

Life Principles-Based Reserves Emerging Practices Education Session

The Actuaries Club of the Southwest (ACSW)
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Agenda

1 Overview

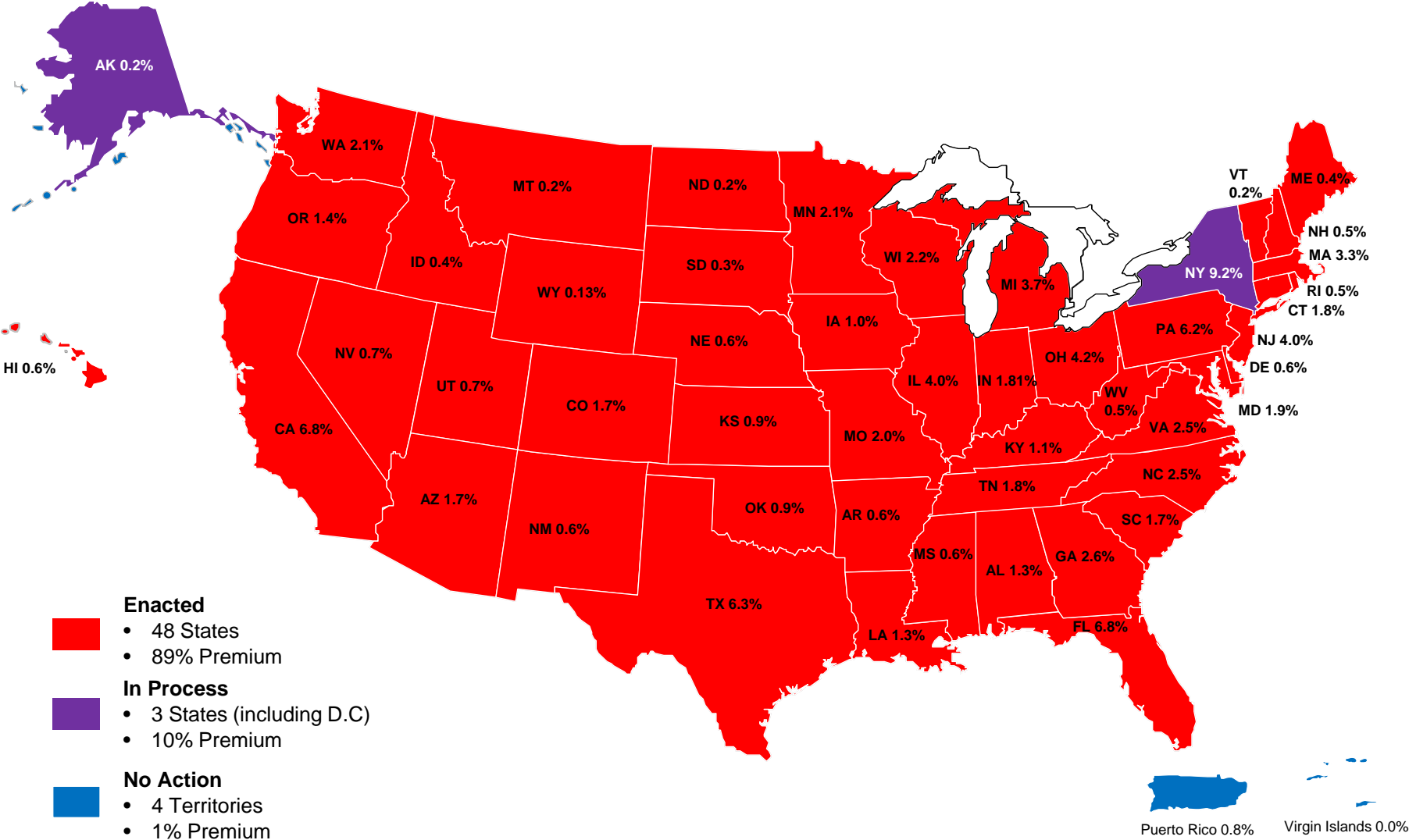
2 Assumptions and margins

3 Reinsurance

Section 1 | Overview

PBR became effective on January 1, 2017 with an optional 3 year phase-in

Readiness continues to vary widely across industry participants



PBR is the maximum of three components

Reserve	Methodology	Calculation	Assumptions	Scenarios
1 Net Premium Reserve (“NPR”)	<ul style="list-style-type: none"> • Formulaic reserve • CRVM for products other than Term & ULSG • Note that the NPR method for Term and ULSG methodology might change 	<ul style="list-style-type: none"> • Seriatim 	<ul style="list-style-type: none"> • Prescribed 	<ul style="list-style-type: none"> • None
2 Deterministic Reserve (“DR”)	<ul style="list-style-type: none"> • Present value of liability cash flows 	<ul style="list-style-type: none"> • Grouped 	<ul style="list-style-type: none"> • Prudent 	<ul style="list-style-type: none"> • Single scenario
3 Stochastic Reserve (“SR”)	<ul style="list-style-type: none"> • CTE(70) of starting assets plus the greatest present value of accumulated deficiencies 	<ul style="list-style-type: none"> • Grouped 	<ul style="list-style-type: none"> • Prudent 	<ul style="list-style-type: none"> • Full scenario set from AAA ESG

The NPR is a seriatim formula reserve and is the equivalent of the standard scenario used for variable annuities

Principles-based reserves are not new

Several actuarial calculations already use principles-based approaches

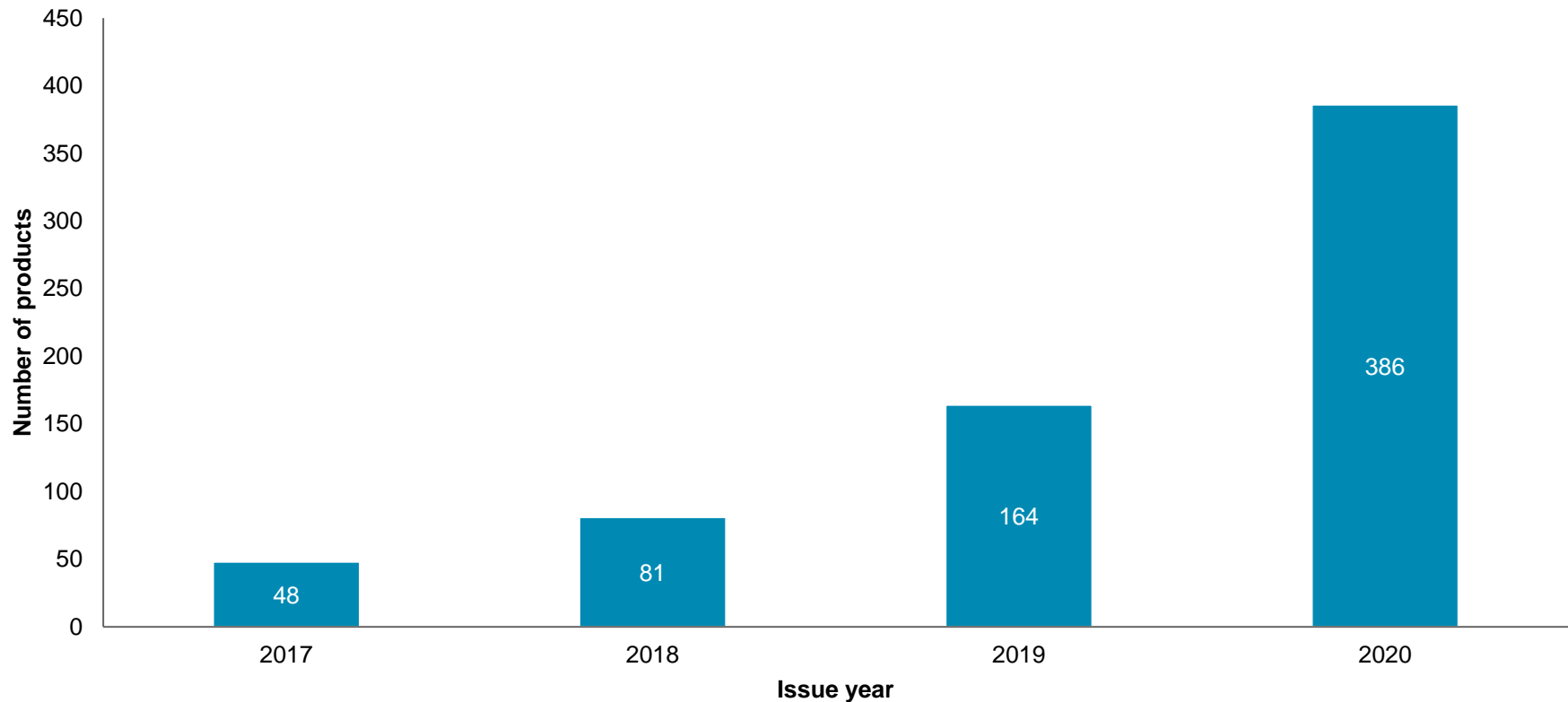
Purpose	Description	Applicable Products	Notes
Statutory	Asset Adequacy Testing	Life and annuity	<ul style="list-style-type: none"> Used to test sufficiency of statutory reserves
	VA CARVM	Variable annuity	
	AG 38 Section 8D	ULSG	<ul style="list-style-type: none"> Requires the DR be calculated for certain ULSG contracts
	AG 48	Term, ULSG	<ul style="list-style-type: none"> PBR calculation to determine a Primary Security Requirement
US GAAP	FAS 97	Annuity and UL	
Other	Economic Reserves/Capital	Life and annuity	<ul style="list-style-type: none"> Used for company reporting and reserves held in financing arrangements
	Embedded Value	Life and annuity	

The 'principles-based' calculations shaded in blue actually follow the same methodology prescribed under VM-20

Industry survey: PBR road map

The optional three year phase-in period is being used across the board with a majority of the products in scope moving to PBR in 2020

Number of products currently or planned to be reserved for under PBR by calendar year



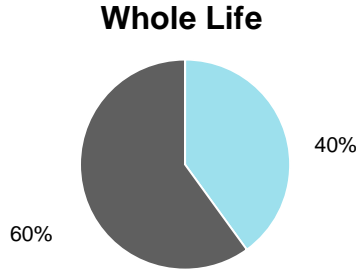
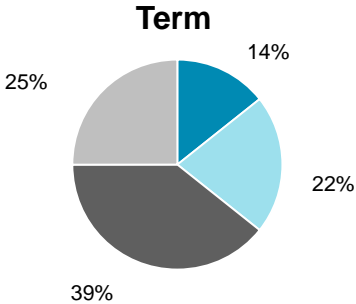
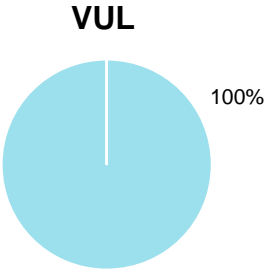
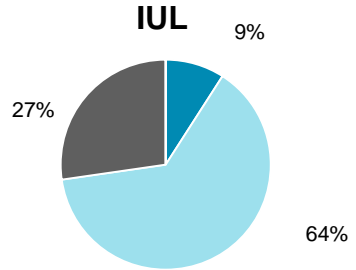
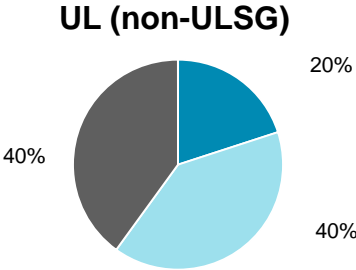
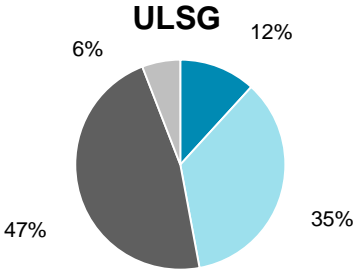
The primary products moving to PBR in 2017-18 have been Term and ULSG

Industry survey: PBR impact on profitability

Most participants saw an increase in profitability to ULSG, Term, and Whole Life products

Impact of PBR on profitability by product type

Based on analysis to date, survey participants saw the following impact resulting from introducing PBR



- Large Increase (+)
- Small Increase (+)
- Large Decrease (-)
- Small Decrease (-)

Section 2 | Assumptions and margins

DR and SR use prudent estimate assumptions

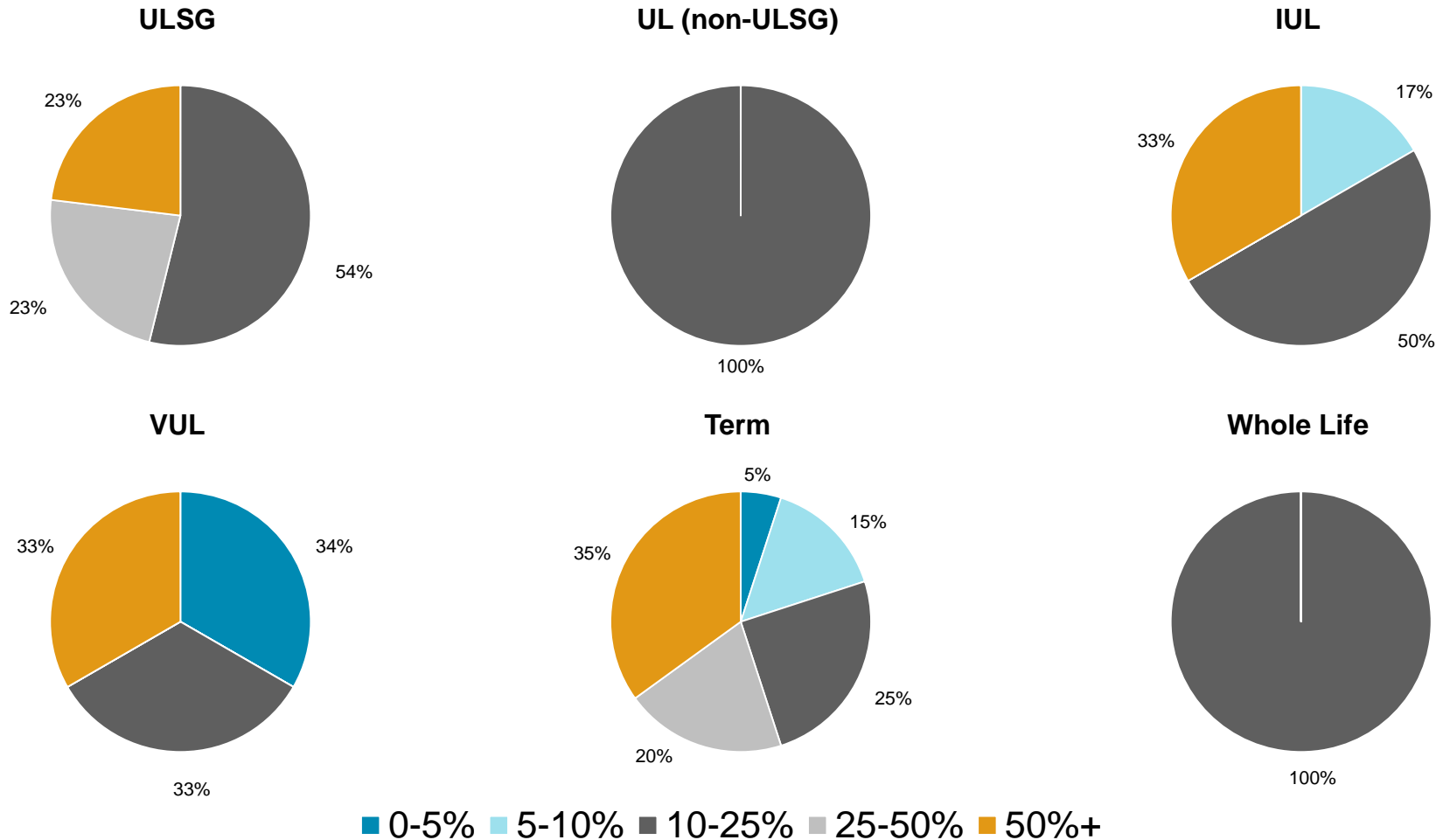
Prudent Estimate Assumptions  Anticipated Experience  Margin

Assumption	Considerations	Anticipated Experience	Prudence Elements
Mortality	<ul style="list-style-type: none"> • Mortality segments • Applicable industry table • Credibility of experience 	<ul style="list-style-type: none"> • Linearly grades to an industry table based on the last duration where sufficient experience exists 	<ul style="list-style-type: none"> • Prescribed margins • Separate margins for company and industry experience • Excludes mortality improvement past the valuation date
Policyholder behavior	<ul style="list-style-type: none"> • Dynamic assumptions • Required sensitivities • Credibility of experience 	<ul style="list-style-type: none"> • Consistent with actuarial practice • Based on available relevant experience 	<ul style="list-style-type: none"> • Specific requirements on sensitivities and increase in policyholder efficiency over time
Expenses	<ul style="list-style-type: none"> • Overhead allocation methodology • Non-recurring expenses 	<ul style="list-style-type: none"> • No future expense improvements • Exclude corporate taxes 	<ul style="list-style-type: none"> • Prudent assumption should be at the high end of the plausible range
Assets	<ul style="list-style-type: none"> • Asset segmentation • PBR credit rating 	<ul style="list-style-type: none"> • Company investment strategy • Anticipated investment expense • Economic scenarios (prescribed) 	<ul style="list-style-type: none"> • Margins embedded within prescribed default costs, interest rate scenarios, credit spreads and limitations to reinvestment strategy

Industry survey: observed aggregate margin level under PBR by product

ULSG, VUL, IUL, and Term saw the highest level of margin, coming in between 30 and 40% (using midpoints to calculate average)

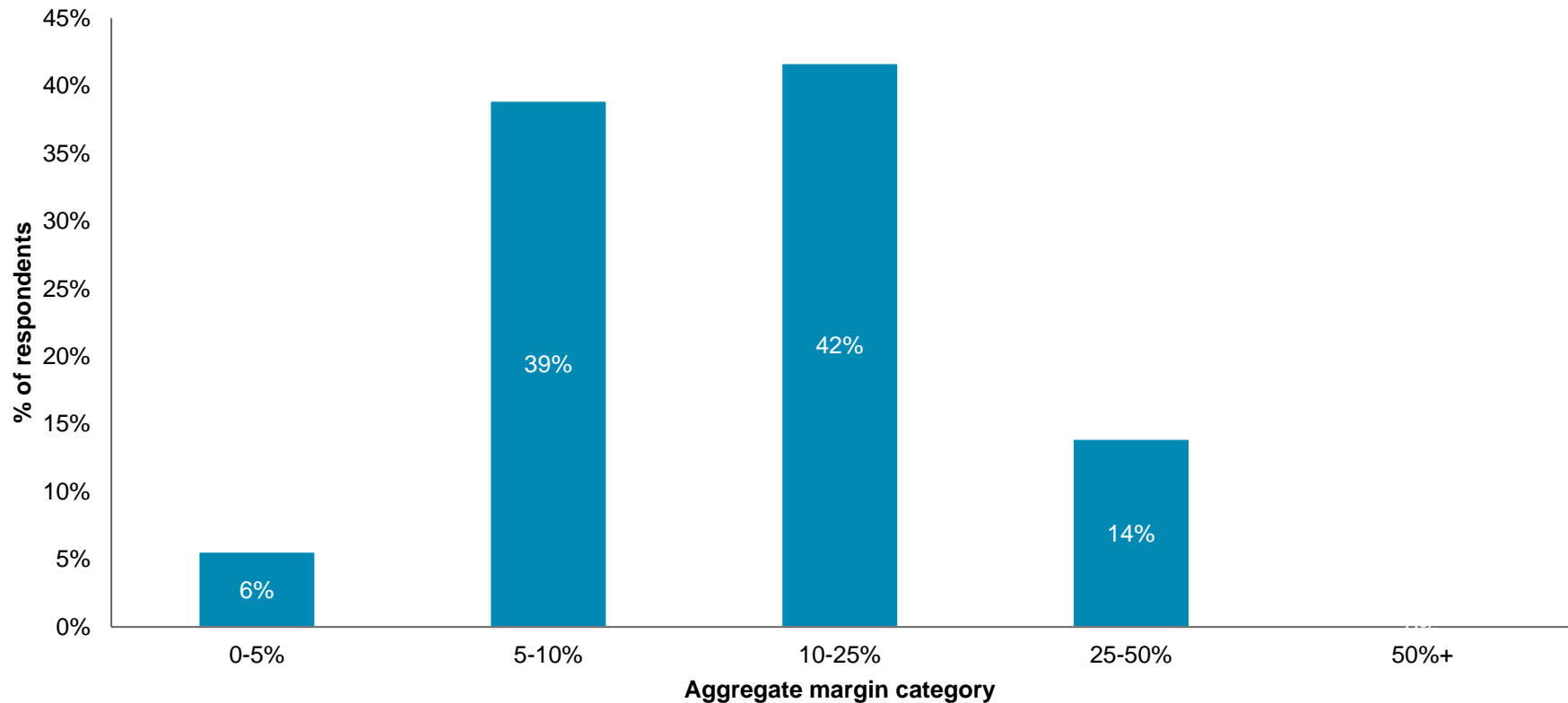
Level of margin observed by product type



Industry survey: view on appropriate aggregate margin levels

Most participants viewed appropriate margins to be between 5-25%

Industry view on appropriate level of aggregate margin



80% of survey participants view an appropriate level of aggregate margins to be between 5-25% and only 5 view an appropriate level to be between 25-50%.

Industry survey: challenges survey participants are facing with prescription of individual margins under PBR

Survey responses fit into four categories

Individual margins can be too conservative

- Ex. Individual margins compounds when they should have diversifying effects.
- Ex. Mortality margin alone would give an appropriate aggregate margin

Interaction of individual margins difficult to assess

- Ex. Difficult to analyze appropriateness of individual margin given interaction of other variables
- Ex. Changes in product design can impact the direction the individual margin is applied

Difficult to obtain sufficient credibility

- Ex. New methods of underwriting do not have enough credibility
- Ex. Credible data is insufficient at granular levels

Effort

- Ex. It is time consuming and resource intensive to calculate all the individual margins

Section 3 | Reinsurance

Section 8 of VM-20 pertains to the impact of reinsurance on the components of reserves under PBR

	Component	Considerations in determining reinsurance impact
Maximum 	Net premium reserve	<ul style="list-style-type: none"> ▪ No change as compared to pre-PBR ▪ Coinsurance: The NPR is reduced by the percentage coinsured ▪ Yearly Renewable Term (YRT): The NPR is reduced by the unearned cost of insurance that is reinsured
	Deterministic and stochastic reserve	<ul style="list-style-type: none"> ▪ Requires two separate calculations, pre- and post-reinsurance ▪ Exclusion testing, if elected, must be performed on a pre- and post-reinsurance basis
	Final PBR reserve	<ul style="list-style-type: none"> ▪ The starting asset collar does not apply to pre-reinsurance reserves ▪ $Credit = Max(NPR_{Gross}, DR_{Gross}, SR_{Gross}) - Max(NPR_{Net}, DR_{Net}, SR_{Net})$

The reserve credit for reinsurance under PBR is significantly different from the formulaic approach that insurers have become accustomed to

A cohort of new business with \$50MM of first year premium consisting of 10-, 20- and 30-year term products was projected for 30 years

Model

- 30 year projection horizon
- Reserve revalued annually

Best estimate assumptions

- Mortality follows 100% of 2015 VBT
- Mortality experience is 30% credible with 10 years of sufficient data
- Expenses, commissions and lapses set at industry averages

Prudent estimate assumptions

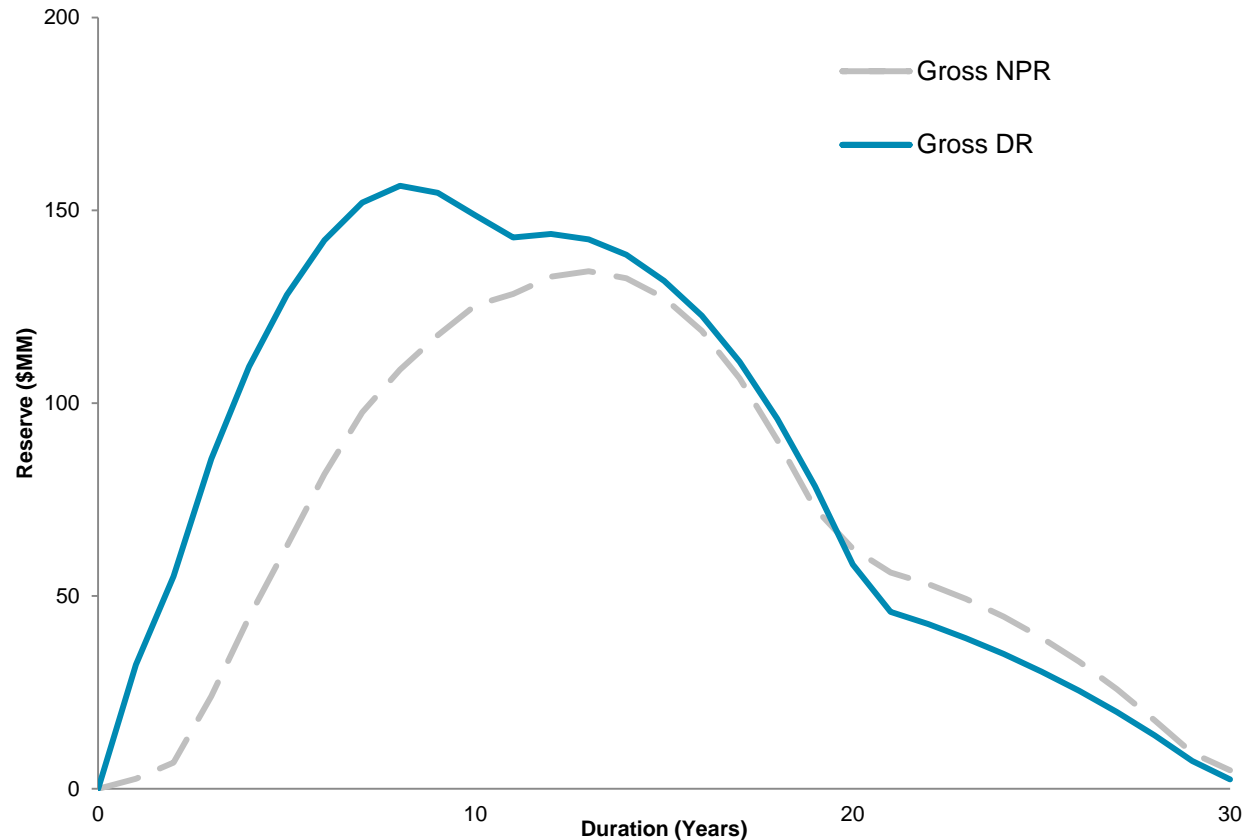
- Mortality is improved up to each valuation date at 1% per year
- 100% shock lapse at end of level term period

Reserve assumptions

- The NPR uses the 2017 CSO and a valuation interest rate of 4.5%
- DR scenarios are re-generated at each valuation date
- Starting assets at each valuation date use the 'direct iteration' approach
- The cohort is assumed to pass the Stochastic Exclusion Test (SET)

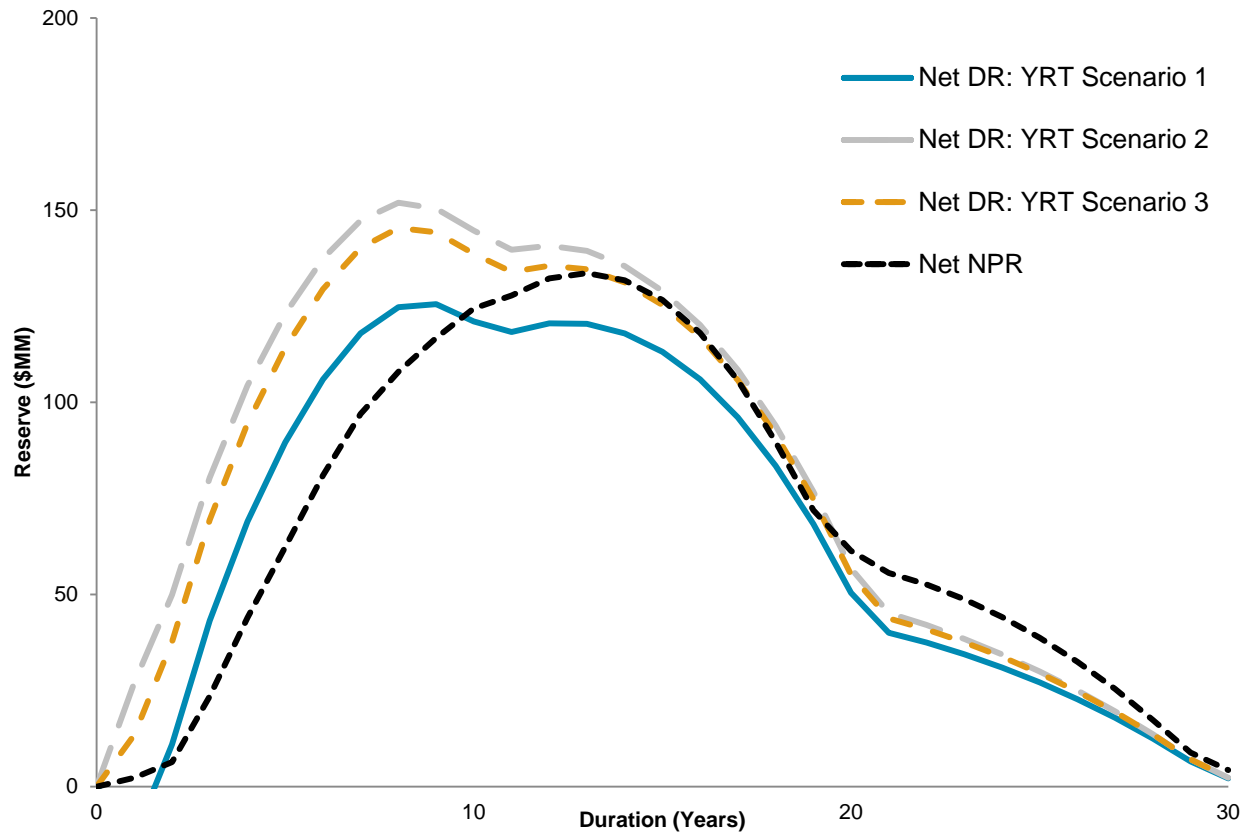
Assumptions used and products modeled are for an illustrative term portfolio intended to be reasonably representative of products offered in the market today

The gross NPR and DR for this cohort of new business are shown below



The DR starts much higher than the NPR, but the gap closes over time, partially because mortality improvement to date is reflected at future valuation dates

A 50 percent first dollar YRT reinsurance arrangement with the current premium scale set equal to 100 percent of the best estimate mortality assumption was modeled



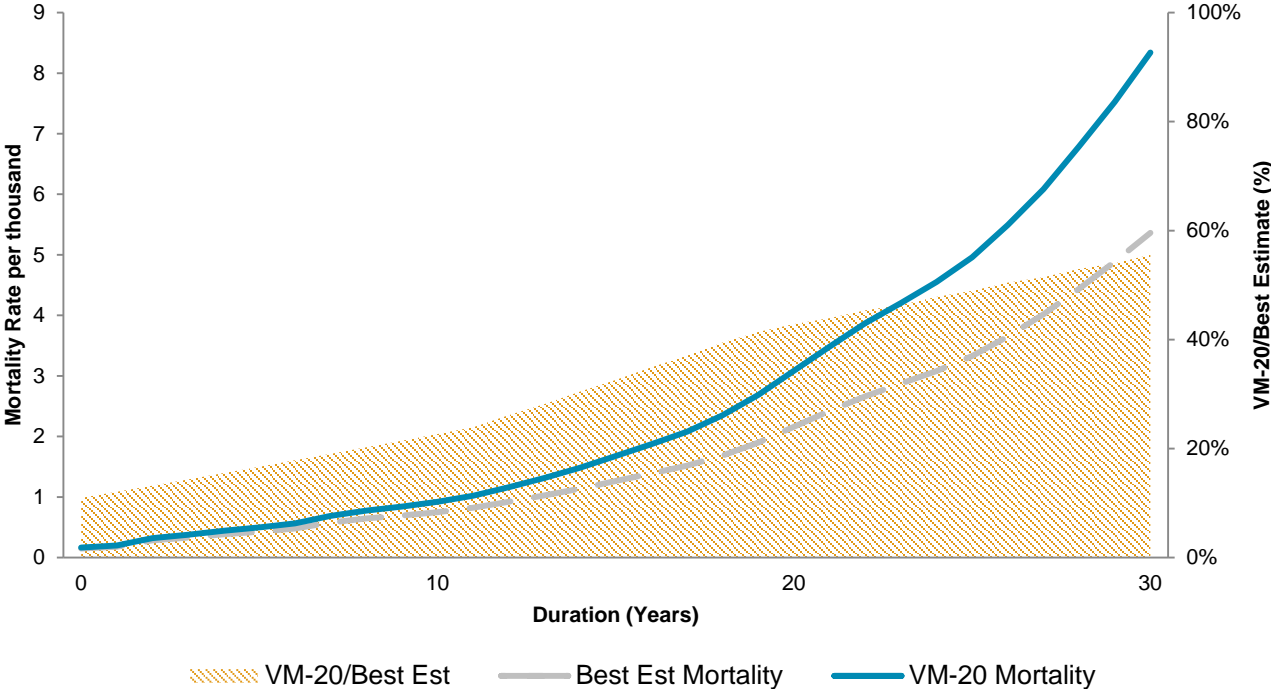
YRT Scenario 1: No change in rates

YRT Scenario 2: Change rates to eliminate any gain/loss from reinsurance

YRT Scenario 3: Increase rates by 15%

PBR mortality margins compound to be substantial in presence of anticipated experience mortality improvement

Best estimate mortality assumption vs. VM-20 mortality assumption for 35 year old male:

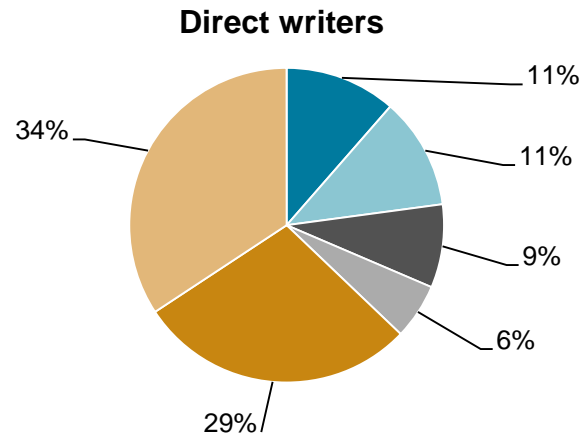


Assumptions: Male, Preferred NT, Issue Age 35. Credibility = 30%

Industry survey: modeling YRT rates under VM-20

The modeling approach taken by reinsurers tends to be more conservative than that taken by direct writers

Approaches to modeling non-guaranteed YRT rates for PBR



- Reinsurer immediately adjusts for 100% of mortality increase over best estimate
- Reinsurer immediately adjusts to achieve break-even (i.e. YRT rates = PBR mortality)
- Reinsurer progressively adjusts for 100% of mortality increase over best estimate
- Reinsurer progressively adjusts to achieve break-even (i.e. YRT rates = PBR mortality)
- Use current scale
- Add a margin to current scale

Nearly a third of direct writers are assuming no change to current YRT rates

