



68 - Products Across the Valuation Manual: Comparing PBR to PBR

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Products Across the Valuation Manual: Comparing PBR to PBR

Session 68

Tuesday, August 27, 2019 1:15 – 2:45



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Products Across the Valuation Manual: The VM, VM-20 and VM-21

JASON KEHRBERG, FSA, MAAA

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The Valuation Manual (VM) and shift to PBR

- The VM was adopted by the NAIC in 2016 and has now been adopted by all 50 states
- It contains the NAIC's valuation requirements for life and health products
- An important (and expected) theme of the NAIC's annual updates to the VM has been more products shifting from formulaic to principle-based reserves, and an ongoing effort to improve existing PBR requirements.

CRVM	PBR
Limited consideration of product risk factors	Designed to better reflect product risk factors and company risk practices
Fully prescribed industry-wide assumptions	Companies can use their own experience where relevant and credible
All assumptions are deterministic	Stochastic interest and equity
All assumptions are locked in	Assumptions are regularly reviewed and unlocked
Annual asset adequacy testing	Annual asset adequacy testing

What sections are in the Valuation Manual?

Sec. I	Introduction	VM-25	Reserve Requirements - Health Insurance
Sec. II	Reserve Requirements	VM-26	Reserve Requirements - Credit Life & Dis.
Sec. III	AOM Requirements	VM-30	AOM Requirements
Sec. IV	Experience Reporting Requirements	VM-31	PBR Report Requirements
Sec. V	VM Minimum Standards	VM-50	Experience Reporting Requirements
VM-01	Definitions	VM-51	Experience Reporting Formats
VM-02	Min NF Mortality & Interest	VM-A	Reserve Requirements (existing model regs)
VM-05	NAIC Model SVL	VM-C	Reserve Requirements (existing guidelines)
VM-20	Reserve Requirements - Life	VM-G	Corporate Governance Guidance for PBR
VM-21	Reserve Requirements - VA	VM-M	Mortality Tables

Requirements for Reserves and Minimum NF Mortality & Interest apply to covered business issued after 12/31/2016.

Requirements for AOM, PBR Reporting, Experience Reporting, and Governance apply to covered business regardless of issue date.

Not all reserve requirements are principles-based

		Principles Based?
Life Insurance	VM-20 (<i>not incl. credit, preneed, industrial</i>)	Y*
Credit Life & Dis.	VM-26	N
Preneed, Industrial	VM-A/C	N
VA	VM-21 (<i>major revisions effective 1/1/2020</i>)	Y*
Non-VA	VM-A/C (<i>VM-22 contains valuation interest rates for SPIAs</i>)	N
Health Insurance	VM-25	N
Riders and Supplemental Benefits	See next slide	Depends
Claim Reserves	Not subject to PBR requirements	N

* PBR treatment for life depends on whether a company is eligible and successfully applies for the Life PBR exemption.

PBR treatment only applies to issues years on a go forward basis once PBR is adopted for a block of business.

Not all aspects of PBR requirements are truly “principles-based”, e.g. the NPR in VM-20, the Alternative Method in VM-21. Elements of PBR requirements may contain varying levels of prescription, e.g. default and mortality prescription.

APF 2017-70 clarified rider treatment for the 2020 VM

Rider Treatment in 2020 VM	May value with base policy	Shall value with base policy		Shall value separate from base policy
	following reserve requirements for			
	base policy	ULSG policies	base policy	Term policies
A. Riders/supplemental benefits on non-life policies not in scope for VM-20; e.g., health, annuity, deposit-type, credit life, or disability products.	✓			
B. Supplemental benefits on life policies including WOP, ADB, GIO, or Conversion	✓*			
C. ULSG and other secondary guarantee riders on life policies		✓*		
D. Riders on life policies not addressed by B or C with any of the following attributes: <ol style="list-style-type: none"> Rider does not have separately identified premium/charge Rider prem, charge, value or benefits determined by ref. to base policy features/perf. Base policy value or benefits determined by ref. to rider features/perf.† 			✓*	
E. Level term riders on base policy named insured(s) not addressed by D.				✓*
F. All other riders/supplemental benefits on life policies not addressed by B, C, D, or E.	✓*‡			

* Follow reserve requirements under VM-20, VM-A, and/or VM-C as applicable.

† The deduction of rider premium/charge from contract value is not sufficient for a determination by reference.

‡ Election to include with the base policy shall be determined at the policy form level, not policy-by-policy.

Comparison of VM-20 and VM-21

Component	VM-20	VM-21
Effective Date	1/1/17 with optional 3-year implementation period	Implement for 1/1/20 (option to phase in recognition impact over 3 years)
Exemption	Can apply for Life PBR Exemption for non-ULSG business if meet premium requirements	No exemption, but simpler Alt Methodology permissible for VAs with no VAGLBs
Final Reserve	Minimum Reserve = NPR for groups that pass both exclusion tests + Max (NPR, DR) for groups that pass SET and fail DET + Max (NPR, DR, SR) for groups that fail the DET <i>*Note: Ignores DDPA adjustment. Term and ULSG always fail DET. Groups with CDHS always fail SET.</i>	Aggregate Reserve = Stochastic Reserve + Additional Standard Projection Amount + reserve for any contracts determined using the Alternative Methodology <i>*Note: Subtract any applicable PIMR for all contracts not valued under the Alternative Methodology</i>
Exclusion Tests	DET and SET	No
DDPA Adjustment	Yes	No
PIMR Adjustment	Yes	Yes

Comparison of VM-20 and VM-21

Component	VM-20	VM-21
Reinsurance	Calc both pre- and post- reinsurance	Calculate both pre- and post- reinsurance
Stochastic Reserve	CTE70 of scenario reserves	Also CTE 70 of scenario reserves, but using a weighted average of CTE 70 (best efforts) and CTE70 (adjusted)
Scenario Reserve	Estimated Starting Assets + GPVAD	Estimated Starting Assets + GPVAD, or Starting Assets if determined using DIM
Discount Rates	NAER for DR; 1.05*1yr Treasury for SR	NAER for Stochastic Reserve and Additional Std Proj Amt
Asset Collar Test	Yes	No
Deterministic Reserve	PV of Net Insurance CF at NAER, or Starting Assets determined using DIM	n/a
Additional Std Projection Amt	n/a	Methodology similar to Stochastic Reserve, but uses prescribed instead of prudent estimate assumptions

Comparison of VM-20 and VM-21

Component	VM-20	VM-21
Prudent Estimate Assumptions	<ul style="list-style-type: none"> • Used for most non-stochastic assumptions in DR and SR other than credit spreads and defaults. • Mortality for DR and SR contains a relatively high amount of prescription. 	Used for most non-stochastic assumptions in stochastic reserve other than credit spreads and defaults.
Prescribed Assumptions/Factors	<ul style="list-style-type: none"> • NPR • Credit spreads and defaults in DR and SR 	<ul style="list-style-type: none"> • Additional Standard Projection Amount • Alternative Methodology • Credit spreads and defaults in stochastic reserve
Reserving Categories	<ul style="list-style-type: none"> • Term, ULSG, Other. • More granular model segments can be used. 	N/a, although assumptions for the Additional Standard Projection Amount are broken out by defined common benefit types (e.g. GMDB, GMIB, GMWB) and the prudent estimate mortality assumption for the stochastic reserve must at least be broken out by VAGLB and no-VAGLB segments.

Comparison of VM-20 and VM-21

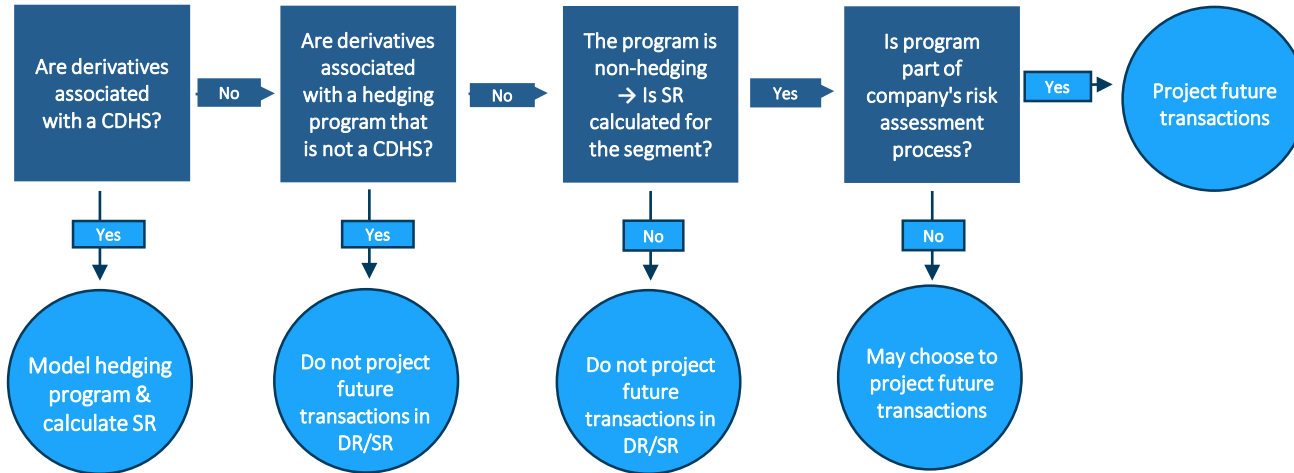
Component	VM-20	VM-21
Formulaic-like components	<p>NPR</p> <ul style="list-style-type: none"> • Similar to CRVM, but considers lapses 	<p>Alternative Methodology</p> <ul style="list-style-type: none"> • If no guaranteed benefits, AG33 • If only GMDB, CSV + amount for each contract based on applying factors to contract.
Stochastic assumptions	<ul style="list-style-type: none"> • Interest (NAIC prescribed ESG) • Equity (NAIC prescribed ESG) 	<ul style="list-style-type: none"> • Interest (NAIC prescribed or proprietary ESG*) • Equity (NAIC prescribed or proprietary ESG*) • Implied Volatility (proprietary ESG) <p><i>*Use of proprietary ESG cannot materially understate the reserve</i></p>
Spreads and defaults	Same prescribed tables and methodology for both VM-20 and VM-21	Same prescribed tables and methodology for both VM-20 and VM-21
Reinvestment guardrail	Yes, fixed income reinvestment into 50/50 AA/A non-callable public corp bonds	Yes, fixed income reinvestment into 50/50 AA/A non-callable public corp bonds
Simplifications	Generally allowed if doesn't lower reserve	Generally allowed if doesn't lower reserve

Comparison of VM-20 and VM-21

Component	VM-20	VM-21
Cell compression allowed	<ul style="list-style-type: none"> • NPR – no • DR and SR – yes 	<ul style="list-style-type: none"> • Stochastic Reserve – yes • Additional Standard Projection Amount <ul style="list-style-type: none"> • No for CSMP method, Yes for CTEPA method • Alternative Methodology – Yes
Seriatim allocation	Based on NPR	Based on measure of risk defined by company
Currently held derivatives	<i>See next slide</i>	<ul style="list-style-type: none"> • No CDHS – Include market value in starting assets. Model contractual hedge cashflows or replace MV with and model as general account assets. • CDHS – Include costs and benefits of hedging instruments in the projection.
Future derivatives	<i>See next slide</i>	<ul style="list-style-type: none"> • No CDHS – Do not consider the cash flows from any future hedge purchases or any rebalancing of existing hedges. • CDHS – Model the appropriate costs and benefits of hedge positions expected to be held in the future through the execution of the CDHS.

Modeling Derivative Programs (VM-20)

- Currently held derivatives – Required to model
- Future derivative transactions – Requirements vary by type of program (see below for summary of VM-20 treatment)



Products Across the Valuation Manual: Common Methods and Techniques

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Common Methods & Techniques

Despite differences in products and calculations, many techniques can be shared:

1. Attribution Analysis
2. Assumption and Margin Setting
3. Projected Reserves & Pricing

Attribution Analysis

VM-31 requires a description of changes in reserve amounts from prior year

- **New challenges from model based reserves**
 - Increased volatility, especially when reserves are small
 - Multiple reserve components, and changes in dominant component
 - Compressed timeline for analysis
- **Variety of analysis tools available, but rollforward analysis is a preferred method**
 - Rollforward Analysis
 - Statutory Source of Earnings Analysis
 - Reserve Trending
 - Stochastic / Key Scenario Analysis
 - Reserve-Per-Thousand Analysis
 - Statutory-to-GAAP Ratios

Rollforward Analysis

Focus on change in dominant reserve

- Continue to track all model components so trends available if dominant reserve changes

Build analysis over time

- Begin broad and build granularity over time
- Consistent order over time reduces noise
- Consider pre-work to meet compressed reporting timelines

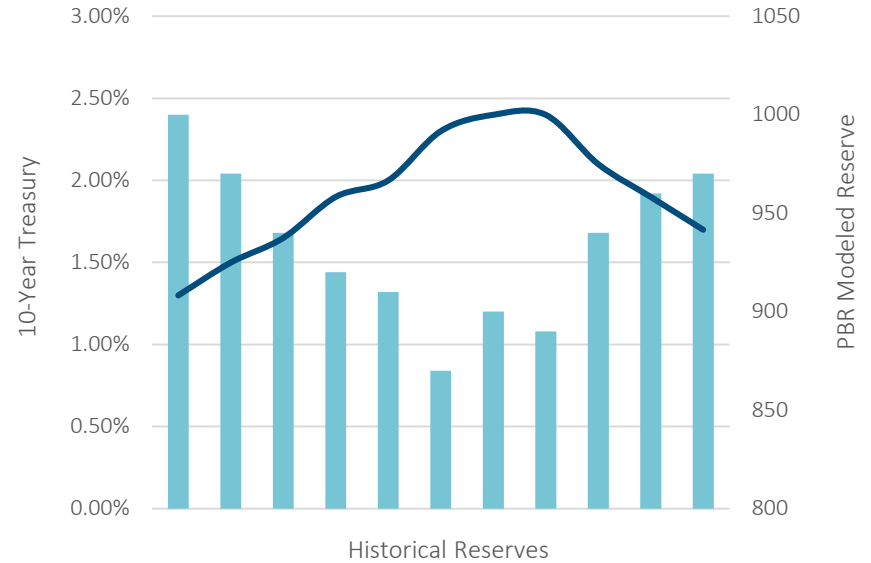
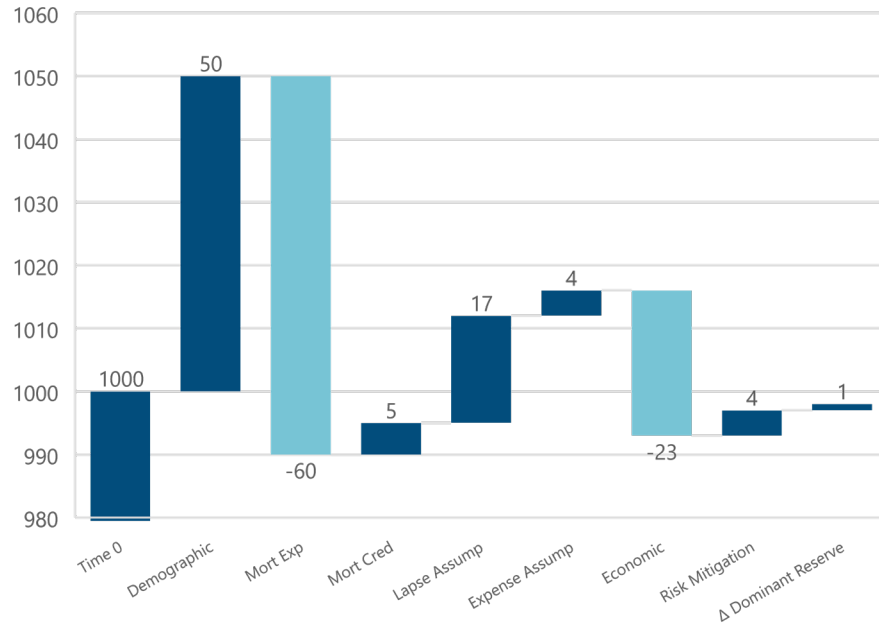
Support multiple metrics

- Similar analysis required for AAT or EV; consistency in impacts across metrics
- Reduce redundant updates and model work, especially if employ nested PBR projections

*For further details on attribution analyses, refer to SOA report “Understanding VM-20 Results”
<https://www.soa.org/globalassets/assets/Files/Research/Projects/2017-understand-vm-20-results.pdf>*

Communication of Results

Waterfall chart, historical trends, comparison of scenario data to change in reserve, etc.



Assumptions & Margins

VM-31 requires a listing of the assumptions and margins, including a discussion of the rationale for each

- **Margins must:**
 - Account for estimation error and adverse deviation
 - Assume policyholder behavior becomes more efficient over time
 - Increase for uncertainty if data not fully relevant or credible, even if prescribed
 - Be set independently unless appropriate method to determine aggregate margin demonstrated
- **Potential margin methods**
 - Sensitivity testing
 - Statistical-based methods
- **Elements to consider for determining materiality**
 - Materiality to the underlying reserve
 - Statistical variability and materiality criteria used in other frameworks

Margin Example

Real-world example of margin framework in PBR Assumptions Resource Manual

Quantile method applied to a sample 10-year level term product that has been issued for many years

- Step 1. Establish company margin-setting policy
- Step 2. Calculate standard deviation of historical experience at each duration
- Step 3. Determine appropriate direction of margin at each duration
- Step 4. Calculate impact of applying margin at set % of standard deviation
- Step 5. Solve for simplified margin that replicates financial impact
- Step 6. Reasonability Check & Qualitative Analysis

For further details, refer to PBR Assumptions Resource Manual published by American Academy of Actuaries

Margin Example

Step 1. Establish company margin-setting policy

- **Criteria for determining if assumption or risk is material**
 - Relative to size of reserve, not total company financial statements
 - Ex: Assumption is material if impact to modeled reserve is greater than 2% or \$5M
- **Margin Methods**
 - Use quantile method if credible historical experience available
 - Target margin approximately equal to one standard deviation for desired conservatism
 - Apply sensitivity testing if credible experience unavailable

Margin Example

Step 2. Calculate standard deviation of historical experience at each duration

Pol Dur	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	\bar{x}	SD _x
1	8.00%	7.80%	6.50%	7.20%	8.20%	7.10%	7.70%	6.60%	6.90%	6.10%	7.20%	0.70%
2	4.00%	6.00%	4.50%	6.20%	5.30%	5.40%	5.10%	4.60%	4.90%	5.00%	5.10%	0.70%
3	3.40%	3.00%	2.50%	3.50%	2.90%	3.00%	5.00%	2.10%	2.00%	3.60%	3.10%	0.90%
4	2.50%	2.00%	2.10%	2.00%	2.00%	2.80%	2.30%	2.00%	1.60%	1.90%	2.10%	0.30%
5	1.50%	1.00%	1.30%	1.00%	0.90%	1.40%	1.10%	0.90%	1.10%	0.80%	1.10%	0.20%
6	1.40%	0.90%	0.80%	1.10%	1.10%	1.00%	0.70%	1.10%	0.50%	1.60%	1.00%	0.30%
7	1.80%	1.20%	0.70%	0.90%	1.00%	0.90%	1.00%	1.00%	1.10%	1.00%	1.10%	0.30%
8	1.00%	1.30%	0.90%	1.50%	0.90%	0.80%	1.10%	0.60%	1.00%	1.20%	1.00%	0.30%
9	1.20%	1.10%	1.10%	1.00%	1.00%	1.30%	0.80%	1.50%	0.60%	1.40%	1.10%	0.30%
10	84.00%	87.00%	79.10%	92.00%	86.30%	88.90%	82.70%	87.90%	79.50%	86.10%	85.40%	4.10%
11-15	8.20%	7.10%	7.70%	6.60%	6.90%	6.10%	7.00%	7.20%	7.10%	8.00%	7.20%	1.00%

Margin Example

Step 3. Determine appropriate direction of margin at each duration

Duration	Δ in DR (Positive Margin)	Sign of Margin to Increase DR
1	1.03%	Positive
2	0.87%	Positive
3	0.52%	Positive
4	0.28%	Positive
5	0.06%	Positive
6	-0.07%	Negative
7	-0.18%	Negative
8	-0.21%	Negative
9	-0.21%	Negative
10	1.50%	Positive
11-15	2.00%	Positive

Margin Example

Step 4. Calculate impact of applying margin at set % of standard deviation

Duration	Sign of Margin	Delta (%)	Delta (\$)
Baseline	Zero Margin		
1	Positive	1.03%	1,030,000
2	Positive	0.87%	870,000
3	Positive	0.52%	520,000
4	Positive	0.28%	280,000
5	Positive	0.06%	60,000
6	Negative	0.07%	70,000
7	Negative	0.18%	180,000
8	Negative	0.21%	210,000
9	Negative	0.21%	210,000
10	Positive	1.50%	1,500,000
11-15	Positive	2.00%	2,000,000
Aggregate		6.9%	6,930,000

Margin Example

Step 5. Solve for simplified margin that replicates financial impact

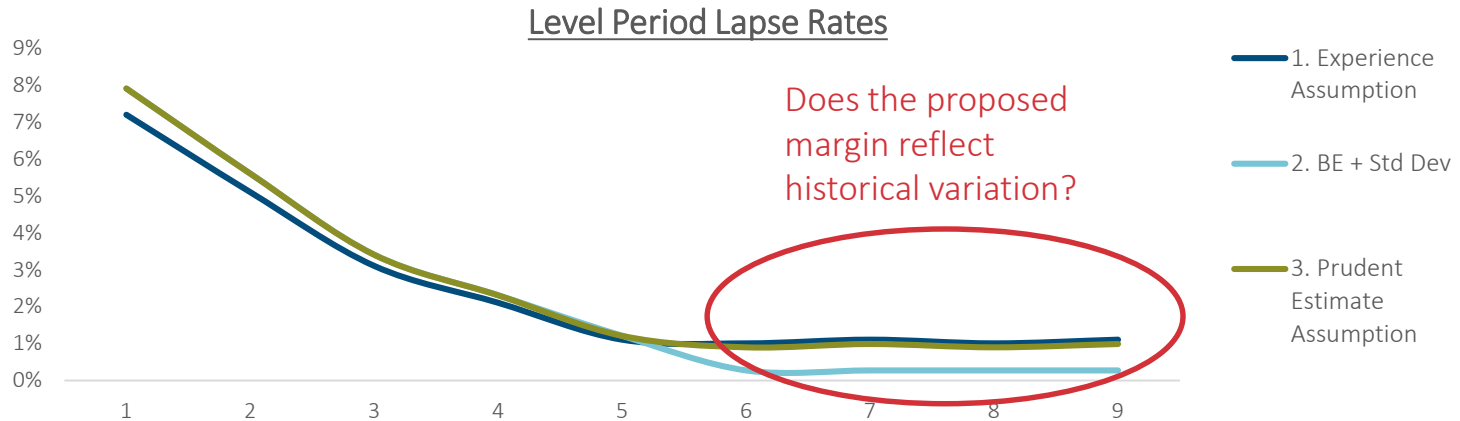
- Margin provides conservatism for uncertainty and adverse deviation
- Should be relatively stable over time
- Can monitor as part of assumption setting process

Margin	Delta (%)	Delta (\$)
Target Impact	6.93%	6,930,000
2%	1.65%	1,650,000
5%	3.25%	3,250,000
10%	6.85%	6,850,000
20%	13.65%	13,650,000

Margin Example

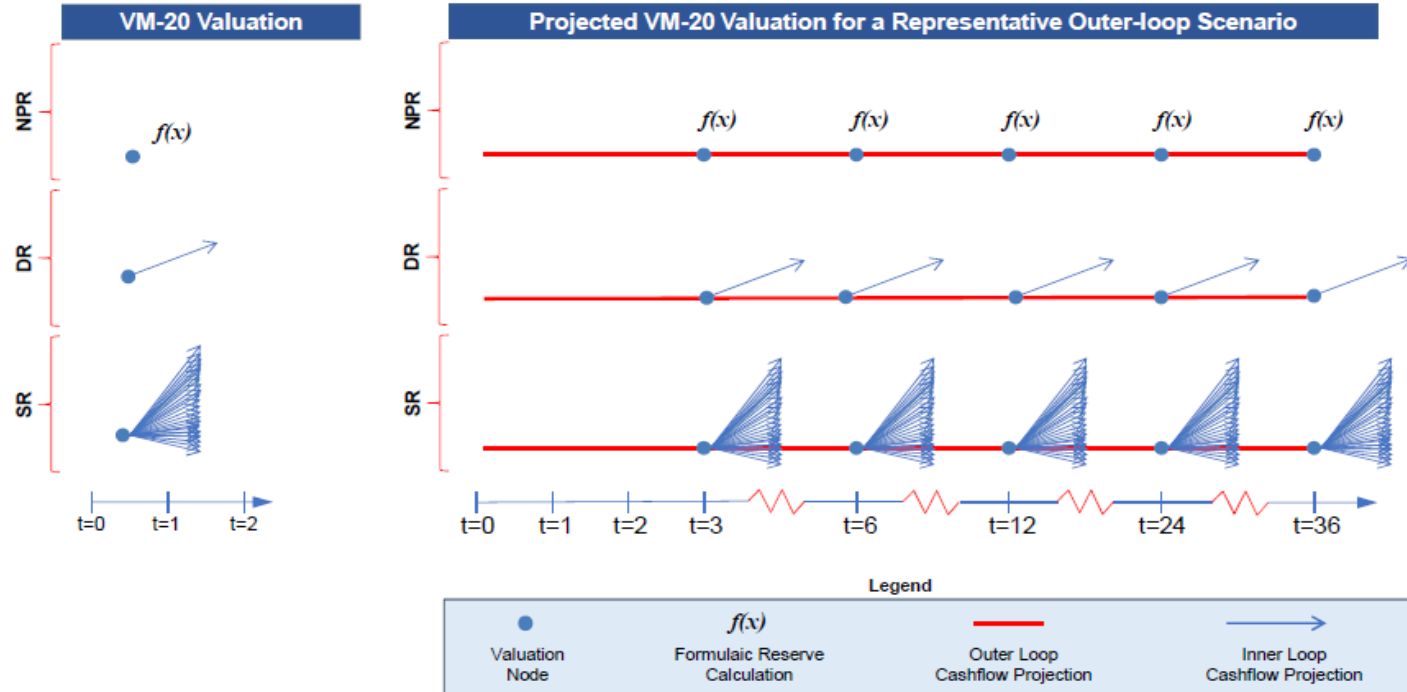
Step 6. Reasonability Check & Qualitative Analysis

- Does the simplified margin appropriately reflect the risk and historical experience? Is additional granularity needed?
- Are there additional risks or sources of uncertainty that should be reflected, i.e., changes to the product design, distribution channel or economic environment?
- Are there trends in the experience that should be reflected?



Projected Reserves

Project future reserves for other company projections



Projected Valuation Assumptions

Asset and liability assumptions may require nested modeling

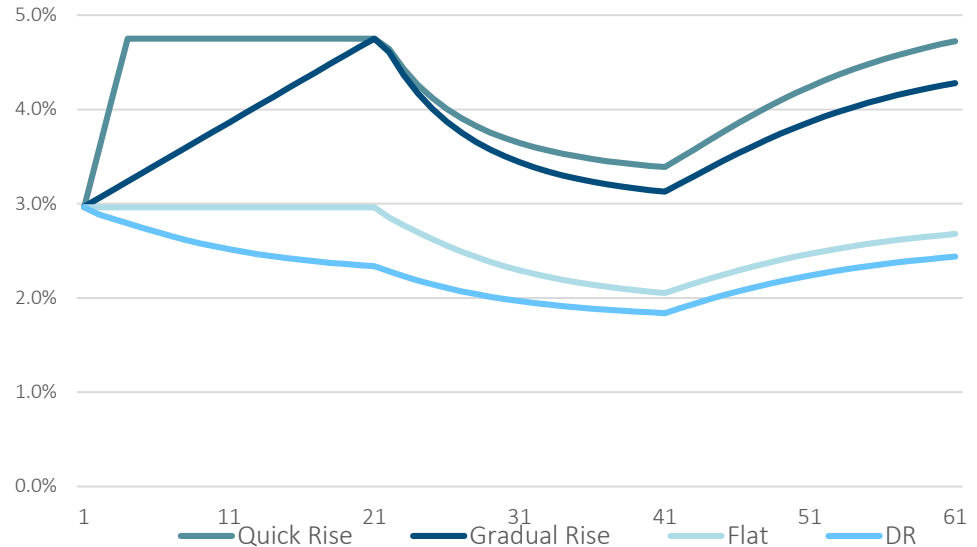
- **Asset Assumptions:**

- Interest and equity scenarios
- Spreads and defaults
- Reinvestment strategy

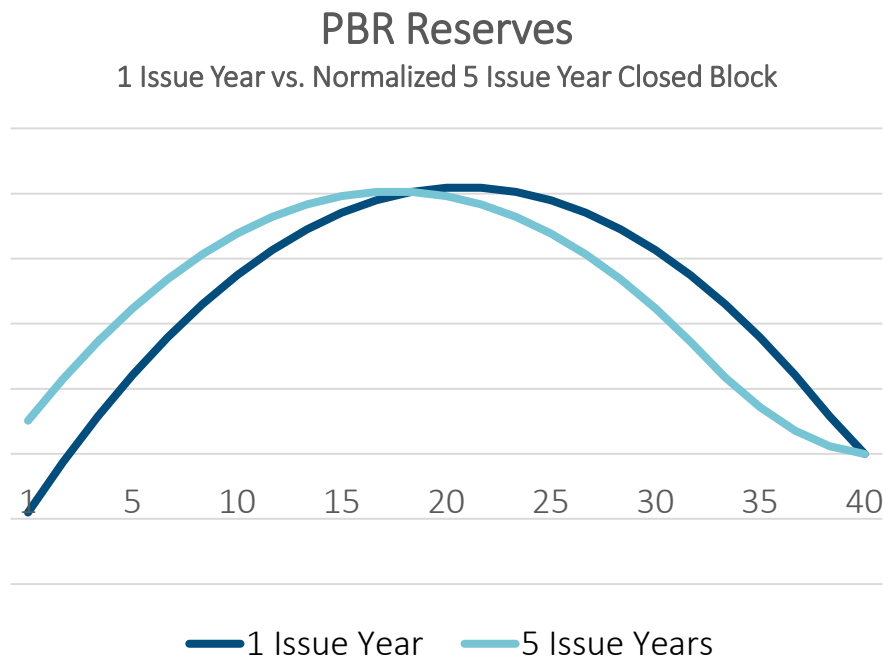
- **Liability Assumptions:**

- Credibility
- Mortality improvement
- Expense efficiencies / inflation

Example: Projected DR Scenarios



Pricing Considerations



- **Periodically check which PBR component prevails**
 - Consider modeling dominant reserve, but tricky if components switch
 - Note segments carrying largest impacts (e.g., longer level periods on term)
- **Consider how many issues years to reflect**
 - Pricing single year of new business vs. cohort approach
 - Product design changes will influence aggregate reserves over time
- **Cell-level pricing methods**
 - Model aggregate reserves
 - Economic and run-time considerations

Products Across the Valuation Manual: New York, VM-31, VM-G

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Journey Down the Boardwalk: NY PBR Development

2015 and prior:
NY not adopting
VM-20

July 2016:
NY announces
intentions to
adopt PBR with
deviations

December 2018:
Governor signs
bill authorizing
NY adoption of
NAIC Valuation
Manual, with
deviations (TBD)

June 2016:
NAIC meets
adoption
threshold for
VM-20

July 2018:
NAIC Financial
Condition (E)
Committee
adopts VM-21
Framework

Fall 2019:
NY expected to
expose proposal
of NAIC VM-20,
VM-21, VM-22
deviations

NY floor Differences: VM-20, VM-21, VM-22

NAIC requirements plus an additional floor for New York for VM-20, VM-21, and VM-22 (with NY still meeting NAIC accreditation standards)

VM-20

- VM-20 NY Floor potentially to be based on pre-PBR reserves

VM-21

- VM-21 NY Floor methodology under development

VM-22

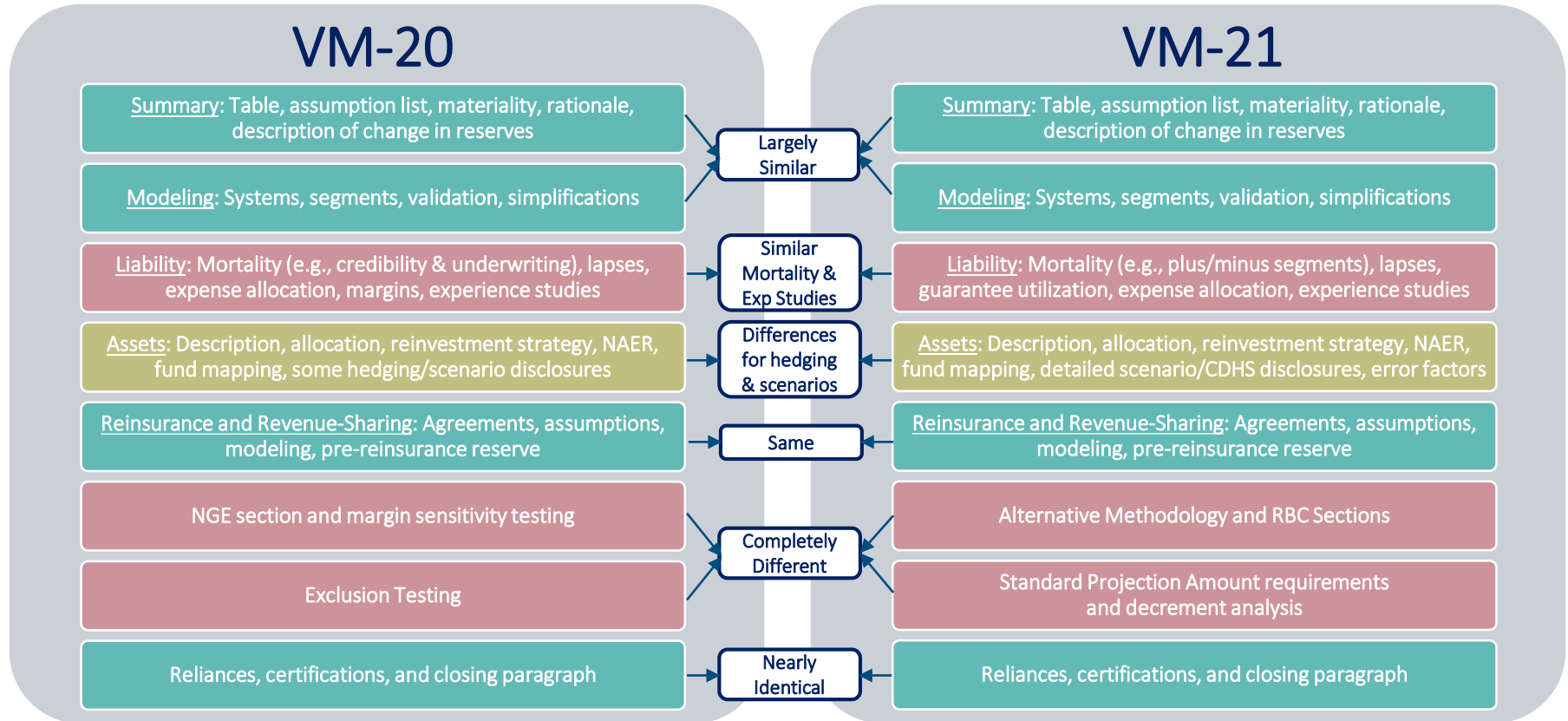
- VM-22 NY Floor expected to focus on discount rates for fixed payout annuities (as VM-22 only covers discount rates)

NY has still not publicly announced or exposed reserve requirements at the time of developing these slides

Tax Reserves - Tax Cuts and Jobs Act (TCJA)

- Tax reserves are based on the statutory reserves under the NAIC prescribed methodology
 - Apply 92.81% factor to the NAIC statutory reserves
 - Do not include additional reserves held in excess of NAIC statutory reserves
 - Asset adequacy reserves
 - Reserves attributable to deferred and uncollected (D&U) premiums
 - State-specific reserve requirements (e.g., excess reserves held under New York State requirements)
 - Aligns more with PBR methodology than prior tax reserve requirements
 - Previously had to adjust NAIC statutory reserves for mortality and interest rate adjustments
 - Now can apply a factor to the total reserve, whether based on prescribed or company-specific assumptions (e.g., deterministic reserve under VM-20 or stochastic reserve under VM-20/VM-21)
- **Greater consistency across life insurance and annuities valued under PBR**
 - Apply factor to PBR reserve for both VM-20 and VM-21
 - Same methodology could apply to future fixed annuity PBR methodology
 - Exceptions exist for certain product types (e.g., annuity certain)

VM-31: Life vs. Variable Annuity Requirements



****VM-31 Executive Summary Covers Both Reports****

VM-G: Applicability Across the VM

VM-G contains governance requirements for modeled reserves

- Specifically outlines responsibilities for the qualified actuary, senior management, and board of directors
- Covers oversight of controls, model validation, assumptions, and other governance measures

VM-G applies to both VM-20 and VM-21 modeled reserves

- Starting in 2017, VM-G requirements applied to VM-21 business issued 2017 and later → also applied to inforce business if aggregated with VM-21 business issued in 2017 and later
- Applies to VM-20 business as of company implementation date
- Not applicable to VM-22 or rules-based reserves

Leveraging opportunities for VM-G compliance between life and variable annuities

- Can use the same type of format and timing for presentations of VM-20 and VM-21 to senior management and the board of directors
- Similar documentation opportunities: minutes and materials from board meeting, VM-31 certifications, and additional internal documentation

Fixed Annuity PBR: The Next Frontier...

- **Fixed annuity PBR currently being worked on by the Academy Annuity Reserves Work Group**
 - Large focus on fixed indexed annuities (FIAs) and fixed deferred annuities (FDAs) with guarantees (e.g., guaranteed living benefits or “GLBs”)
 - Actuarial Guideline 33 requires holding reserves to fund the largest accumulated policyholder benefit after projecting all combinations of optionality and surrender timing, even if low probability or not to the policyholder’s advantage
- **Opportunity for PBR standards applicable across life and annuity products**
 - NAIC requirements for VM-20 and VM-21 have started to stabilize after recent adoption, which allows for greater focus towards laying the foundation for fixed annuity PBR
 - Targeting adoption of general framework within next 2 years and implementation in 3 years
 - Presentation made at the Summer NAIC National Meeting to target adoption with 1/1/2022 effective date
 - Target a proposed methodology framework deck for early/mid 2020 and drafted language for 2021
 - Many potential obstacles related to field testing, drafting, and regulatory approval process still to be worked out

Fixed Annuity PBR: The Next Frontier...

- Methodology Topics to be Considered

- **VM-21 Methodology:** Focus on recently adopted VM-21 general account methodology and make targeted deviations as needed.
- **Exclusion Test:** Can products with limited policyholder optionality or interest rate risk be excluded? May consider possible stochastic exclusion ratio test or certification method, similar to VM-20 requirements.
- **Scope:** Focus has been on fixed deferred annuities and fixed indexed annuities (especially those with living guaranteed benefits). Also consider whether to include Single Premium Immediate Annuities (SPIAs), Guaranteed Investment Contracts (GICs), and other products in the fixed annuity PBR methodology.
- **Hedging:** VM-21 recently introduced greater potential hedge effectiveness within the stochastic reserve if such can be demonstrated through back-testing. Consider whether to propose similar requirements for hedges covering indexed-credits on fixed indexed annuities.
- **Asset Requirements:** Investment spread on the general account tends to be a proportionately greater source of profit margin for fixed annuities than for life insurance and variable annuities. Include similar reinvestment guardrails requirements to VM-20/VM-21 or VM-22?
- **Floors:** VM-21 has a standard projection amount and VM-20 has the net premium reserve. What is the floor for fixed annuity PBR?



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