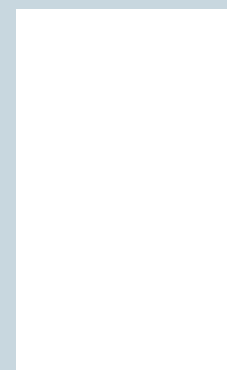
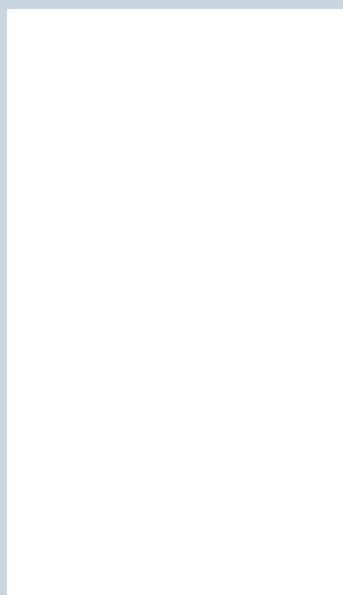
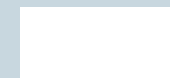
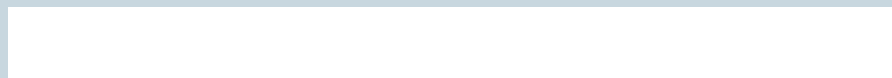


Principles-Based Reserving

International Association of Black Actuaries

July 28, 2017



What do you need to know to develop about PBR?

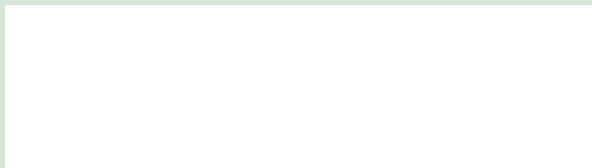
Principles Based Reserving

VM-20 Assumption Setting

Modeling Considerations

Additional Considerations and Implications

Principles-Based Reserving



What is Principles-Based Reserving (PBR)?

- Life insurance policy reserves historically been calculated using a formulaic approach, with locked-in assumptions prescribed by state laws and regulations
- New and innovative product designs, and products which have increasingly grown in complexity, led to the development of PBR
- PBR replaces the current formulaic approach to determining policy reserves with an approach intended to more closely reflect product risks
- PBR is intended to “right-size reserves,” reducing reserves that are too high for some products and increasing reserves that are too low for other products
- Under PBR, reserves will be adjusted as economic conditions change and as company experience emerges
- Minimum reserves for life insurance are defined in the Valuation Manual (VM-20)

The maximum of three components is the Minimum Reserve under VM-20

Deterministic Reserve

A gross premium reserve that uses the company investment strategy under a prescribed economic scenario. Present values use discount rates based on projected net earned rates.

VM-20 is prospective, applying to new business only, with the exception of some ULSG products

VM-20 Minimum Reserve

Stochastic Reserve

Up to 10,000 scenarios from prescribed ESG. Calculate Greatest Present Value of Accumulated Deficiencies for each scenario. Discount rate is 105% of one-year Treasury rates. Stochastic Reserve based on CTE (70).

Exclusion tests can provide relief from having to calculate the deterministic and stochastic reserve

Net Premium Reserve

A “formulaic” type reserve intended to serve as the “floor” reserve for any specific policy. Separate calculation for ULSG vs. term products. Defaults to current CRVM for other products.

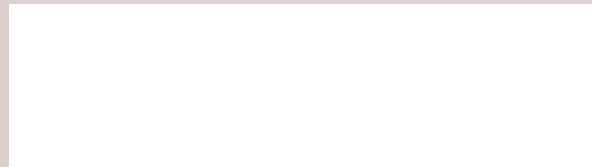
Principle-Based Life Reserves – It's Finally Here

- PBR was effective January 1, 2017
- Companies have a three year transition period to implement PBR, PBR is mandatory beginning January 1, 2020
- Implementation during the transition period can occur by product
- Companies may move to the 2017 CSO Table without implementing PBR
- Small companies may be exempt from PBR
- As of April 17, 2017 the Valuation Manual has been adopted by 47 states
 - AK, MA, and NY have not adopted
 - NY has announced it will adopt PBR in 2018
 - MA has introduced legislation to adopt PBR

Implementation Status

- The SOA recently released its “Report of the Society of Actuaries 2016 Mortality & Other Implications of PBR (VM-20) Survey – Part 2”
- 72 companies participated in the survey
- 15 survey respondents indicated that they would be adopting PBR for some policies in 2017
 - 10 expect to value only term plans
 - 4 expect to value only UL plans
 - 1 expects to value both term and UL
- The leading reasons for delaying adoption were:
 - Electing the three year transition period
 - Use of the small company exemption
 - Uncertainty about the tax reserve impact
- 15 respondents intend to cede business to captives after January 1, 2017
- 32 respondents plan to use the 2017 CSO for valuations in 2017, while 19 intend to use the 2017 CSO for determining minimum cash values

VM-20 Assumption Setting



Introduction to PBR assumptions

Focus on two assumption sets

Prescribed assumptions include mortality, lapse, and discount rates

- Methods consistent with prior formulaic reserve calculations

Prudent estimate assumption methodology provides some guidance but leaves a lot of room for judgment

- Assumptions are company experience plus a margin
- Some aspects of the mortality assumption include a fair amount of prescription
- Other liability assumptions are less prescribed

NPR prescribed components

Little change to what you already know

- **Mortality**
 - 2017 CSO and 2017 CSO Preferred Structure (2001 CSO Tables are available during transition)
 - GI/SI: 2017 Table in development for use

- **Interest Rates**
 - Interest rates are calendar year rates that are not unlocked for issue year blocks
 - Interest rates remain unchanged if they do not differ from prior year calculated interest rates by 0.50%

- **Lapse Rates**
 - ULSG lapse rates are determined based on the expected funding level of secondary guarantees
 - Lapse rates for the UL w/o SG reserve floor is 0%
 - Term product lapse rates are prescribed and vary by guarantee duration and premium jump

Who sets prudent estimate assumptions?

Overlap in responsibilities



- Company experience may be reasonably consistent with best-estimate assumptions
- Companies may wish to minimize assumption sets by combining best estimate and company experience where it makes sense to do so
- May need some modifications from how best estimate is calculated now to comply with company experience
 - Mortality may not be a good fit for combining
 - Minor changes for non-mortality
- Who is currently responsible for best-estimate assumptions? May be natural for ownership of company experience assumptions
- Margins, mortality grading, and application of judgment, may be more heavily developed with the valuation team

General guidance on prudent estimate assumptions

Section 9 of VM-20 – Anticipated Experience

1	Identify risk factors not prescribed or stochastically modeled
2	Anticipated experience
3	Use relevant and credible company experience; credibility blend elsewhere
4	Where credibility theory is of limited use rely on other accepted actuarial practices
5	Sensitivity testing
6	Annual review

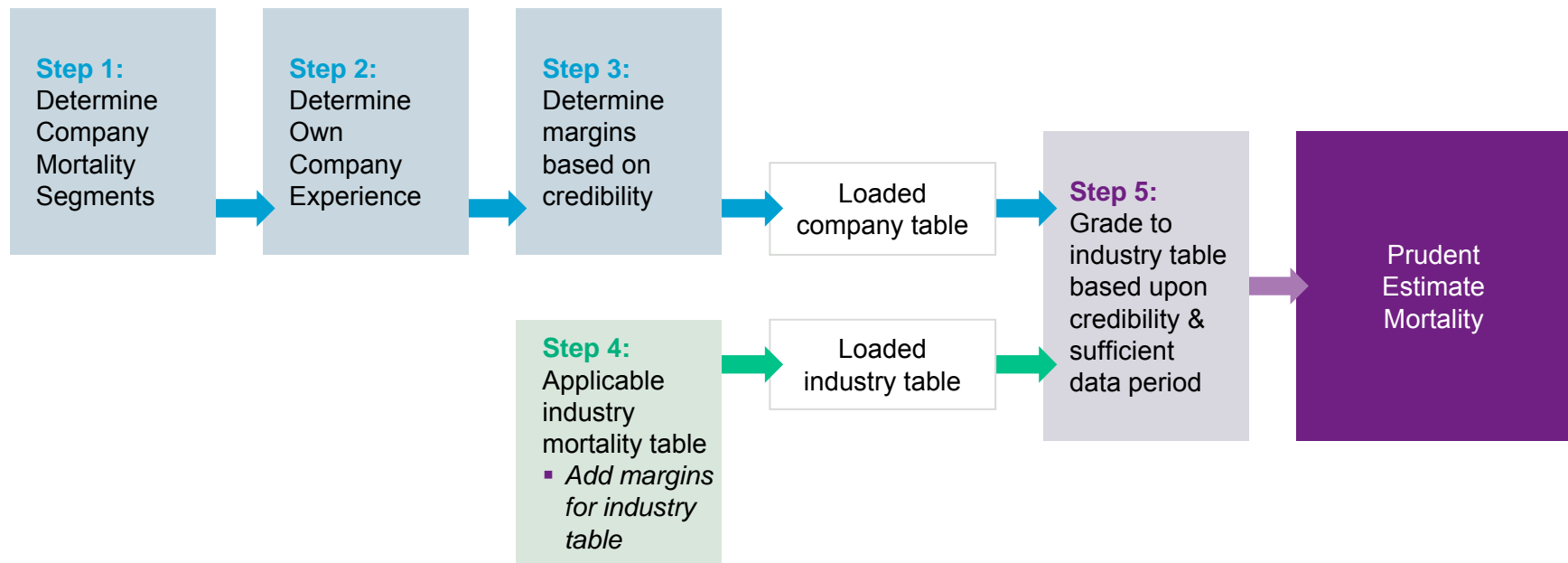
General guidance on prudent estimate assumptions

Section 9 of VM-20 – Margin

- Set a margin for each assumption independently
- Should increase reserves
- Assume independent variables
- Level of uncertainty should impact margin
- Not required if variations in the assumption do not have a material impact

Prudent estimate mortality assumptions

Step by step process

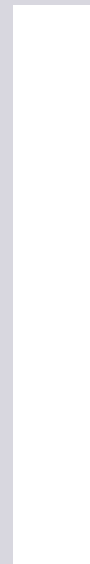
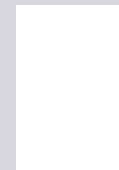
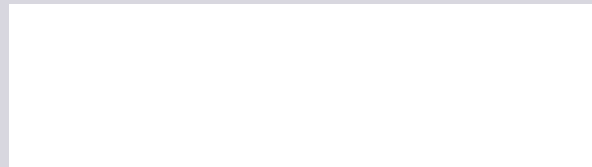
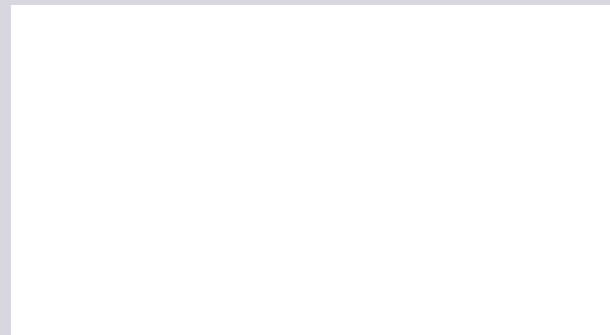


Other Assumptions

Additional considerations by product

Category	Assumption Types
Term	Lapses, post level profits, conversions
ULSG	Lapse, premiums, withdrawals/surrenders
Corporate Assumptions	Expenses and taxes
Non Guaranteed Elements	COIs, crediting spreads, etc.
Reinsurance	Counterparty actions
Assets	Interest rate spread, default cost

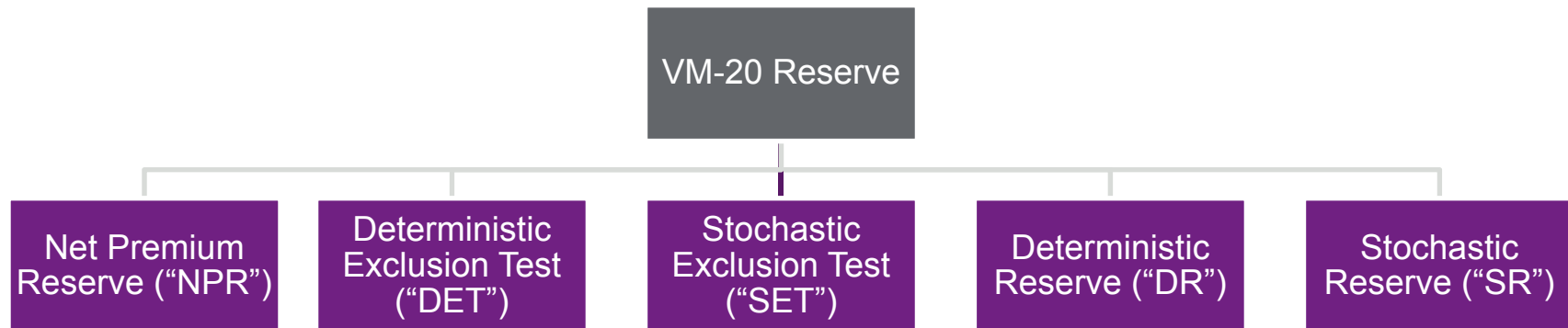
Modeling Considerations



VM-20 Model Structure

VM-20 Valuation Models vs. Projection Models

- **Valuation models** will calculate VM-20 Reserves at a **specific point in time**



- **Projection models** will calculate this VM-20 reserves at the model start date and at **each future period**

Valuation Model

Initial Decisions

- What system will be used?
 - For NPR?
 - For modeled reserve?
- What will the starting point for the models be?
- Which area will perform the modeling work?
- What modifications will be necessary to current models?
- How will exclusions tests be performed?
- At what level will you aggregate?

How do I model PBR over time?

- Projecting VM-20 modeled reserves will add complexity to models
- How to account for inforce aging at best estimate assumptions with prudent estimate reserves?
- Should increased credibility and other items that may impact prudent estimate assumptions be factored into the model?
- How are sensitivity runs impacted?
- What simplifications can be made?

Modeling complexities

- Stochastic Models
 - How many scenarios are adequate for pricing?
 - Who owns the stochastic exclusion tests?
- Inner and outer loops
 - Inforce ages at best estimate assumption
 - VM-20 is run with prudent estimate assumptions
 - Future mortality improvement may be applicable to the inforce but is not allowed for projecting modeled reserves
 - Historical mortality improvement may be applied to the assumption
- How many issue years are modeled? Does aggregating across multiple issue years impact results?
- Should you price/model different products together? What impact does aggregation have?
- Are your models setup for multiple issue years or products? If not how to estimate?

Modeling simplifications

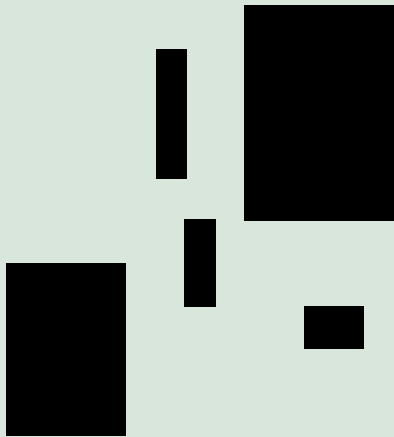
- How is pricing different from valuation?
 - How are your goals different?
 - If you can create a product where the NPR governs is life is easier?
 - How do you determine how many scenarios? System constraints or first principles?
 - How is your final answer impacted?
- How precise does the reserve component need to be to reasonably capture profitability?
- What nuances of VM-20 can be simplified for the pricing model?
 - What is the impact of these simplifications?
- How frequently should you run stochastic models? Can you live with approximations for some iterative steps?

Model governance



- Principle Based Reserve Model Governance Practice Note
- How are pricing and valuation models different?
- Who owns the models? How much consistency should they have?
- How are the models and assumptions governed?
- How do the pricing models fit and stay consistent with valuation models?
- If the pricing actuary is making changes do those impact valuation?

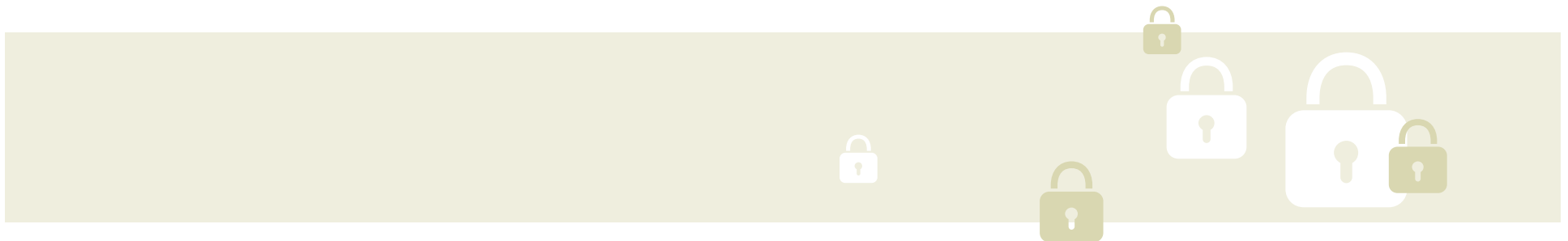
Additional Considerations



Assumption unlocking

Pricing for volatility

- Assumptions for the modeled reserve may change at each valuation date
- This increases the volatility of earnings for products
- Pricing sensitivities will be more complex to model
- Changes in the best estimate assumption likely mean changes in your prudent estimate assumptions
- Pricing actuaries will need to be comfortable with wider ranges of pricing results
- May initially need more sensitivities to understand how reserves change
- Companies will need to be comfortable with modeling VM-20 sensitivities and outer loop projections

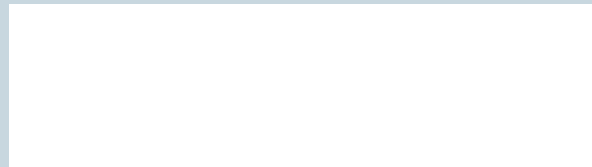
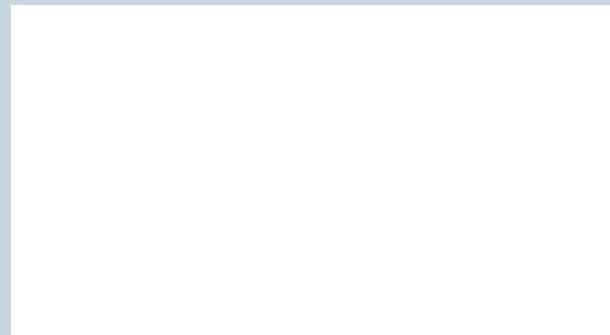


What is the tax reserve?

What to assume

- The industry is waiting for IRS guidance on the tax reserve under VM-20
- Companies are making assumptions for the tax reserves to begin modeling
- Some companies assume the NPR reserve
 - The use of the VM-20 floor reserve is considered conservative
 - A formulaic reserve is consistent with previous tax reserves
- Alternatively, one may assume the maximum of the modeled reserves and NPR
 - Less conservative than use of the NPR
 - Many have questions on how the IRS would audit the modeled reserve components
- Companies need to be flexible in reserve assumption as retroactive adjustments may be necessary once the IRS rules

Implications



Necessary to Start Now

- Your company has less than three years to prepare for PBR
- A strong implementation plan is needed to layout the order of implementation and necessary implementation steps – this requires significant thought and analysis
- PBR puts a lot more ‘pressure’ on models – additional model development and governance may be required
- You may require additional resources in addition to training for current resources
- Robust experience studies are necessary to support development of prudent estimate assumptions
- Principles-based reserve calculations involve a significant amount of additional work, in particular in setting up models, developing/updating prudent estimate assumptions (especially mortality), preparing the PBR Actuarial Report, and in simply doing the recurring work for each valuation date

Impact on your Business

- Product profitability and competitiveness will be impacted by underlying factors of PBR (e.g. products with more credible experience have the potential for lower reserves)
- May result in changes to the level of post level term premiums
- Simpler ULSG product designs may emerge
- Impact of streamlined underwriting on assumption setting will need to be considered
- May be pressure on reinsurers to offer lower guarantees
- Some companies may seek to sell life blocks to avoid the burden of PBR
- Statutory reserve volatility will increase
- Small companies opting for the small company exemption will have limitations placed on their ULSG offerings

Questions



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