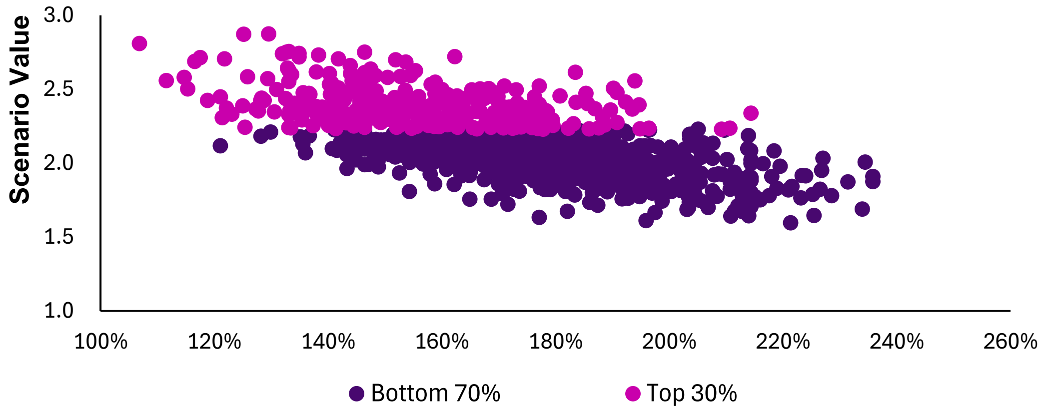
2) Reinvestments: Depending on the initial investment approach, reinvestment is a key driver of results that is impacted by the reinvestment guardrails. The model currently invest for ~10 years and will need to reinvest at the VM-22 guardrail level

3) In-the-moneyness lapse: Dependent on policyholder behavior assumptions, equity and interests will impact the lapse rate

Change in 5-year UST (at issue to year 10)



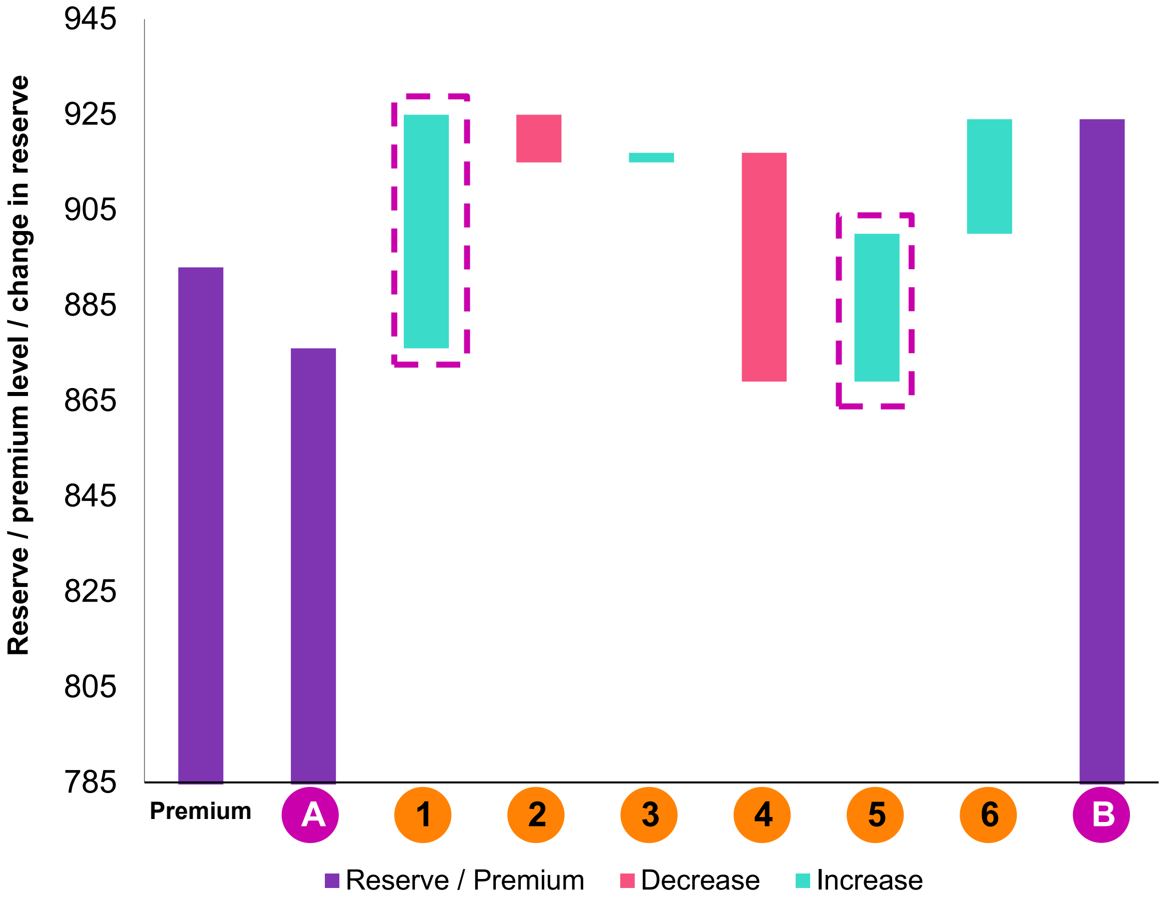
Year 10 Wealth Factor with S&P 500 10% cap index account



FIA Income: AG33 to VM-22 Waterfall

Differences between best estimate assumptions and AG33 worst case scenario drive the results

Age 65 Male - Single Policy



Waterfall steps

	Step	
A	Starting VM-22	
1	100% Income utilization at year 10 and 0% lapses	▲
2	0% Equity growth and 0% option budget	▼
3	Discount cash flows at 4.75%	▲
4	Remove Expenses	▼
5	AG33 Mortality	▲
6	Discount rate differences and timing of cash flows	▲
B	Final AG33	

SPIA

Reinvestment by scenario is a key driver of reserves

Results

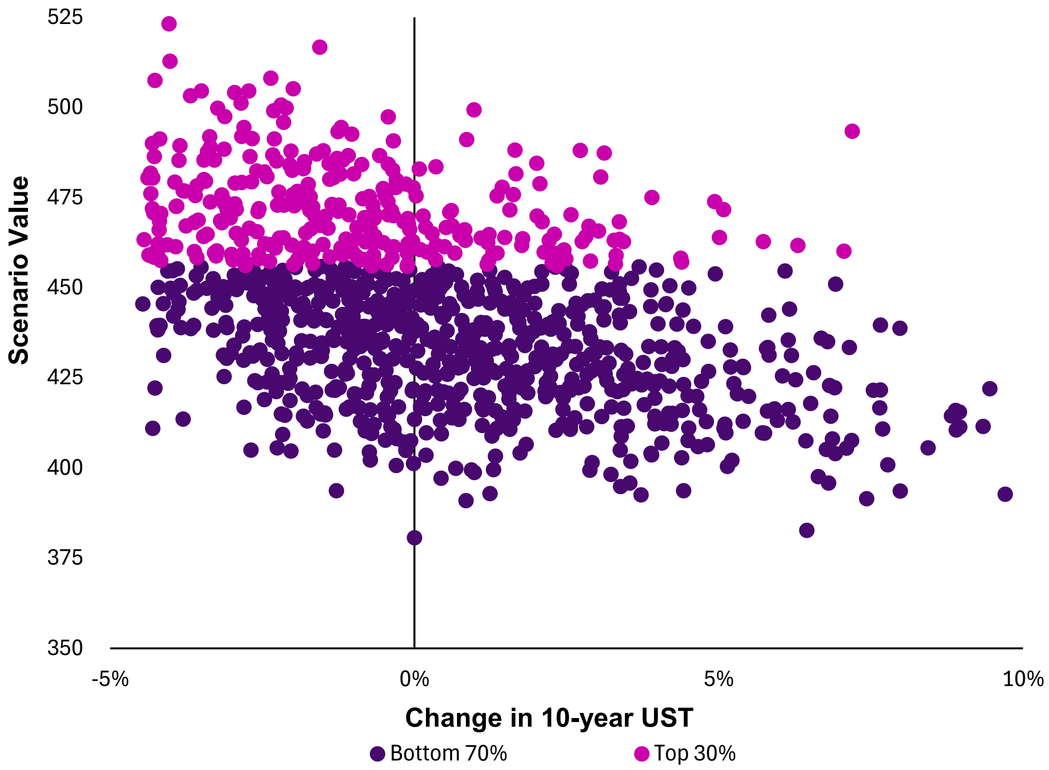
Product	Premium	AG33 reserve	VM-22 reserve	% Change in reserve
SPIA	500	516.8	472.8	-8.5%

Observations

Increasing rate scenarios drive up the NAER (discount rate), leading to lower GPVAD

Majority of CTE70 scenarios lead to higher discount rate than current CARVM, VM-22 reserve is lower than CARVM reserve

SPIA Results: Change in 10-year UST (at issue to year 20)



VM-22 versus Bermuda EBS /SBA considerations

Current VM-22 framework is expected to have higher reserves than current Bermuda EBS /SBA

Consideration	VM-22	Bermuda EBS/SBA
1 Aggregation	Aggregation is allowed – but must be managed together from an investment perspective	Allowed across all blocks of business
2 Asset modeling	Prescribed guardrails spreads and defaults	Best estimate yield with prescribed defaults and downgrades Significantly less limitations on assets included in calculation
3 Margins	Margins required (approach varies by company)	Risk margin added – no explicit margins required
4 Liability assumptions	Best estimate	Best estimate
5 CSV floor	Floored at CSV in aggregate	Negative reserves allowed to offset positive reserves, not floored at CSV
6 Equity returns	Equity tails exist in the GOES scenarios	Equity risk is not included in the SBA

Key takeaways

1. VM-22 will likely see many changes over the next few years
2. Compute time and cost are leading to companies assessing new software solutions for VM-22
3. Analyzing current reserves with and w/o reinsurance to VM-22 will be critical to determine timing of VM-22 election
4. Asset and ALM strategies are expected to change for products reserved for under VM-22 to limit reserve volatility