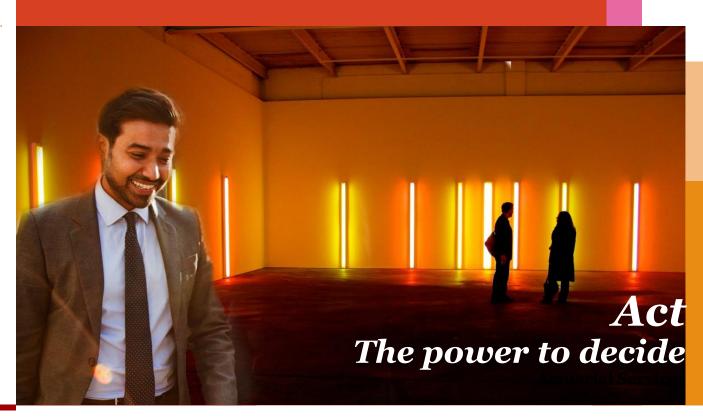
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Principle-Based Reserves Discussion

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Agenda

- PBR Audit and Observations
- Regulatory Discussion
 - Revisions to VM
 - CA DOI and NY DFS
- Implementation Issues and Discussion
- Q&A

PBR Audit and Observations

Potential PBR Audit Procedures

Consider for each of NPR, Deterministic, Stochastic

- Process walkthrough
- Understanding of process
- Assess Grouping
- Select sample of calculations/algorithms to be tested
- Test liability/asset calculations/projections for sample policies/assets
- Reasonability test cash-flows (in aggregate)
- Test discount rate calculations
- Test calculation of aggregate reserve
- Test final reserve comparison
- Inventory asset and liability assumptions
- Validate prescribed assumptions (asset default, spread, mortality, etc.)
- Assess both the reasonableness of assumption/margins and the consistency with VM-20
- Test assumptions inputs in valuation system/projection system
- Test data underlying company experience studies and support
- Mortality assumption calculation
- Test scenario inputs
- Test valuation rates
- Inforce data (asset and liability)
- Reserve attribution
- Reserve trending (NPR/1000)

Reserve Movements

Other Inputs

Planning

Calculations/ Methodology

Assumptions

Mortality Assumption

- Not grading to 100% of the industry table by the later of attained age 100 or 15 years after underwriting
- The use of alternative credibility formulas for Limited Fluctuation
- For credibility, seeing a 50/50 split between Limited Fluctuation and Bühlmann credibility

• ULSG NPR

- Confusion around lapse assumption (whether should change or be static)
- Not including surrender benefits in the VNPR calculation
- Not including lapses in the actuarial present value calculations

Assumptions

- Difficulty in setting a margin for premium persistency for ULSG
- Not increasing expense assumption for inflation in modelled reserve calculation
- Margins must be defined separately for each risk factor regardless of correlation between risk factors

Modeling of Reinsurance

- YRT rates are usually not guaranteed, therefore, consideration has to be made to comply with Section 8.C.7 around counterparties being knowledgeable and exercising the options within the contracts
- Consideration of a margin on YRT rates
- Consequently, direct writers will likely ask reinsurers for contractually guaranteed periods for YRT rates
- Consideration of assumption margins for both gross and net of reinsurance as margins set on one may not increase reserves for the other

Documentation

- Not enough support/rationale for margins
- Not enough support/rationale for not modelling riders in the modeled reserve and other approximations
- Not enough support/rationale for using alternative to the UCS tool (will be named Relative Risk Tool (RRT) in 2019 manual)

Regulatory Discussion

Notable LATF Adoptions – For 2020 Manual

- Mortality The grading criteria from company experience table to industry table is more granular (smaller ranges of credibility %'s) for 1/1/2020 valuation with option to use for 1/1/2019
- ULSG NPR
 - If multiple secondary guarantees, must look at the one producing the largest NPR versus just the longest guarantee.
 - Dynamic lapse formula is calculated at valuation date and constant for all durations
- ULSG lapses for modeled reserves now reference the 2015 CIA term-100 study versus the 2007 study
- GI mortality table adoption 2017 GI table with 75% loading
- Clarification that margin adjustments for less than 100% correlation can not be based on implicit or prescribed margins
- MANY non-substantive clarifications and reference edits driven by CA DOI

Notable Regulators

- CA DOI
 - Many companies received a lengthy letter with questions from the CA DOI
 - Questions included
 - Description of governance process (e.g. board minutes, assumption approvals, model controls, etc)
 - Mortality experience, Underwriting, specific files calculating credibility
 - More support and rationale for all other assumptions and margins as well
 - Model validation, model documentation, and model training
- NY DFS
 - VM passed in House and Senate; awaiting governor approval
 - DFS is allowed to deviate from VM for up to 10 years

PBR Implementation Issues and Discussion

Common issues for PBR Implementers

- 1. Product aggregation under PBR and how this fits within a company's risk management framework
- 2. Companies are still evaluating what experience to use for their simplified underwriting mortality experience
- 3. Companies struggling with modelling reinsurance contracts under existing PBR regulation
- 4. Forecasting of deterministic and stochastic reserves is proving more challenging than expected
- 5. Riders and whether they need to be modeled separately or jointly with base policy

Common issues for PBR Implementers (cont'd)

- 6. Governance needs to be modified to include PBR assumptions, models, and results
- Modifying experience reporting functions to include VM-50 reporting requirements
- 8. Limitations of current valuation, modelling, and administrative systems
- 9. Margin setting (and evaluation of the conservatism of total margins) has been a focus of many clients as management approaches PBR
- 10. Indexed products and whether to capture dynamic hedging prospectively

