2020 VALUATION ACTUARY
VIRTUAL SYMPOSIUM

Life PBR and the treatment of reinsurance
Update and insider perspectives

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September 1, 2020

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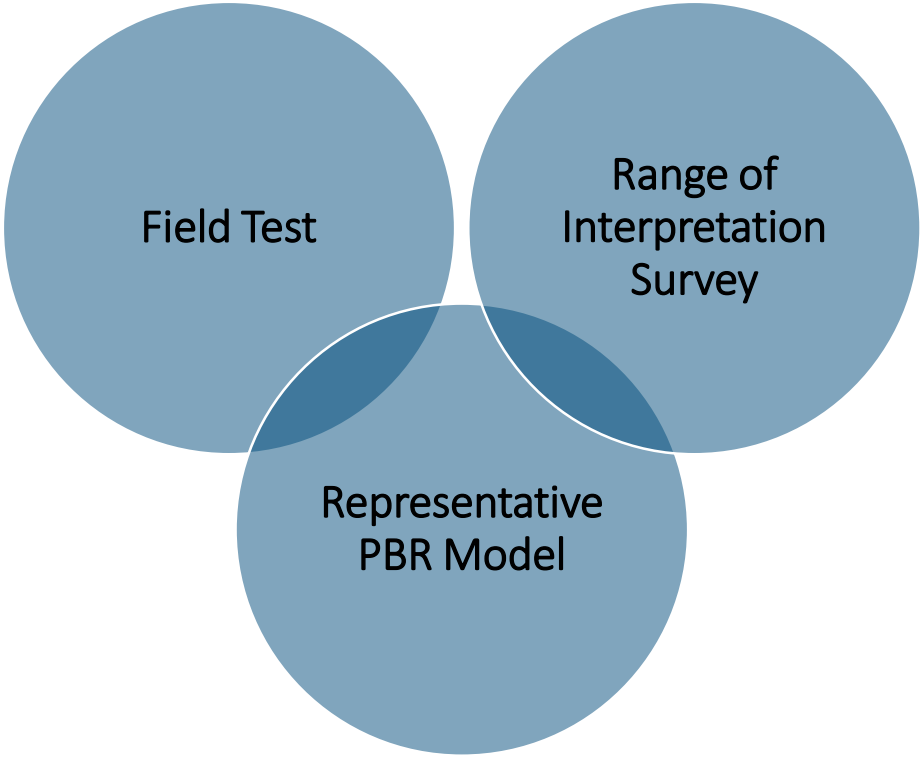
Agenda

1. Background
2. Field Study
3. Range of Interpretation Survey
4. Key Takeaways
5. Current Status and Additional Resources

Scott O'Neal, FSA, MAAA
September 1, 2020

Project Overview



Field Test

- Participants provide projected results under different APFs and scenarios

Range of Interpretation Survey

- Poll participants to describe how they would implement each of the proposed solutions (APFs)

Representative PBR Model

- Validate and interpret Field Test and Survey output
- Utilize Representative PBR Model to extend understanding of results

Introduction to Proposed Solutions

"Principles"
APF 2019-40

- Model YRT premiums using anticipated experience with margins based on clarified modeling principles/guidance and actuarial judgment

"Best Estimate"
APF 2019-41

- Premiums determined using current YRT premium scale with projected adjustments based on what the company actually expects will occur
- Claims determined using the company's anticipated experience mortality assumptions including mortality improvement

"Prescribed Margin"
APF 2019-42

- Non-guaranteed reinsurance premiums are modeled as the current scale plus a margin, which is developed based on prescribed inputs, with some flexibility to make adjustments to reflect contract provisions

Field Study Overview

Submission requirements

Compute point-in-time and projected reserves for Term and/or ULSG products, using the 2020 Valuation Manual with modifications to the treatment of non-guaranteed reinsurance

Produce modeled results and detailed disclosures for two baseline runs and each proposed solution with modification per testing scenarios

Participation

187	Entities invited to participate
11	Participating entities
0	Participating reinsurers
7	Submissions for Term
8	Submissions for ULSG

Representative PBR Model Key Dimensions

YRT Rate Scale Analysis

- **Baseline YRT Scale**: YRT scale in line with anticipated mortality excluding future mortality improvement (FMI)
- **Lower YRT Scale**: YRT scale reflective of future mortality improvement
- **Higher YRT Scale**: YRT scale greater than anticipated mortality without FMI

Credibility Levels

- **High Credibility** Scenario (100% Credibility)
- **Low Credibility** Scenario (50% Credibility)

Field Test Scenarios

Baseline

- Interim solution (1/2 Cx)
- No Change to current YRT rates

2019-40

- Action A – No change in YRT rates and counterparty actions
- Action B – Prudent estimate YRT rates and counterparty actions
- Action C – Prudent estimate YRT rates after reaching a Loss Trigger
- Action D – Prudent estimate YRT rates after consecutive years of Loss Trigger

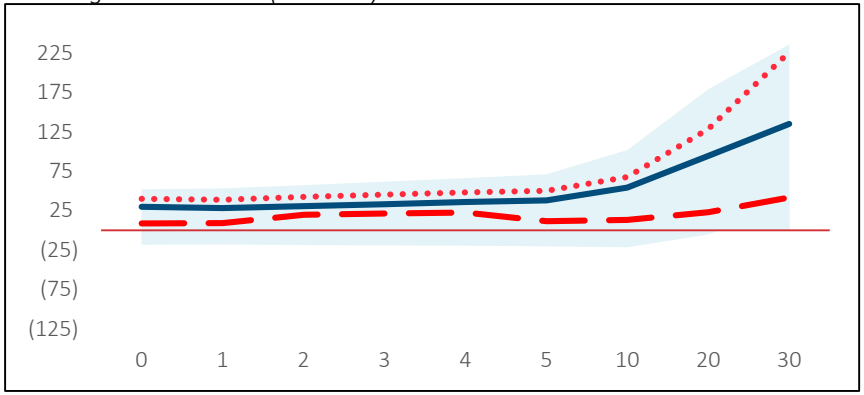
2019-41

- Anticipated experience mortality includes 15 years of future mortality improvement at rates of 0%, 0.5% and 1.0%

2019-42

- Anticipated experience mortality includes future mortality improvement for a specified number of years (5, 10, 15 and 20 years)

3.1 ULSG Gross DR – Net DR (per 1000 of projected ceded NAAR)
No change to YRT rates (Baseline)

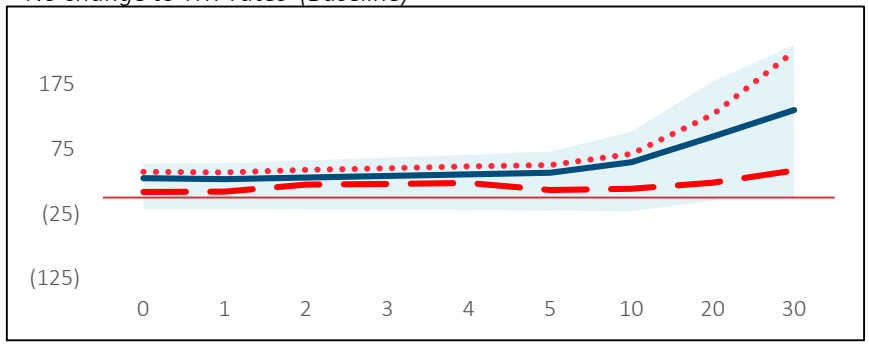


Field Test Results Legend

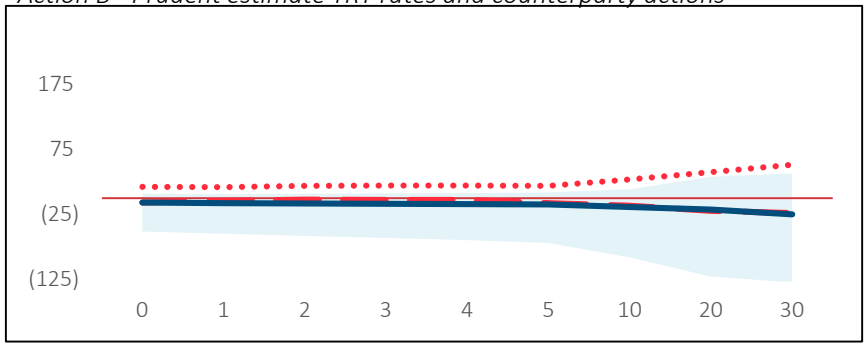
- 25th percentile (Field test)
- 75th percentile (Field test)
- Coverage range (Representative PBR model)
- "Baseline YRT scale" with high credibility

APF 2019-40 Field Test Results

3.1 ULSG Gross DR – Net DR (per 1000 of projected ceded NAAR)
No change to YRT rates (Baseline)



3.6 ULSG Gross DR – Net DR (per 1000 of projected ceded NAAR)
Action B - Prudent estimate YRT rates and counterparty actions

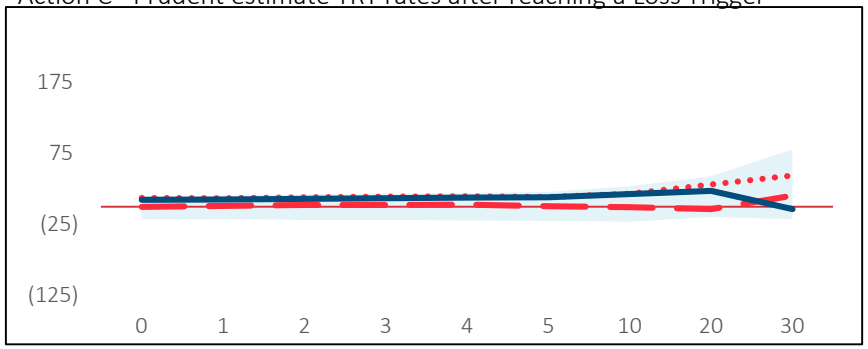


Commentary

- Both Action B and Action C reduced the overall range of modeled "DR Reserve Credits" seen in field test participant results
- Action B saw large reductions to the upper end of the "DR Reserve Credit" range, but saw an increase to the lower end of the range – particularly as shown by the PBR Representative Model results
- The loss ratio mechanism of Action C greatly reduced the high and low end of the range of field test and PBR Representative Model results

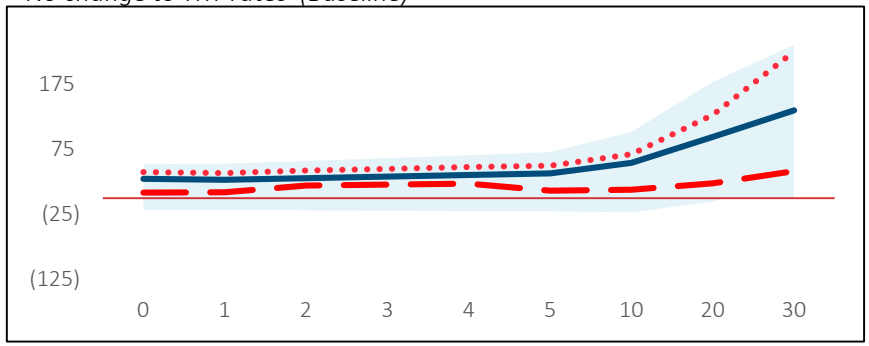
25th percentile (Field test)
75th percentile (Field test)
Coverage range (Representative model)
"Baseline YRT scale" with high credibility

3.8 ULSG Gross DR – Net DR (per 1000 of projected ceded NAAR)
Action C - Prudent estimate YRT rates after reaching a Loss Trigger



APF 2019-41 Field Test Results

3.1 ULSG Gross DR – Net DR (per 1000 of projected ceded NAAR)
No change to YRT rates (Baseline)

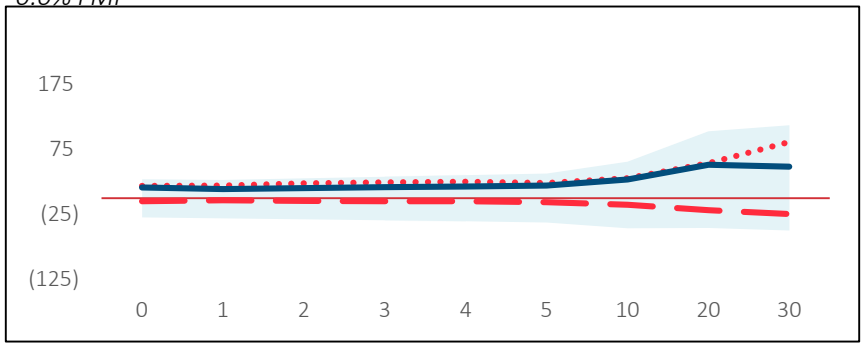


Commentary

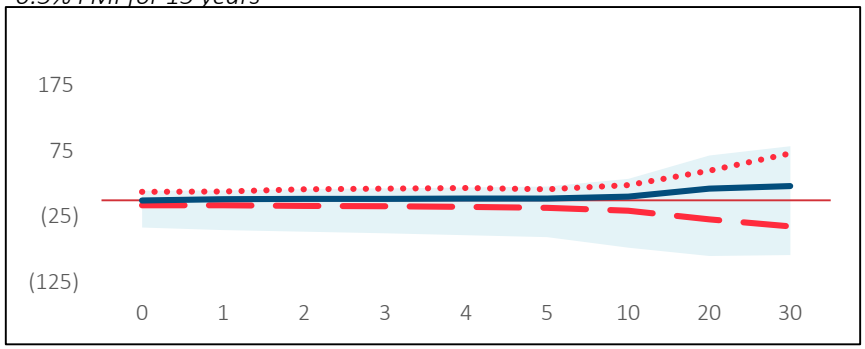
- Field test instructions asked participants to model different levels of future mortality improvement applied to reinsurance claim settlements only
- The representative PBR model included margins in addition to YRT premiums as a modeling simplification rather than a pure interpretation of the APF
- 50bps of incremental mortality improvement reduces the DR "reserve credit" to close to zero in initial projection years for the "Baseline YRT scale"

25th percentile (Field test) | Coverage range (Representative model)
75th percentile (Field test) | "Baseline YRT scale" with high credibility

3.11 ULSG Gross DR – Net DR (per 1000 of projected ceded NAAR)
0.0% FMI

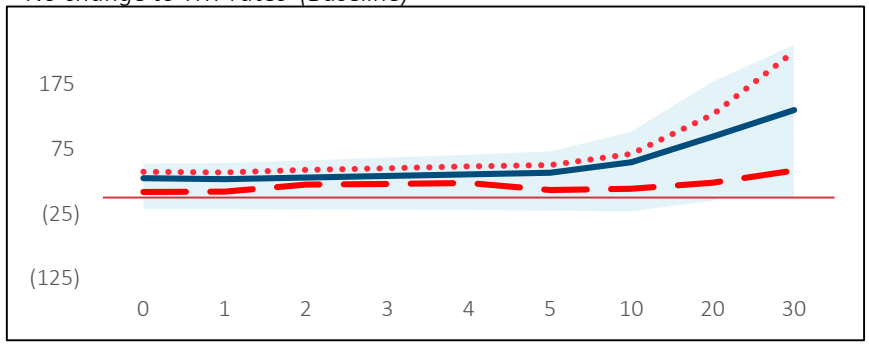


3.12 ULSG Gross DR – Net DR (per 1000 of projected ceded NAAR)
0.5% FMI for 15 years



APF 2019-42 Field Test Results

3.1 ULSG Gross DR – Net DR (per 1000 of projected ceded NAAR)
No change to YRT rates (Baseline)

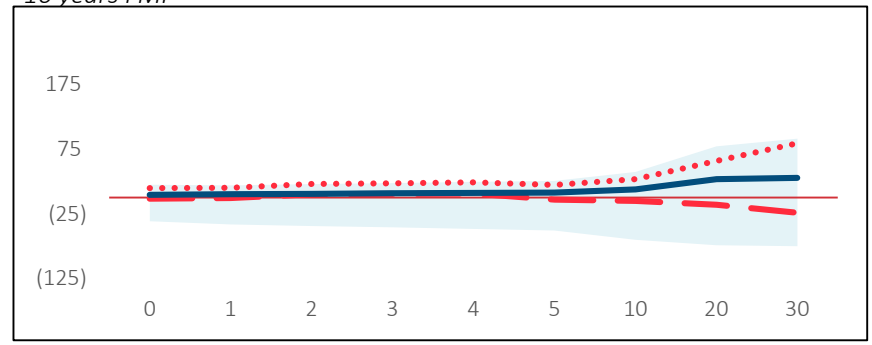


Commentary

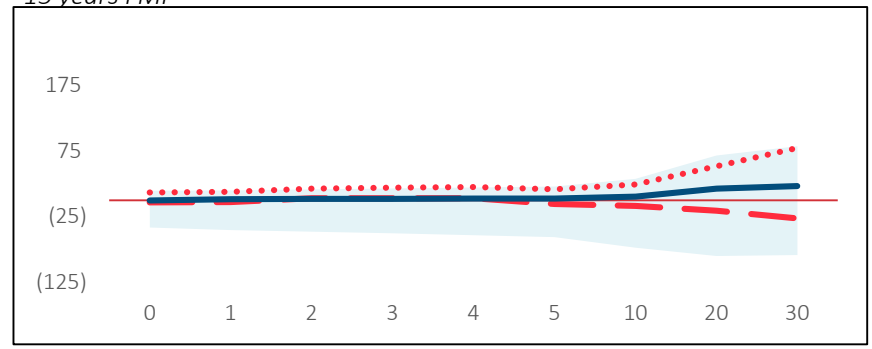
- APF 2019-41 and APF 2019-42 produce similar results, with main variations driven by the application of mortality improvement (magnitude and length)
- 5-years of incremental mortality improvement reduces the DR "reserve credit" by roughly 50%
- When a margin is defined as the relationship between anticipated experience and best estimate mortality, "Higher YRT rate scales" lead to negative reserve credits

25th percentile (Field test) | Coverage range (Representative model)
75th percentile (Field test) | "Baseline YRT scale" with high credibility

3.14 ULSG Gross DR – Net DR (per 1000 of projected ceded NAAR)
10 years FMI



3.16 ULSG Gross DR – Net DR (per 1000 of projected ceded NAAR)
15 years FMI



Range of Interpretation Survey Introduction

51 legal entity responses to survey

36 separate direct writers and reinsurers

55% of industry by new business face amount

Survey Purpose

- Poll companies on the modeling approach they would use to implement APFs
- Supplement and broaden range of practice outside of the participation of field test responses
- Collect separate responses for different treatment by treaty type

Survey Response Choices

- **None –** Maintain the current scale throughout the projection
- **Reactive –** Increase by a percent of the prescribed margin after X years
- **Breakeven –** Increase by percent of difference between PBR mortality and current scale of YRT rates

The Representative PBR Model was utilized to analyze surveyed approaches for each APF. To focus on the impact of different approaches, the Baseline YRT scale and High Credibility was used in the model.

APF 2019-40 | Survey Results

Reinsurer Reaction	Survey %
None	19%
Reactive	40%
Break-even	25%
Other	16%

Modeling Details

- No change to YRT premiums

Increase YRT premiums by

- 100% of prescribed mortality margin after 1 year and **every year thereafter**
- Includes implicit margin assuming future mortality improvement in all years

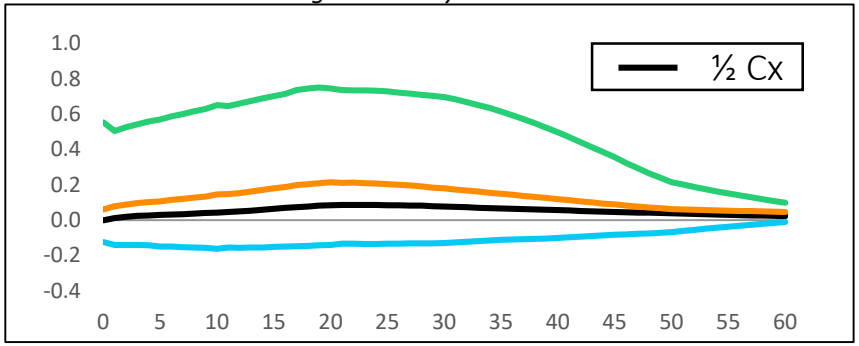
Increase YRT premiums by

- 100% of the difference between current YRT premium and prescribed mortality immediately and **every year thereafter**

Commentary

- APF 2019-40 had the most variation in survey responses
- Responses ranged from straightforward (reactive or break-even) to complex
- The largest "DR Reserve Credit" produced by the representative model was from the "None" reinsurer reaction
- The reactive scenario with the implicit margin including all years of FMI creates a negative "DR Reserve Credit"

4.3 ULSG Pre-reinsurance DR – Post-reinsurance DR (projected reserves)
"Baseline YRT scale" and high credibility



APF 2019-41 | Survey Results

Reinsurer Reaction	Survey %
None	55%
Reactive	17%
Break-even	18%
Other	10%

Modeling Details

- No change to YRT premiums

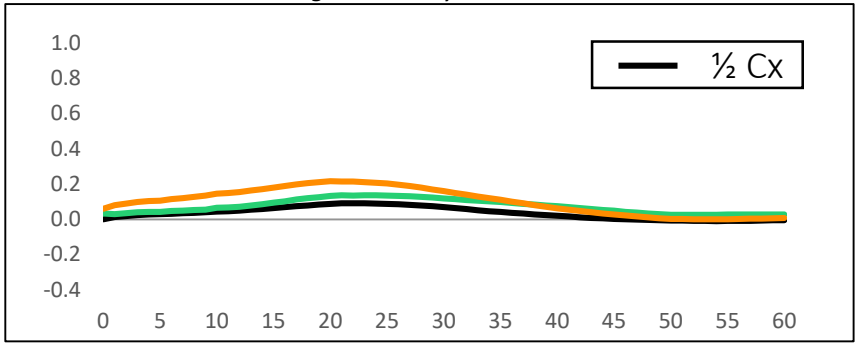
Increase YRT premiums by

- 100% of the difference between current YRT premium and prescribed mortality immediately and **every year thereafter**

Commentary

- Most responses were either None or Break-even
- Many responses indicated the need for multiple models or runs to apply this APF to reflect best estimate mortality for reinsurance cash flows and VM-20 mortality for all other cash flows
- The smallest range in modeled "DR Reserve Credits" was due to high alignment between the YRT scale w/ margin and the mortality used for reinsurance claim settlements

4.9 ULSG Pre-reinsurance DR – Post-reinsurance DR (projected reserves)
"Baseline YRT scale" and high credibility



APF 2019-42 | Survey Results

Reinsurer Reaction	Survey %
None	1%
Reactive	64%
Break-even	29%
Other	6%

Increase YRT premiums by

- 100% of prescribed mortality margin after 1 year and annually thereafter
- Includes 10 years of future mortality improvement in implicit margin

Increase YRT premiums by

- 100% of prescribed mortality margin after 1 year and every year thereafter
- Include implicit future mortality improvement margin

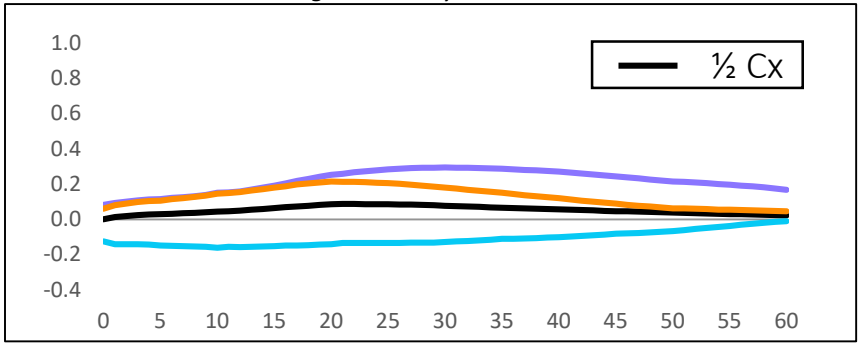
Increase YRT premiums by

- 100% of the difference between current YRT premium and prescribed mortality immediately and **every year thereafter**

Commentary

- Most responses were reactive and incorporate 100% of the prescribed margin
- Variation in reactive responses was the number of years of mortality improvement included in the margin
- The choice of number of years of future mortality improvement to include in the margin is critical, as

4.15 ULSG Pre-reinsurance DR – Post-reinsurance DR (projected reserves)
"Baseline YRT scale" and high credibility



Select Takeaways from YRT Field Test Analysis

4. Differences in modeled reserves are primarily driven by the relationship between the current scale of YRT premiums and PBR mortality (anticipated experience and the level of margin)

- Observed differences in the relationship between the current scale of reinsurance premiums and anticipated mortality as well as the level of mortality margin explain the degree of variability in impacts of reinsurance on modeled reserves across field test participants
- The prescription of triggers (APF 2019-40) and levels of future mortality improvement (APF 2019-41 and 2019-42) reduce differences between the scale of reinsurance premiums and mortality and can be thought of as mechanisms which can be used to define the level of risk shared between parties in the modeled reserve

5. Variation in surveyed approaches points to several considerations including level of prescription, modeling complexity, variation in results and others in a long-term solution

- APF 2019-42 has the highest level of prescription. APF 2019-40 allows for more flexibility; however, measures to reduce the variation in results (e.g., “loss ratio” trigger) add additional prescription.
- APF 2019-41 has the most complexity (modeling and theoretical) as it requires projecting YRT premium and claim settlement cashflows using a separate mortality assumption
- APF 2019-40 has the widest variation in modeled range of interpretation “reserve credits” primarily due to survey respondents modeling no change to their current scale. APF 2019-41 has the smallest variation in modeled “reserve credits” but could have larger variations in practice due differences in model implementation.

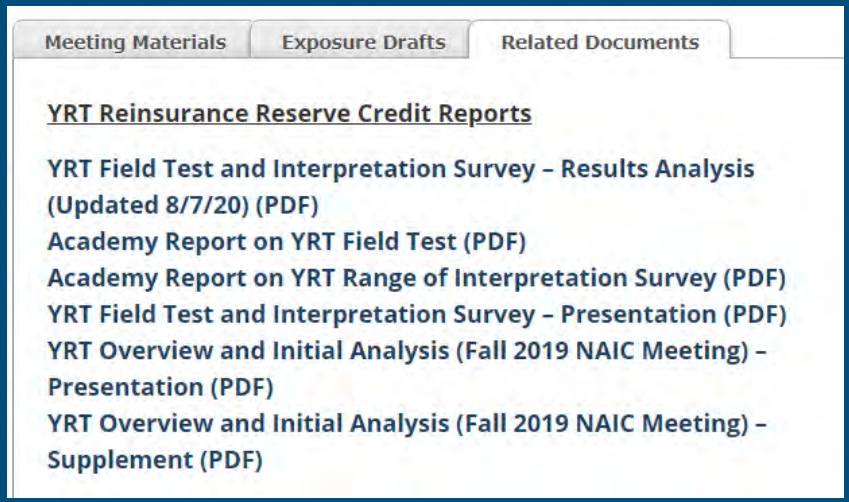
Current Status and Additional Resources

Current Status

- Questions and comments regarding the YRT presentations at the Summer NAIC National Meeting are still being accepted by Reggie Mazyck **RMazyck@naic.org**
- Additional LATF meetings will be scheduled to address any questions from regulators or interested parties

Additional Resources

Life Actuarial (A) Task Force Webpage
Related Documents Tab
https://content.naic.org/cmte_a_latf.htm

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OLIVER WYMAN

LIFE PBR AND THE TREATMENT OF REINSURANCE

UPDATE AND INSIDER PERSPECTIVES

Valuation Actuary Symposium | Virtual Session

Chris Whitney, FSA, MAAA
September 1, 2020

AGENDA

01	**Background**	
02	**Case study**	
03	**Industry field test**	
04	**Key takeaways**	

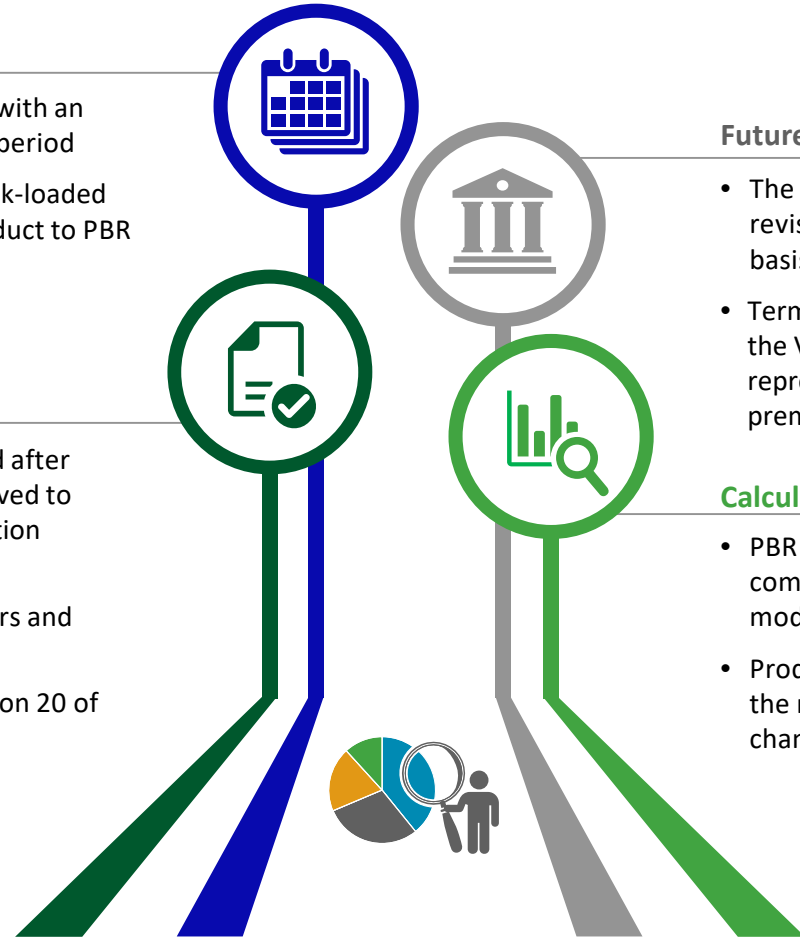
1 LIFE PBR IS NOW EFFECTIVE FOR ALL INDIVIDUAL LIFE INSURANCE POLICIES (AND ASSOCIATED REINSURANCE) THAT ARE ISSUED 1/1/2020 OR LATER

Timing and implementation

- Life PBR became effective 1/1/2017 with an optional three-year implementation period
- PBR implementations are heavily back-loaded and only 23 companies moved a product to PBR in 2017

Applicability

- Applies to all life new business issued after 1/1/2020 as well as any business moved to PBR during the optional implementation period
- Requirements apply to both reinsurers and direct writers
- Requirements are prescribed in Section 20 of the new valuation manual (VM-20)



Future changes

- The valuation manual is a living document with revised requirements released on an annual basis
- Terms for adoption are the same as those for the VM itself (requires 42 states/ territories representing 75% of total US life insurance premium)

Calculations

- PBR is the maximum of three reserve components; a formulaic floor and two modeled reserve components
- Products may be exempt from components of the requirements if they are not sensitive to changes in interest rates

1 BACKGROUND

Several sources of guidance exist for the modeling of reinsurance cash flows. Prior to recent changes, the guidance was non-prescriptive and took the form of considerations and required disclosures.

Source	Details
VM-20	• The actuary should assume that the counterparty is likely to act efficiently • The assumptions used may differ between the ceding and assuming company • Additional (outside the cash flow model) stochastic analysis may be required for certain types of reinsurance (i.e. stop-loss)
VM-31	• Requires a description of assumptions and methodology used to model reinsurance cash flows
PBR ASOP	• Recommends consistency between reinsurance assumptions and other assumptions • Margins should consider the guarantees in the arrangements, past practices of the reinsurer and how the company might respond to different actions the reinsurer could take
AAA Practice note	• States that “some actuaries will assume less than 100% selection against the company” • Recommends analyzing the financial impact on the reinsurer and assuming more selection if the financial impact is significant

1 RANGE OF PRACTICE

A wide range of practice was observed from early adopters of PBR in regards to the treatment of non-guaranteed reinsurance; regulators began discussing changes to requirements in 2019

> *Reported reserves were higher post-reinsurance than pre-reinsurance **for some companies**, and **in some cases, the highest reserve changed** between reserve methods pre- and post-reinsurance (e.g. DR highest pre-reinsurance, NPR highest post-reinsurance)*
>
> – NAIC Valuation Analysis (E) Working Group

> *A **ceding insurer** might use one set of assumptions to **manufacture a large reserve credit**, while the reinsurer uses a different set of assumptions to calculate a much smaller reserve... We recommend that LATF explore improvements to the Valuation Manual that could **mitigate the risk of this type of gaming.***
>
> – NAIC Reinsurance (E) Task Force

2 CASE STUDY #1

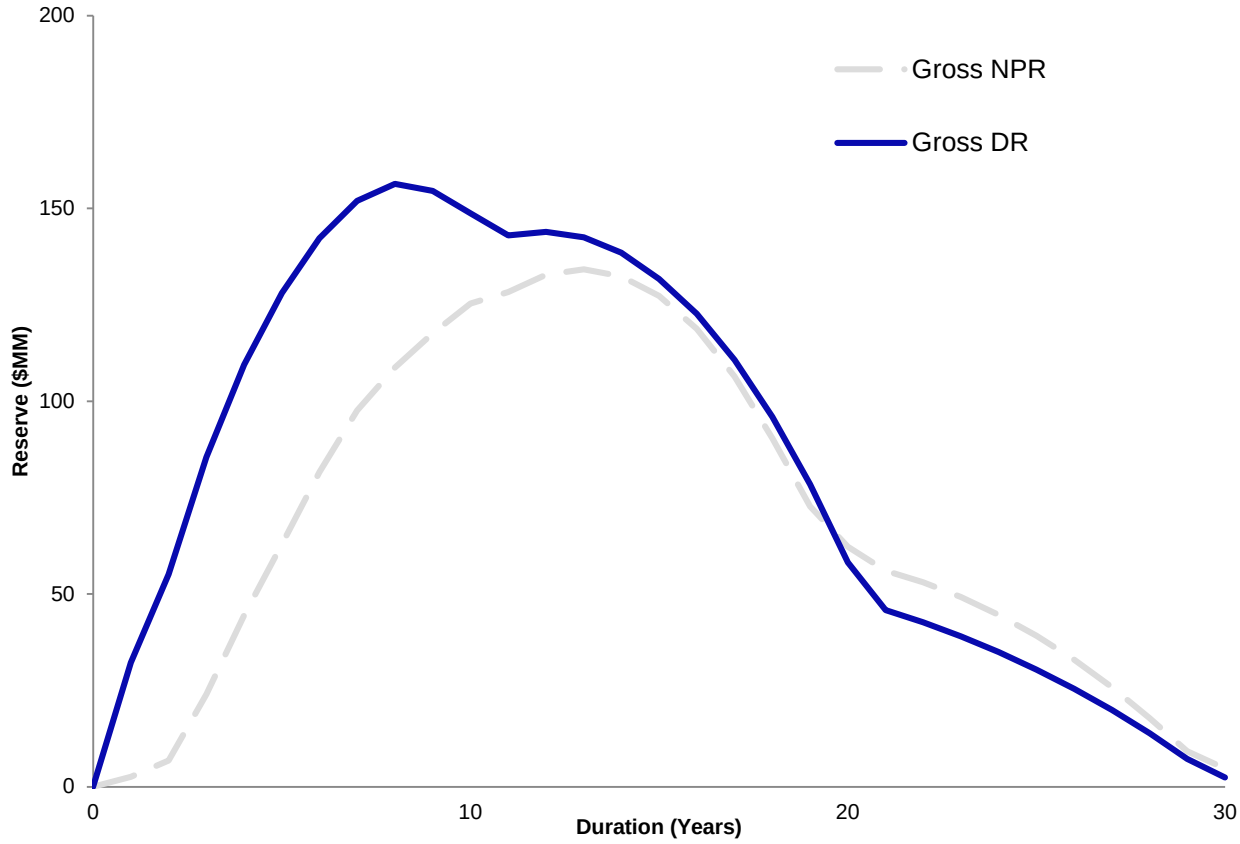
A cohort of new business with $50MM of first year premium consisting of 10-, 20- and 30-year term products was projected for 30 years

Category	Details
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

2 CASE STUDY #1

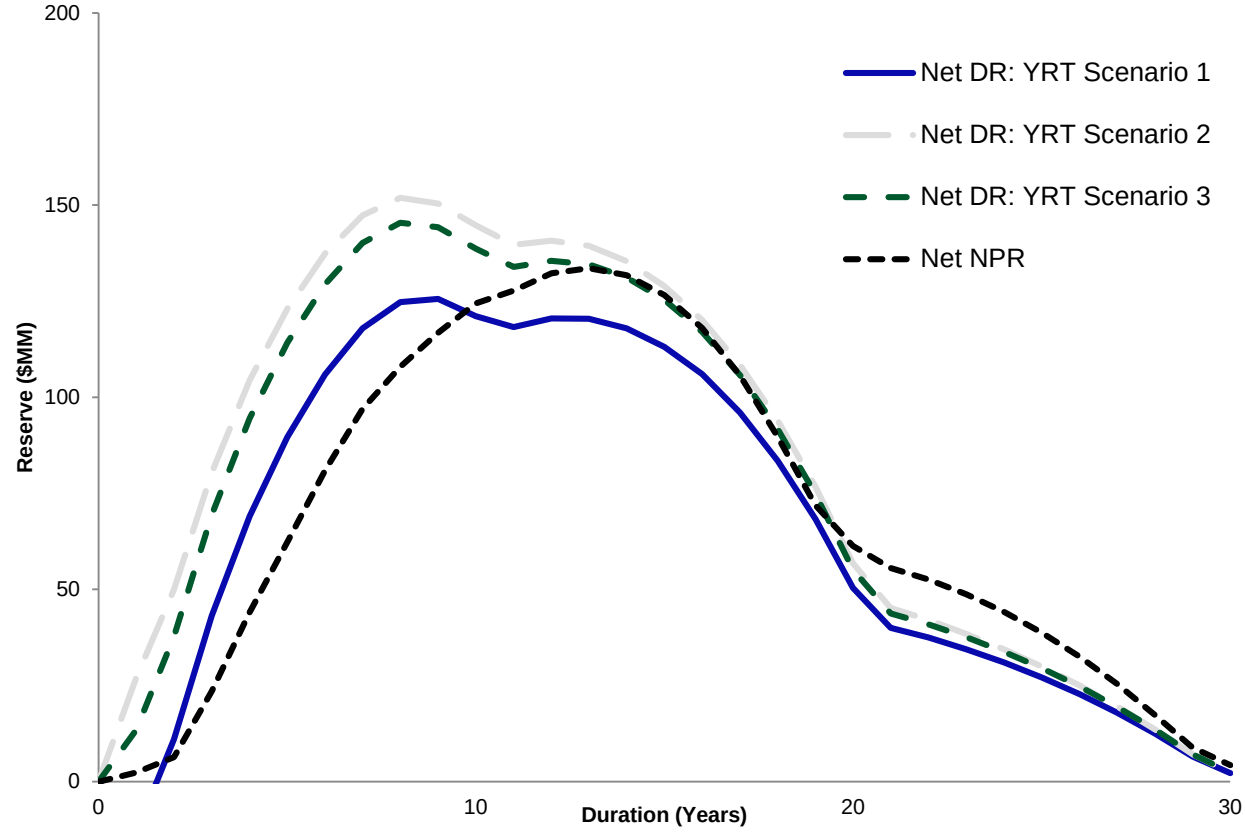
The gross NPR and DR for this cohort of new business are shown below



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

2 CASE STUDY #1

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%

2 CASE STUDY #1

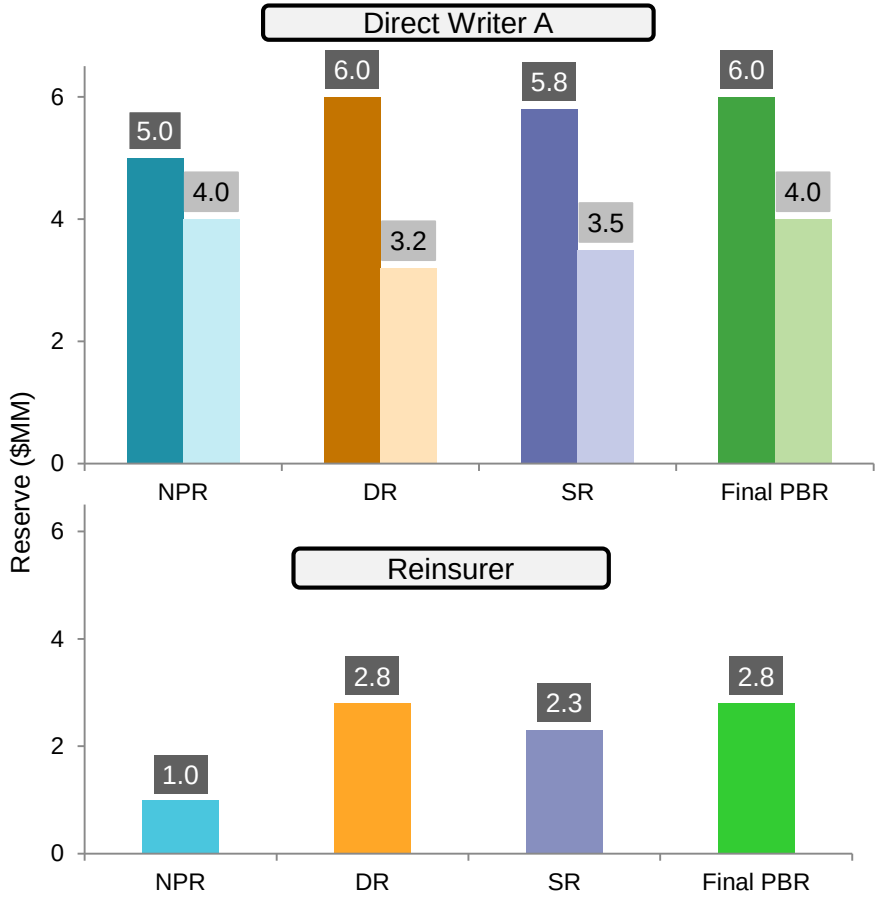
The difference in net reserves under the YRT scenarios modeled is driven by the level of implicit and explicit margin in the VM-20 mortality assumption

The result below is for 35-year-old male, preferred non-tobacco, time 1 valuation

The mortality assumption under VM-20 contains no future mortality improvement and is based on a company-specific prudent assumption grading to a prudent industry table when sufficient data no longer exists

2 CASE STUDY #2

The gross and net reserves resulting from a hypothetical YRT arrangement are shown below for illustrative purposes



Detailed commentary

1. Assume that valuation assumptions are exactly the same between Direct Writer A and Reinsurer

2. Final PBR reserve for Direct Writer A is 4.0, the max of NPR, DR and SR on a net of reinsurance basis

	NPR	DR	SR	Final PBR
Gross	5.0	6.0	5.8	6.0
Net	4.0	3.2	3.5	**4.0**
Ceded	**1.0**	**2.8**	**2.3**	**2.0**

3. Direct Writer A's ceded reserves are equal to 2.0

4. Reinsurer's final PBR reserve is calculated using the max of the gross less net components for NPR, DR, and SR and equals 2.8

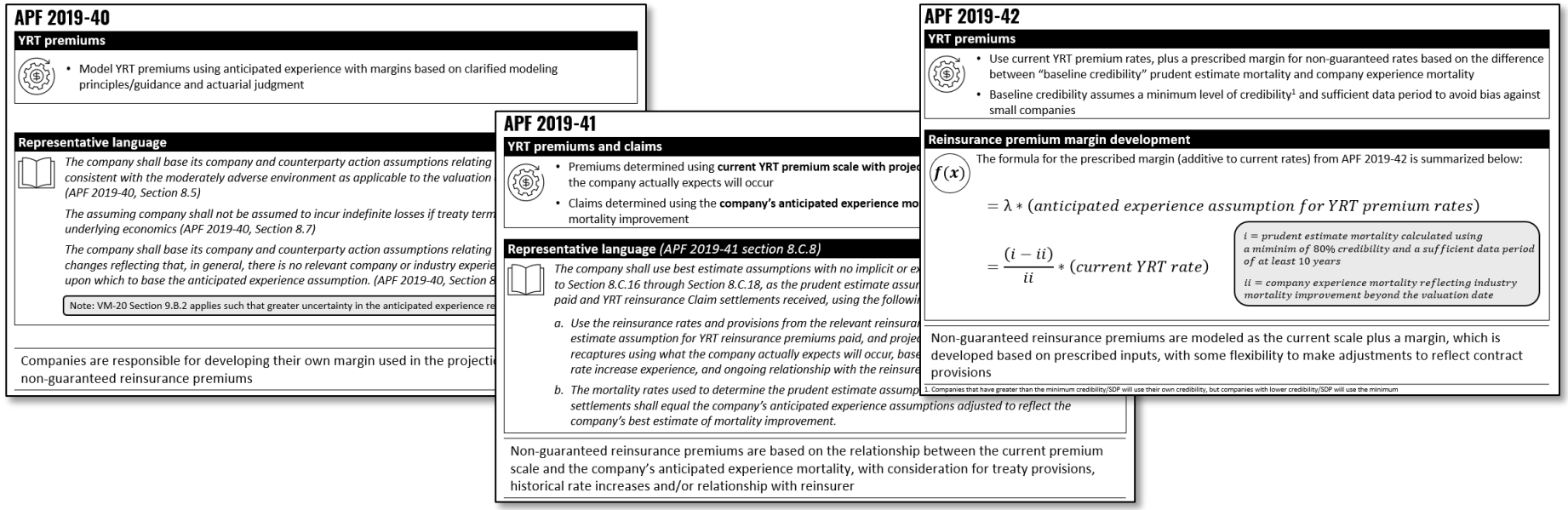
	NPR	DR	SR	Final PBR
Assumed	**1.0**	**2.8**	**2.3**	**2.8**

Even with the exact same assumptions, the mechanics of the PBR calculation can result in a difference in ceded reserves and assumed reserves

3 INTERIM SOLUTION AND INDUSTRY FIELD TEST

The Life Actuarial (A) Task Force ("LATF") implemented an "interim solution" for the 2020 Valuation Manual, and requested additional analysis be performed to aid in the selection of a longer-term solution

Solution	Guidance
Interim solution	• Applies to business issued in 2020+; optional to business on PBR that was issued in 2017-2019 • Non-guaranteed reinsurance is not required to be modeled and the reserve credit for ceded reinsurance (reserve for assumed reinsurance) is equal to the formulaic ½ Cx
Longer-term solutions	• The scope of the industry field test is limited to three of the proposed amendments that LATF had been discussing prior to the adoption of the "interim solution" (see below) along with two baselines (no change in premiums and ½ Cx)

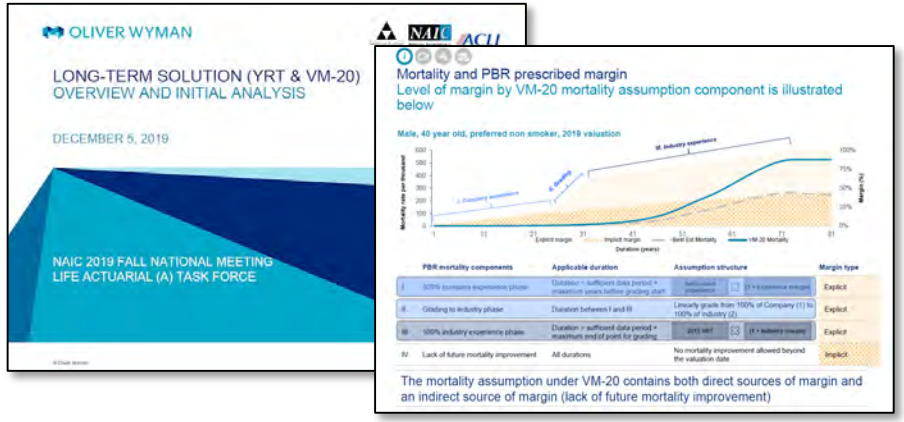


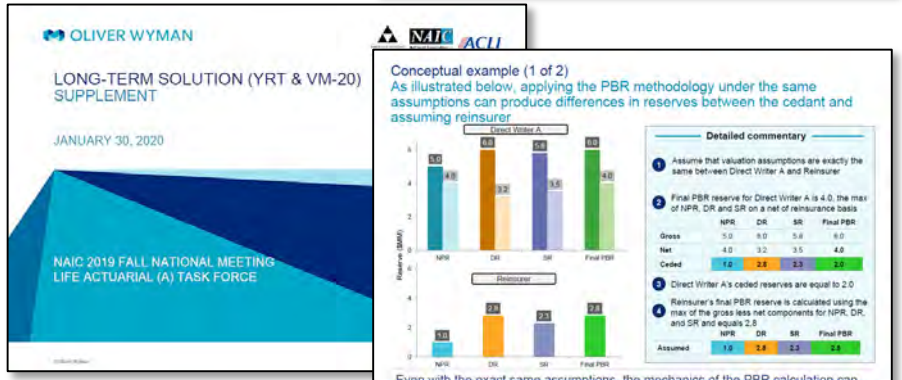
3 INITIAL ANALYSIS AND FIELD TEST RESULTS

A representative PBR model was used for initial analysis while the industry field test was conducted (December 2019 – March 2020)

Initial analysis

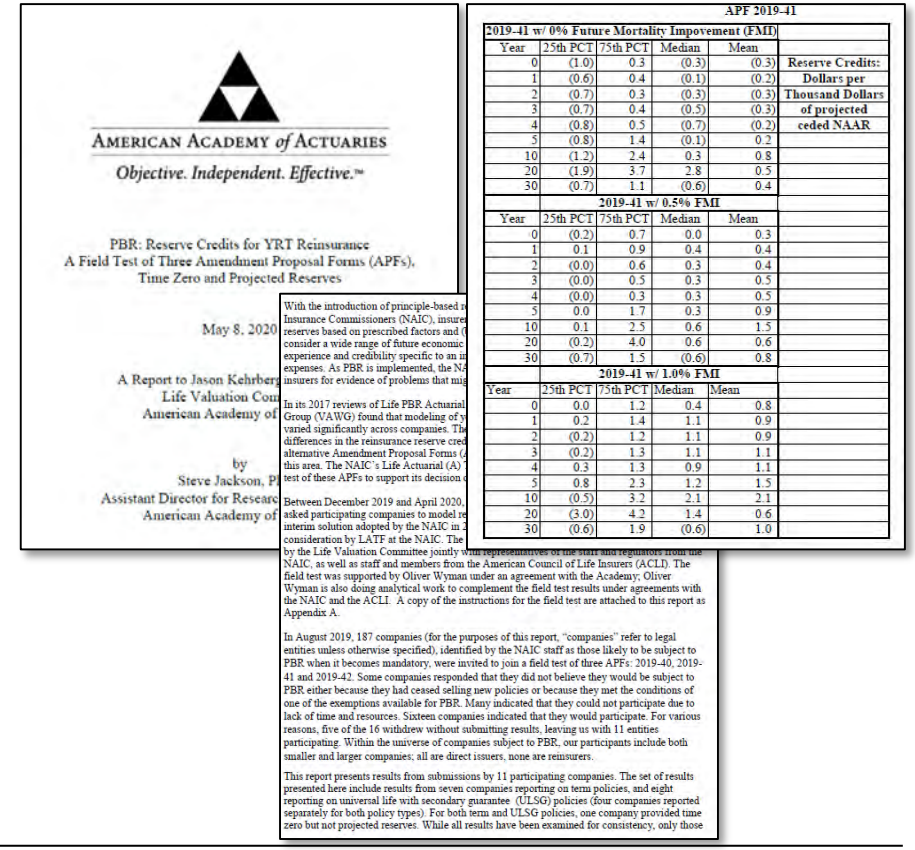
Shared at Fall 2019 NAIC Meeting and subsequent LATF calls





Industry field test

Results from industry field test



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PBR: Reserve Credits for YRT Reinsurance
A Field Test of Three Amendment Proposal Forms (APFs), Time Zero and Projected Reserves

May 8, 2020

A Report to Jason Kehrberg
Life Valuation Cou
American Academy of

by
Steve Jackson, P
Assistant Director for Researc
American Academy of

With the introduction of principle-based r
Insurance Commissioners (NAIC), insurer
reserves based on prescribed factors and (
consider a wide range of future economic
experience and credibility specific to an in
expenses. As PBR is implemented, the NA
insurers for evidence of problems that mig

In its 2017 reviews of Life PBR Actuarial
Group (VAWG) found that modeling of y
varied significantly across companies. The
differences in the reinsurance reserve cred
alternative Amendment Proposal Forms (A
this area. The NAIC's Life Actuarial (A)
test of these APFs to support its decision

Between December 2019 and April 2020,
asked participating companies to model re
interim solution adopted by the NAIC in 2
consideration by LATF at the NAIC. The
by the Life Valuation Committee jointly with representatives of the staff and regulators from the NAIC, as well as staff and members from the American Council of Life Insurers (ACLI). The field test was supported by Oliver Wyman under an agreement with the Academy; Oliver Wyman is also doing analytical work to complement the field test results under agreements with the NAIC and the ACLI. A copy of the instructions for the field test are attached to this report as Appendix A.

In August 2019, 187 companies (for the purposes of this report, "companies" refer to legal entities unless otherwise specified), identified by the NAIC staff as those likely to be subject to PBR when it becomes mandatory, were invited to join a field test of three APFs: 2019-40, 2019-41 and 2019-42. Some companies responded that they did not believe they would be subject to PBR either because they had ceased selling new policies or because they met the conditions of one of the exemptions available for PBR. Many indicated that they could not participate due to lack of time and resources. Sixteen companies indicated that they would participate. For various reasons, five of the 16 withdrew without submitting results, leaving us with 11 entities participating. Within the universe of companies subject to PBR, our participants include both smaller and larger companies; all are direct issuers, none are reinsurers.

This report presents results from submissions by 11 participating companies. The set of results presented here include results from seven companies reporting on term policies, and eight reporting on universal life with secondary guarantee (ULSG) policies (four companies reported separately for both policy types). For both term and ULSG policies, one company provided time zero but not projected reserves. While all results have been examined for consistency, only those

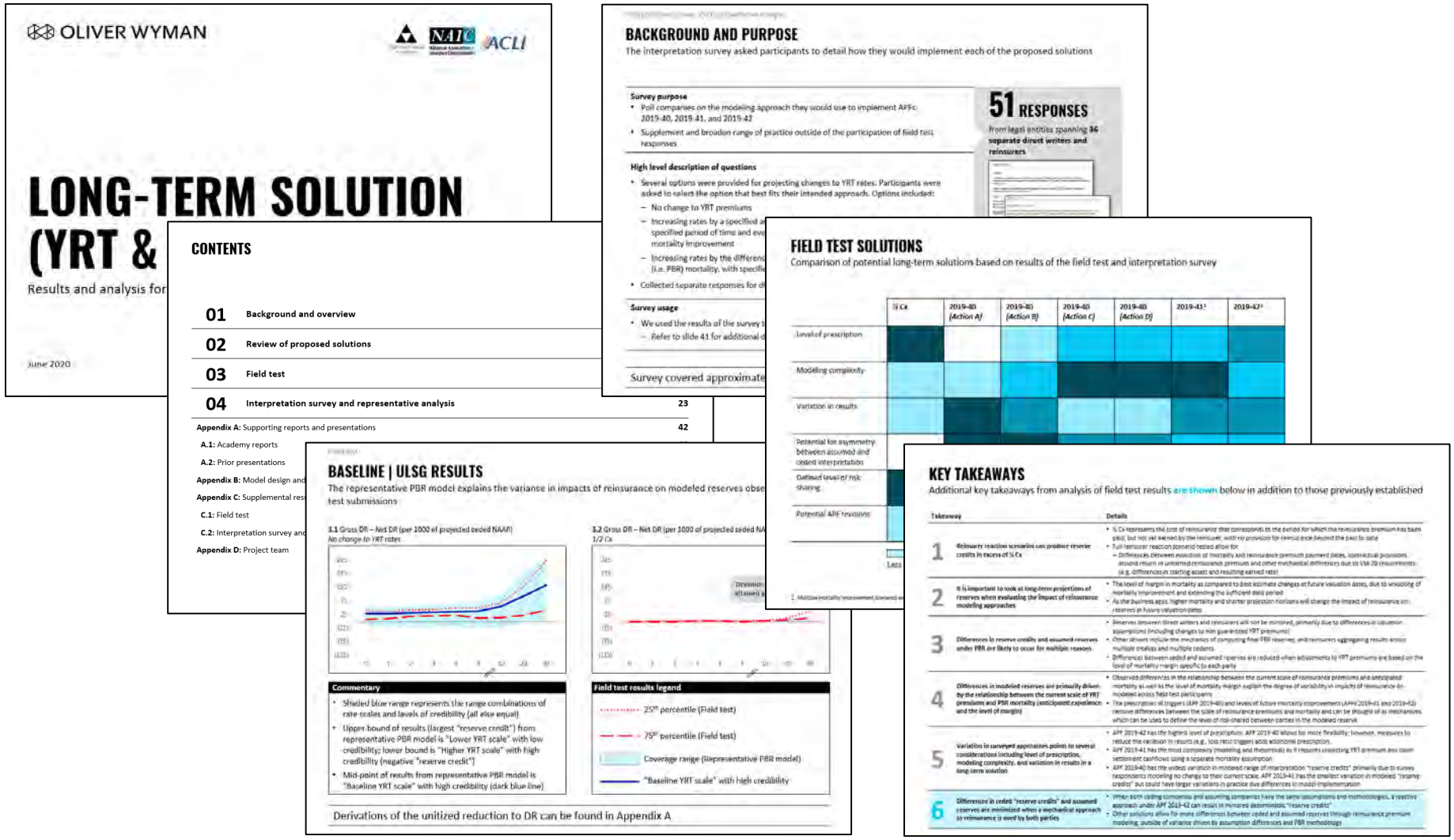
APF 2019-41

2019-41 w/ 0% Future Mortality Improvement (FMI)					
Year	25th PCT	75th PCT	Median	Mean	
0	(1.0)	0.3	(0.3)	(0.3)	Reserve Credits:
1	(0.6)	0.4	(0.1)	(0.2)	Dollars per
2	(0.7)	0.3	(0.3)	(0.3)	Thousand Dollars
3	(0.7)	0.4	(0.5)	(0.3)	of projected
4	(0.8)	0.5	(0.7)	(0.2)	ceded NAAR
5	(0.8)	1.4	(0.1)	0.2	
10	(1.2)	2.4	0.3	0.8	
20	(1.9)	3.7	2.8	0.5	
30	(0.7)	1.1	(0.6)	0.4	
	2019-41 w/ 0.5% FMI				
Year	25th PCT	75th PCT	Median	Mean	
0	(0.2)	0.7	0.0	0.3	
1	0.1	0.9	0.4	0.4	
2	(0.0)	0.6	0.3	0.4	
3	(0.0)	0.5	0.3	0.5	
4	(0.0)	0.3	0.3	0.5	
5	0.0	1.7	0.3	0.9	
10	0.1	2.5	0.6	1.5	
20	(0.2)	4.0	0.6	0.6	
30	(0.7)	1.5	(0.6)	0.8	
	2019-41 w/ 1.0% FMI				
Year	25th PCT	75th PCT	Median	Mean	
0	0.0	1.2	0.4	0.8	
1	0.2	1.4	1.1	0.9	
2	(0.2)	1.2	1.1	0.9	
3	(0.2)	1.3	1.1	1.1	
4	0.3	1.3	0.9	1.1	
5	0.8	2.3	1.2	1.5	
10	(0.5)	3.2	2.1	2.1	
20	(3.0)	4.2	1.4	0.6	
30	(0.6)	1.9	(0.6)	1.0	

The remainder of this section focuses on the report developed at the conclusion of the field test which contains results as well as related analysis performed with the representative PBR model

3 FIELD TEST REPORT

A report was delivered to LATF in mid-June which covers results of the industry field test and associated survey as well as additional analysis performed using the representative PBR model in light of the results



4 KEY TAKEAWAYS

01 **PBR continues to evolve, with a potential for changes to be retroactive**

02 **There is a precedent for regulatory intervention in areas where a significant range of practice and/or interpretation exists**

03 **The complexity of principles-based reserve calculations and interplay of assumptions requires significant effort, planning and coordination to evaluate the impact of potential changes**


OLIVER WYMAN

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