Reinsurance in a PBR World
Session 1C

Ravi Bhandari, FSA, MAAA
Thomas Colbrook, FSA, MAAA
Chris Whitney, FSA, MAAA

October 26, 2020
Active participation in the Society of Actuaries is an important aspect of membership. While the positive contributions of professional societies and associations are well-recognized and encouraged, association activities are vulnerable to close antitrust scrutiny. By their very nature, associations bring together industry competitors and other market participants.

The United States antitrust laws aim to protect consumers by preserving the free economy and prohibiting anti-competitive business practices; they promote competition. There are both state and federal antitrust laws, although state antitrust laws closely follow federal law. The Sherman Act, is the primary U.S. antitrust law pertaining to association activities. The Sherman Act prohibits every contract, combination or conspiracy that places an unreasonable restraint on trade. There are, however, some activities that are illegal under all circumstances, such as price fixing, market allocation and collusive bidding.

There is no safe harbor under the antitrust law for professional association activities. Therefore, association meeting participants should refrain from discussing any activity that could potentially be construed as having an anti-competitive effect. Discussions relating to product or service pricing, market allocations, membership restrictions, product standardization or other conditions on trade could arguably be perceived as a restraint on trade and may expose the SOA and its members to antitrust enforcement procedures.

While participating in all SOA in person meetings, webinars, teleconferences or side discussions, you should avoid discussing competitively sensitive information with competitors and follow these guidelines:

- Do not discuss prices for services or products or anything else that might affect prices
- Do not discuss what you or other entities plan to do in a particular geographic or product markets or with particular customers.
- Do not speak on behalf of the SOA or any of its committees unless specifically authorized to do so.
- Do leave a meeting where any anticompetitive pricing or market allocation discussion occurs.
- Do alert SOA staff and/or legal counsel to any concerning discussions
- Do consult with legal counsel before raising any matter or making a statement that may involve competitively sensitive information.

Adherence to these guidelines involves not only avoidance of antitrust violations, but avoidance of behavior which might be so construed. These guidelines only provide an overview of prohibited activities. SOA legal counsel reviews meeting agenda and materials as deemed appropriate and any discussion that departs from the formal agenda should be scrutinized carefully. Antitrust compliance is everyone’s responsibility; however, please seek legal counsel if you have any questions or concerns.
Presentation Disclaimer

Presentations are intended for educational purposes only and do not replace independent professional judgment. Statements of fact and opinions expressed are those of the participants individually and, unless expressly stated to the contrary, are not the opinion or position of the Society of Actuaries, its cosponsors or its committees. The Society of Actuaries does not endorse or approve, and assumes no responsibility for, the content, accuracy or completeness of the information presented. Attendees should note that the sessions are audio-recorded and may be published in various media, including print, audio and video formats without further notice.
Presenters

➢ Ravi Bhandari, FSA MAAA CFA CIA (Moderator)
  ✓ Special Projects AVP in Corporate Actuarial at Hannover Re (HLR)
  ✓ Responsible for implementing PBR at HLR

➢ Chris Whitney, FSA MAAA (Presenter)
  ✓ Principal at Oliver Wyman (OW)
  ✓ Supports OW’s clients in optimizing their PBR implementation

➢ Thomas Colbrook, FSA MAAA (Presenter)
  ✓ VP in Pricing at Hannover Re
  ✓ Structures reinsurance solutions that alleviate client concerns under a PBR regime
Agenda

➢ Chris
  ✓ Market landscape
  ✓ Regulatory update
  ✓ Emerging practices
  ✓ Key takeaways

➢ Thomas
  ✓ Evolution of regulatory environment
  ✓ VM-20 observations, implications, and challenges
  ✓ Assessment of reinsurance solutions against target objectives

➢ Questions and Answers
REINSURANCE IN A PBR WORLD

2020 SOA Annual Meeting | Virtual Session 1C

Chris Whitney, FSA, MAAA
October 26, 2020
AGENDA

01 Market landscape

02 Regulatory update

03 Emerging practices

04 Key takeaways
PRICING & PROFITABILITY | TERM

With reinsurance being less beneficial to pricing due to the loss of tax leveraged financial reinsurance solutions for redundant reserves under PBR, nearly half of Term writers are seeing profits fall short of targets.

2020 Oliver Wyman Pricing Survey¹
As of Q1 2020

Impact of reinsurance

52% view reinsurance as a benefit among applicable use cases (88% reflecting reinsurance in pricing)

Product performance and drivers

44% Short of expectations 49% Meeting expectations 7% Exceeding expectations
PBR IMPACT ASSESSMENT | TERM

Most term writers observe reserve decreases as a result of PBR, but not all observe a corresponding increase in profitability.

### Term | 51 writers

<table>
<thead>
<tr>
<th>Profitability (bps change in IRR)</th>
<th>Decrease</th>
<th>No change</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small (&lt; 100 bps)</td>
<td>21%</td>
<td>59%</td>
<td>20%</td>
</tr>
<tr>
<td>Medium (100-200 bps)</td>
<td>21%</td>
<td>58%</td>
<td>21%</td>
</tr>
<tr>
<td>Large (&gt; 200bps)</td>
<td>58%</td>
<td>35%</td>
<td>17%</td>
</tr>
</tbody>
</table>

- 63% of writers have completed robust PBR analysis
- ▼ 22% reduction in products offered under PBR (relative to pre-PBR)
- 8% of writers have state-specific product variations due to PBR

<table>
<thead>
<tr>
<th>Reserves (% change)</th>
<th>Decrease</th>
<th>No change</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small (0-5%)</td>
<td>18%</td>
<td>65%</td>
<td>17%</td>
</tr>
<tr>
<td>Medium (5-10%)</td>
<td>16%</td>
<td>60%</td>
<td>24%</td>
</tr>
<tr>
<td>Large (&gt; 10%)</td>
<td>10%</td>
<td>14%</td>
<td>76%</td>
</tr>
</tbody>
</table>

1 Initial 2 Peak

<table>
<thead>
<tr>
<th>Product design</th>
<th>Updates to rates and values only</th>
</tr>
</thead>
<tbody>
<tr>
<td>68%</td>
<td></td>
</tr>
</tbody>
</table>

- No change

<table>
<thead>
<tr>
<th>Product strategy</th>
<th>Value proposition</th>
</tr>
</thead>
</table>
| Value proposition
| Emphasize cost |
| Emphasize accumulation |
| 24% |
| N/A |

- Significant changes to products
- Create entirely new products

1 Excerpt from Oliver Wyman’s 2020 life PBR survey; which covers both direct writers and reinsurers with participation from more than 50 companies

© Oliver Wyman
UNIVERSAL LIFE

UL profitability is heavily pressured; with nearly half of participants realizing returns below relatively modest profit targets, primarily due to investment returns.

2020 Oliver Wyman Pricing Survey¹
As of Q1 2020

2019 Oliver Wyman Pricing Survey
As of Q4 2018

¹Excerpts from Oliver Wyman’s annual life pricing survey; which covers retail and institutional products with participation from more than 60 writers

© Oliver Wyman
Unfavorable profitability impacts of PBR have driven many writers to make significant changes to product design and strategy.

52% of writers have completed robust PBR analysis.

- 45% Decrease
- 21% No change
- 34% Increase

22% reduction in products offered under PBR (relative to pre-PBR).

17% of writers have state-specific product variations due to PBR.

**Profitability (bps change in IRR)**

<table>
<thead>
<tr>
<th>Decrease</th>
<th>No change</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>45%</td>
<td>21%</td>
<td>34%</td>
</tr>
</tbody>
</table>

- Small (< 100 bps)
- Medium (100-200 bps)
- Large (> 200bps)

**Product design**

- Updates to rates and values only: 52%
- Significant changes to products: 21%
- Create entirely new products: 3%

**Product strategy**

- **Value proposition**
  - Emphasize cost: 35%
  - Emphasize accumulation: 16%

- **Short term secondary guarantee**
  - Addition of guarantee: 5%
  - Removal of guarantee: 17%

- **Level term (or guarantee) period**
  - Extension: 7%
  - Reduction: 15%

---

1 Excerpt from Oliver Wyman’s 2020 life PBR survey; which covers both direct writers and reinsurers with participation from more than 50 companies

© Oliver Wyman
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
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 $\frac{1}{2} C_x$

**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 $\frac{1}{2} C_x$)

**APF 2019-40**
- **YRT premiums**
  - Model YRT premiums using anticipated experience with margins based on clarified modeling principles/guidance and actuarial judgment

**APF 2019-41**
- **YRT premiums and claims**
  - Premiums determined using current YRT premium scale with projected company experience normal to 10 years
  - Claims determined using the company’s anticipated experience modified by mortality improvement

- **Representative language**
  - The company shall base its company and counterparty action assumptions relating to mortality consistent with the moderately adverse environment as applicable to the valuation.
  - The company’s experience shall reflect the company experience of the year 2019, and the company’s experience shall be modified by the mortality improvement.
  - The company’s experience shall be modified by the mortality improvement.
  - The company’s experience shall be modified by the mortality improvement.
  - The company’s experience shall be modified by the mortality improvement.
  - The company’s experience shall be modified by the mortality improvement.

- **Companies are responsible for developing their own margin in the projected future non-guaranteed reinsurance premiums**

**APF 2019-42**
- **YRT premiums**
  - Use current YRT premium rates, plus a prescribed margin for non-guaranteed rates based on the difference between “baseline credibility” prudent estimate mortality and company experience mortality

- **Baseline credibility assumes a minimum level of credibility and sufficient data period to avoid bias against small companies**

- **Representative language**
  - The formula for the prescribed margin (additive to current rates) from APF 2019-42 is summarized below:

  $$f(x) = \lambda * (\text{current YRT rate})$$

  where:
  - $\lambda = \text{prudent estimate mortality calculated using a minimum of 90% credibility and a sufficient data period of at least 10 years}$
  - $x = \text{company experience mortality reflecting industry mortality improvement beyond the valuation date}$

- **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**

- **Non-guaranteed reinsurance premiums are based on the relationship between the current YRT scale and the company’s anticipated experience mortality, with consideration for treaty provisions, historical rate increases and/or relationship with reinsurer**
INITIAL ANALYSIS AND FIELD TEST RESULTS

A representative PBR model was developed 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*

---

The mortality assumption under VM-20 contains both direct sources of margin and an indirect source of margin (lack of future mortality improvement).

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

With the introduction of principle based contracts, the Mortality Project Committee (MPC) has been responsible for developing mortality tables and associated assumptions that reflect the experience and variability in mortality rates. The MPC has been working with the National Association of Insurance Commissioners (NAIC) to develop a new mortality table called VM-20, which is expected to be adopted in 2021. As of January 1, 2021, all new life insurance policies issued in the United States will be based on mortality rates from VM-20.
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 and field test results.
More than half of participants are experiencing reserve margins in excess of what they feel is an appropriate level.

84% of participants are not using aggregate margin analysis beyond PBR reporting requirements.

---

1 Excerpt from Oliver Wyman’s 2020 life PBR survey; which covers both direct writers and reinsurers with participation from more than 50 companies

2 Margin defined as excess of reserve over best estimate liability
A majority of participants are impacted by the interim solution, leading to a 50% reduction in those considering changes to their reinsurance strategy as a result of PBR.

**Application of interim solution (½ Cx)**

- **84%** of participants are impacted by the interim solution for modeling non-guaranteed reinsurance premiums.

**Potential changes to reinsurance arrangements**

- **38%** of impacted participants were considering changes to their reinsurance strategy as a result of PBR **prior to the interim solution**.
- **18%** of impacted participants were considering changes to their reinsurance strategy as a result of PBR **as a result of the interim solution**.

- **Guarantee current scale for a period of time**
  - 75%
- **Expand disclosures**
  - 38%
- **Increase coinsurance**
  - 19%
- **Other**
  - 31%

- **Guarantee current scale for a period of time**
  - 63%
- **Expand disclosures**
  - 38%
- **Increase coinsurance**
  - 50%
- **Other**
  - 13%
New business profitability is heavily pressured and many feel that significant margins exist in reserves under PBR.

PBR continues to evolve, with a potential for changes to be retroactive and there is a precedent for regulatory intervention in areas where a significant range of practice and/or interpretation exists.

The complexities and uncertainties of PBR have driven many to revaluate their new business reinsurance strategy as the block of business subject to PBR grows.
XXX Reserve Management by Era
Historic Timeline of Common Solutions

Regulation XXX Effective Date

Financial Crisis

AG 48 Effective Date

VM-20 Effective Date

1 Eras describe the predominant transactions but many transactions are executed across eras
Challenges Under VM-20

- Administration and Modelling Complexity
- Financial Reporting Volatility
- Increased Reporting Requirements
- Supporting Credibility and Assumptions
- Margins in VM-20 Reserves
Sources of Margin in VM-20 Reserve

Experience Driven
- Mortality Experience
  - Credibility
  - Sufficient Data Period
- Lapse Experience
- Fully Allocated Expenses
- Other Assumption Uncertainty

Prescribed
- Industry Tables
- No Mortality Improvement
- Economic Scenarios
- Post-Level Term Profits
- Secondary Guarantee Ultimate Lapse Rate

Modelling
- Non-Guaranteed Elements
- Policyholder Behavior
- Reinsurance Terms
- Other Margins

Total VM-20 Reserve Margin
Reinsurance and VM-20
Reserve Credit Considerations

• Reinsurance Reserve Credit
  – Credit for Reinsurance = Pre-Reinsurance Minimum Reserve – Post-Reinsurance Minimum Reserve
  – VM-20 Reserve = Max(Net Premium Reserve, Deterministic Reserve, and Stochastic Reserve)
    • Net Premium Reserve
      – Credit for coinsurance quota share of business ceded to Reinsurer
    • Deterministic and Stochastic Reserves
      – Calculation needs to reflect any provisions under reinsurance treaty, including:
        • Expense allowances
        • Rate guarantee language
        • Recapture rights
        • Non-guaranteed elements
        • Experience refund provisions
        • Other contractual provisions

• Statutory Risk Transfer Requirements vs. VM-20 Reinsurance Reserve Credit
  – Reinsurance agreement may meet all risk transfer requirements, but under VM-20, this may not result in reserve credit proportionate to the ceded quota share
Insurer Capital Structure
Economic vs. Regulatory

Assets company would hold absent any regulatory conservatism

<table>
<thead>
<tr>
<th>Economic Balance Sheet</th>
<th>Best Estimate Liability</th>
<th>Economic Capital</th>
</tr>
</thead>
</table>

Potential financing amount

<table>
<thead>
<tr>
<th>Statutory Balance Sheet</th>
<th>Best Estimate Liability</th>
<th>Conservatism in Statutory Reserve</th>
<th>Capital and Surplus</th>
</tr>
</thead>
</table>

Cost of Reinsurance
Coinsurance Solutions
Traditional vs. Structured

Considerations

Objective
Reinsurance Cost
Allowances
Recapture Rights
Upside Potential/Downside Protection

Traditional

Risk sharing; Competitive reinsurance allowances
Equity-like return
Priced for competitiveness
No right of early recapture
Loss of upside in exchange for additional downside protection

Structured

Reserve and capital management
Ranges from equity-like return to debt-like spreads
VM-20 fully allocated expenses
Ability to recapture within deal tenor
Retain upside potential while providing downside tail risk
Mortality Credibility Level
Deterministic Reserve Impact

Deterministic Reserve: Ends of Credibility Spectrum

- 0% Credibility
- Full Credibility
- Economic Reserve
Captive Capital Structure

**Grandfathered**
- Capital and Surplus (e.g. Multiple of CAL RBC)
- Redundant Reserve
- Economic Reserve

**AG 48 Compliant**
- Capital and Surplus (e.g. Multiple of CAL RBC)
  - Senior Layer
  - Mezzanine Layer
  - Economic Reserve

**VM-20 Compliant**
- Capital and Surplus (e.g. Multiple of CAL RBC)
  - Mezzanine Layer
  - Actuarial Method Reserve supported by Primary Security
  - Economic Reserve

Additional elements:
- Total A/XXX Statutory Reserve
- Backed by traditional NAIC-Eligible Security
- Financed portion supported by Alternative Asset
- Backed by alternative Asset
- VM-20 Reserve
## Comparing Reinsurance Solutions by Objective

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Traditional Coinsurance</th>
<th>Structured Reinsurance</th>
<th>Captive Financing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited Experience Credibility</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>VM-20 Reserve Margins</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>Reporting Requirements</td>
<td>🟢</td>
<td>🟢</td>
<td>🔴</td>
</tr>
<tr>
<td>Volatility in Statutory Financials</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>Downside Protection</td>
<td>🟢</td>
<td>🟢</td>
<td>🔴</td>
</tr>
<tr>
<td>Ability to Retain Upside Potential</td>
<td>🔴</td>
<td>🟢</td>
<td>🟢</td>
</tr>
</tbody>
</table>
Final Considerations

• VM-20 Subject Business
  – Challenges faced will vary by company, product, credibility levels, and other factors
  – Important to identify pain points
  – Structures can be designed to best meet company’s specific objectives
  – Certain reinsurance structures may allow for simplified VM-31 requirements
  – Be aware of new guidance provided with respect to VM-20

• Legacy Business
  – Reinsurance solution on legacy business can be executed to increase available capital
  – This additional capital can then be used to support new business growth, product development, or new modelling and administration systems

• Evolution of Reinsurance Structures
Disclaimer

This presentation does not address the investment objectives or financial situation of any particular person or legal entity. Investors should seek independent professional advice and perform their own analysis regarding the appropriateness of investing in any of our securities.

While Hannover Re has endeavoured to include in this presentation information it believes to be reliable, complete and up-to-date, the company does not make any representation or warranty, express or implied, as to the accuracy, completeness or updated status of such information.

Some of the statements in this presentation may be forward-looking statements or statements of future expectations based on currently available information. Such statements naturally are subject to risks and uncertainties. Factors such as the development of general economic conditions, future market conditions, unusual catastrophic loss events, changes in the capital markets and other circumstances may cause the actual events or results to be materially different from those anticipated by such statements.

This presentation serves information purposes only and does not constitute or form part of an offer or solicitation to acquire, subscribe to or dispose of, any of the securities of Hannover Re.

© Hannover Rück SE. All rights reserved.
Hannover Re is the registered service mark of Hannover Rück SE.