

44th India Fellowship Seminar

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Modelling Reinsurance – Small Change, Big Consequences

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Case Study - Introduction

- The company writes a significant portion of non-participating endowment assurance and Term with Return of Premium (TROP) products.
- Historically, reinsurance was not fully modelled due to its insignificant level relative to premiums.
- As the valuation actuary, the company acknowledges the concerns raised by an external actuary about the reinsurance modelling practices.
- However, recent developments of downward revision of Premiums and increase in Reinsurance Premium necessitate a thorough review and potential revision of the company's approach to modelling reinsurance.

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Company's Product Mix



The company offers a diversified range of life insurance products tailored to meet various customer needs across protection, savings, and investment goals.

Key
Products

Non-Participating Endowment Assurance

Term with Return of Premiums (TROPs)

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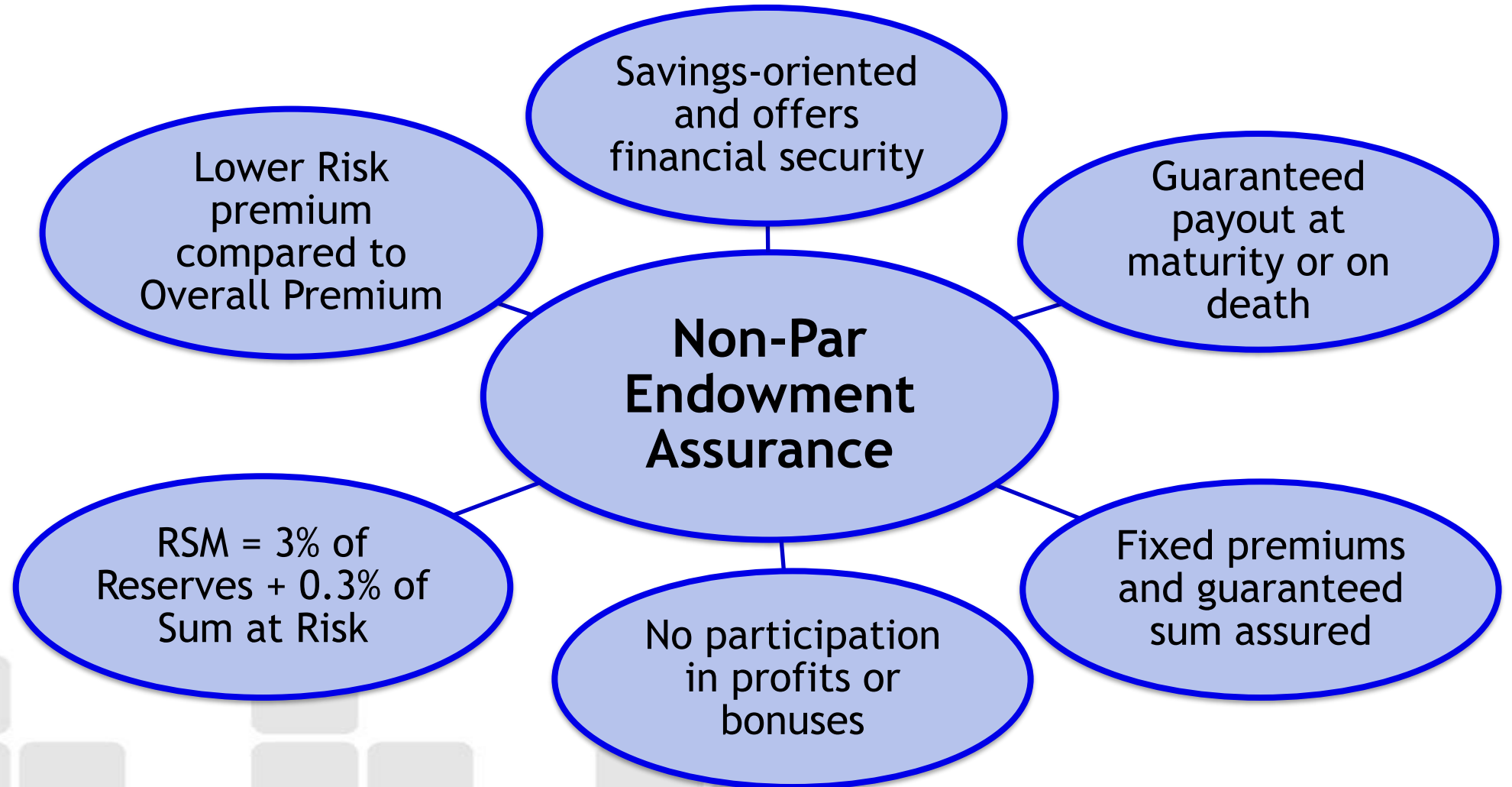
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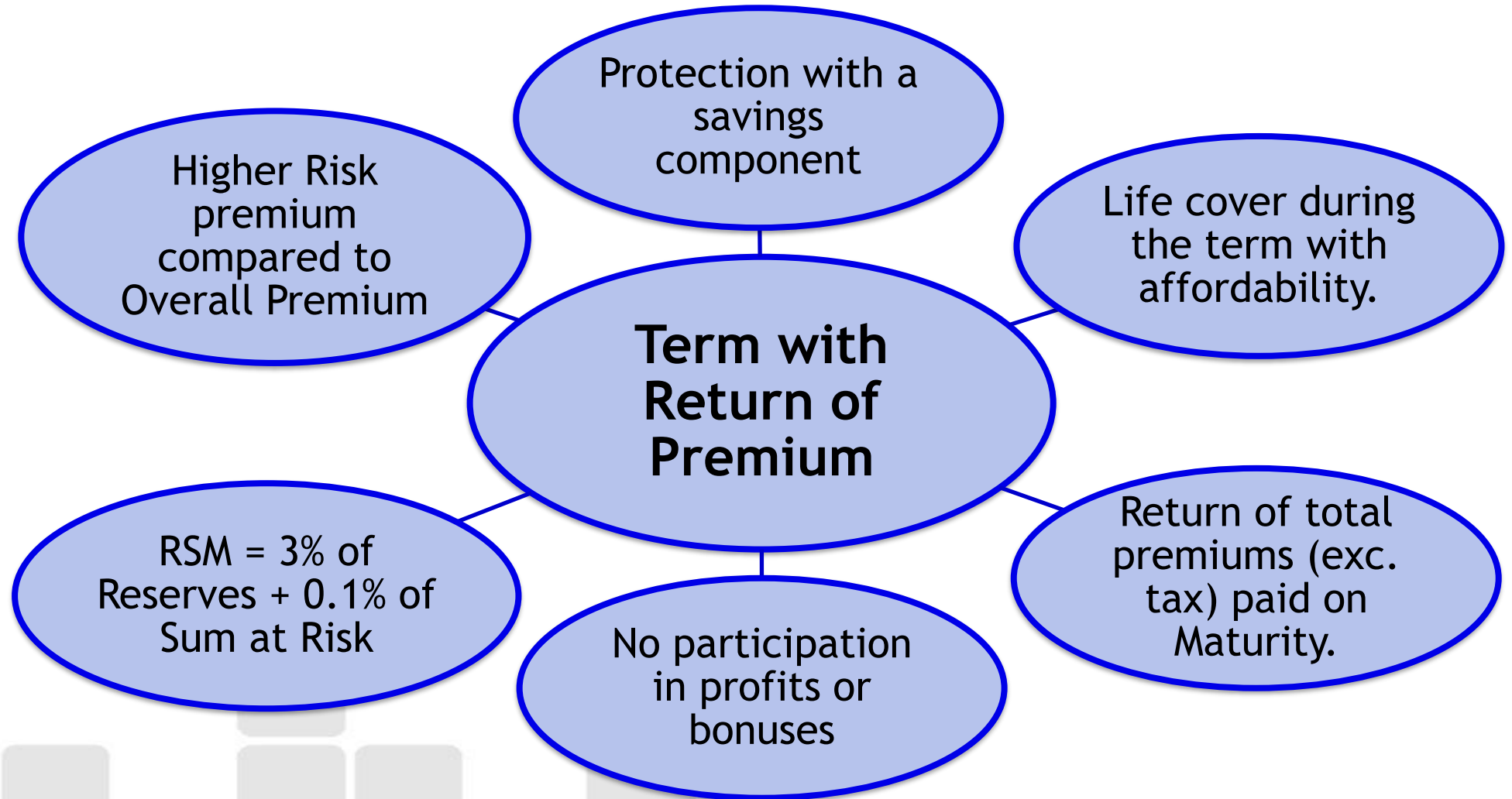
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Product Features



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Recent Developments

- **Premium Adjustments:**

- Company has revised its premiums downwards to remain competitive in the market
- *This strategic decision, while beneficial for market positioning, has implications for our risk management and profitability*

- **Reinsurance Premiums:**

- Concurrently, reinsurance premiums have been revised upwards due to the reinsurers' experience
- *This divergence between our downward revised premiums and increase in reinsurance cost necessitates a re-evaluation of our reinsurance modelling strategy*

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Current Reinsurance Modelling Practice

- Reinsurance was not fully modelled due to its insignificant levels relative to gross premiums
- Negligible impact on profit margins
- Focus remained on gross cash flows and statutory reserves and not on sub-components of reinsurance
- Company needs to settle all the valid claims irrespective of Reinsurance recoveries

Underlying assumptions for current practice



- Company follows Risk Premium Reinsurance arrangements
- Reinsurance premiums were stable and predictable
- Risk transfer was limited due to product mix (e.g., low mortality risk in savings product or higher retention levels or lower ticket size sold)
- Modelling simplicity was prioritized over modelling precision

Valuation Model - Profitability

Profitability cash flows

Net Premiums	Office Premium Reinsurance Premium	-	XXX
<i>Plus</i> Interest Income			XXX
<i>Less</i> Net Death Benefit outgo	Death benefit outgo Reinsurance Recoveries	-	XXX
<i>Less</i> Benefit outgo (others)			XXX
<i>Less</i> Expenses + Commission			XXX
<i>Less</i> Increase in Reserves			XXX
Profit before Tax			XXX

Reinsurance Premium Rates are known in advance but Reinsurance recoveries depend upon the mortality assumption.

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Consideration for Modelling Reinsurance

Risk Exposure
and Solvency
Risk Mitigation

- Critical tool for mitigating risk
- Protection from large claims or catastrophic event
- Stabilize our loss experience
- Protect solvency
- Provide capital relief
- Expertise and technical assistance

Consideration for Modelling Reinsurance

Financial Impact

- **Cost-Benefit Analysis:** To determine whether the benefits of modelling reinsurance outweighs the cost and efforts
- **Impact on Profit Margins:** The upward revision in reinsurance premiums could erode our profit margins. Modelling will help understand the current financial impact and make informed decisions

Consideration for Modelling Reinsurance

Regulatory and Compliance Considerations

- IRDAI Regulation and practice standards suggests considering reinsurance
- IRDAI requires insurers to maintain sufficient reserves and demonstrate solvency
- Reinsurance modelling ensures compliance with accounting standards, which require the proper recognition of reinsurance assets and liabilities

Consideration for Modelling Reinsurance

Operational Considerations

- Data and Systems requirements
- Expertise and Resources:
 - Actuarial expertise
 - Reinsurance terms and conditions
 - Appropriate software tools

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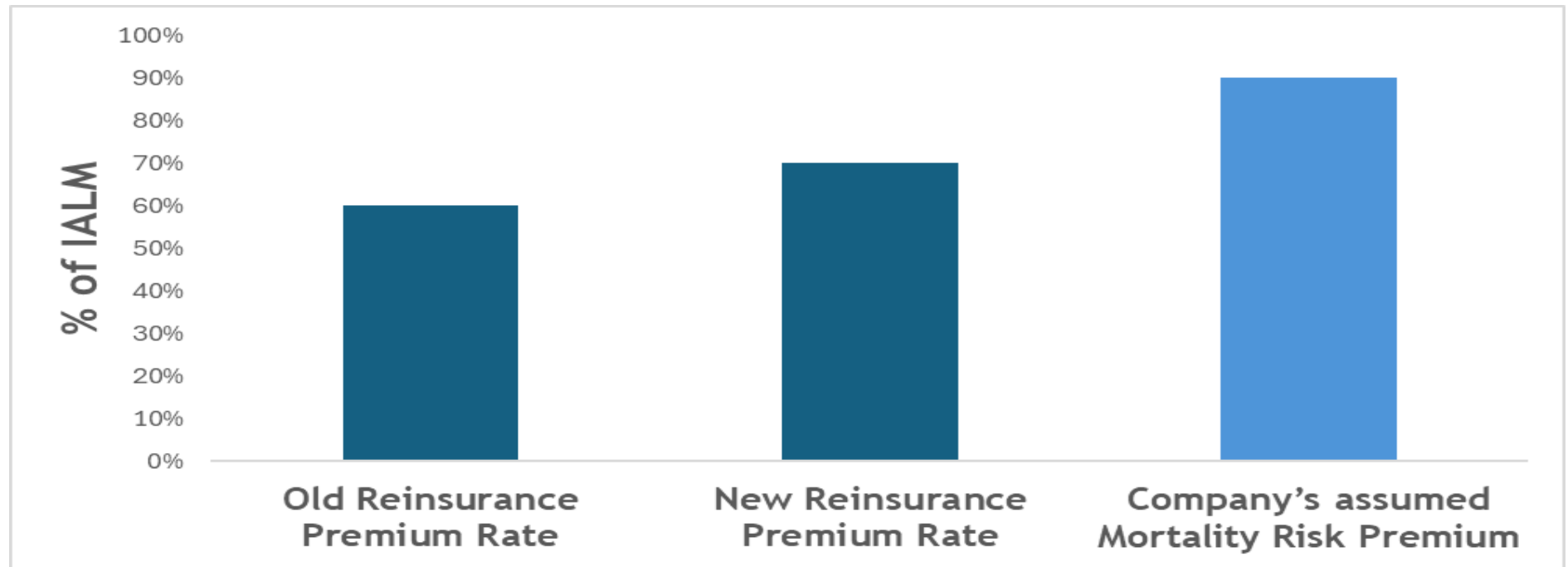
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Reasons for not modelling Reinsurance

- If the Reinsurance rate increase is still within the acceptable range then there might not be adverse impact on solvency level



Reasons for not modelling Reinsurance

- Reinsurance Sum at Risk may not change significantly if the current retention level is high
- Modelling Reinsurance can be time consuming exercise and need to do Cost Vs Benefit analysis
- If revised reinsurance premiums are still lower than base risk premiums and currently company's reserves are slightly prudent, then company may decide not to model it now
- Reinsurance could be modelled later due to some other modelling constraints or system incapacibilities now if it is mutually agreed

Implications of not modelling Reinsurance



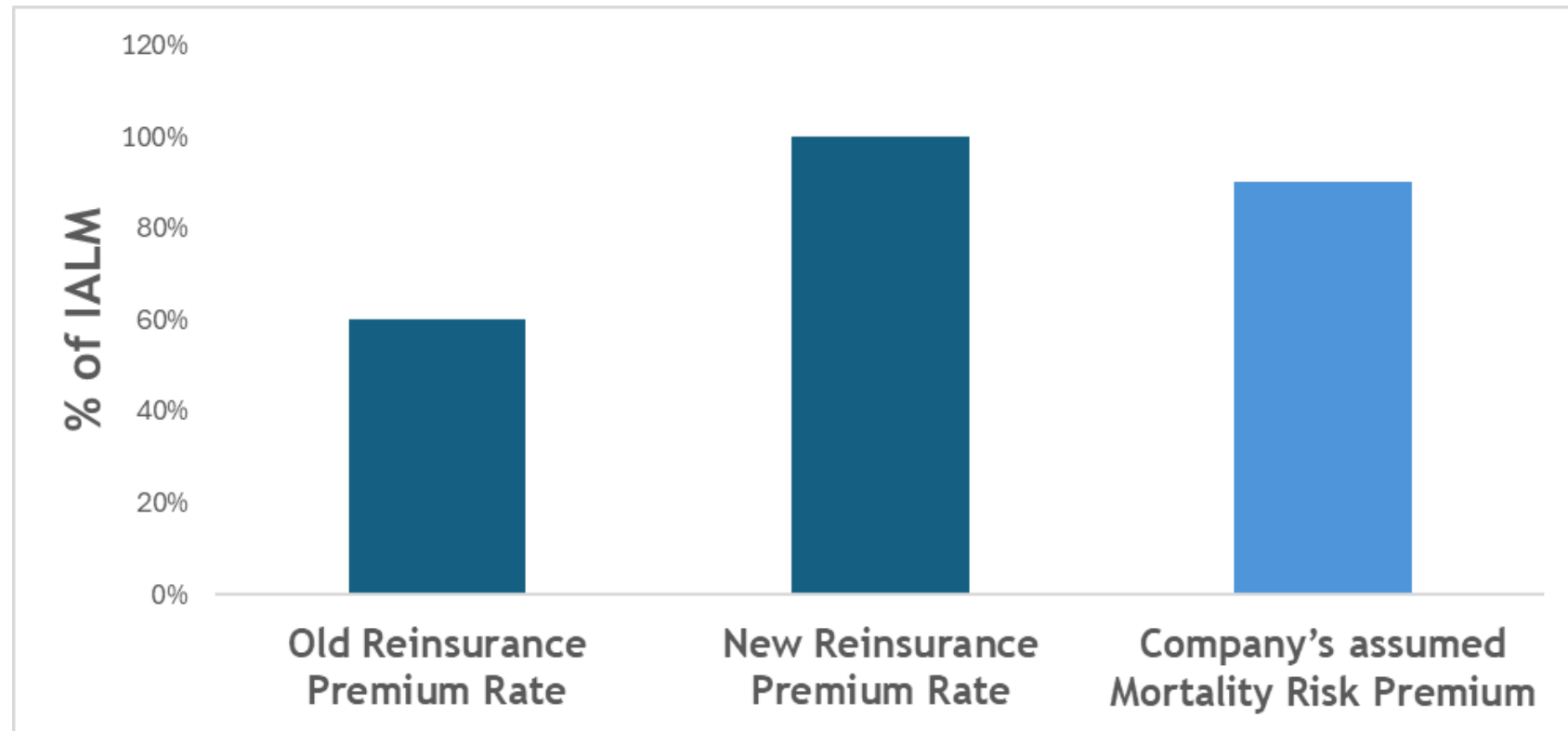
- Underestimation of net liabilities in scenarios with rising reinsurance costs
- Lack of sensitivity analysis to reinsurance pricing changes
- Potential misalignment with IRDAI's evolving expectations on risk-based capital and disclosures
- Inability in complying with new accounting standards e.g. IFRS 17, if implemented in near future
- With significant growth in new business, inability to assess the mortality risk and the capital requirement

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Reasons for modelling Reinsurance

- The increase in Reinsurance rates is significant and the revised rate is higher than base mortality rates assumed



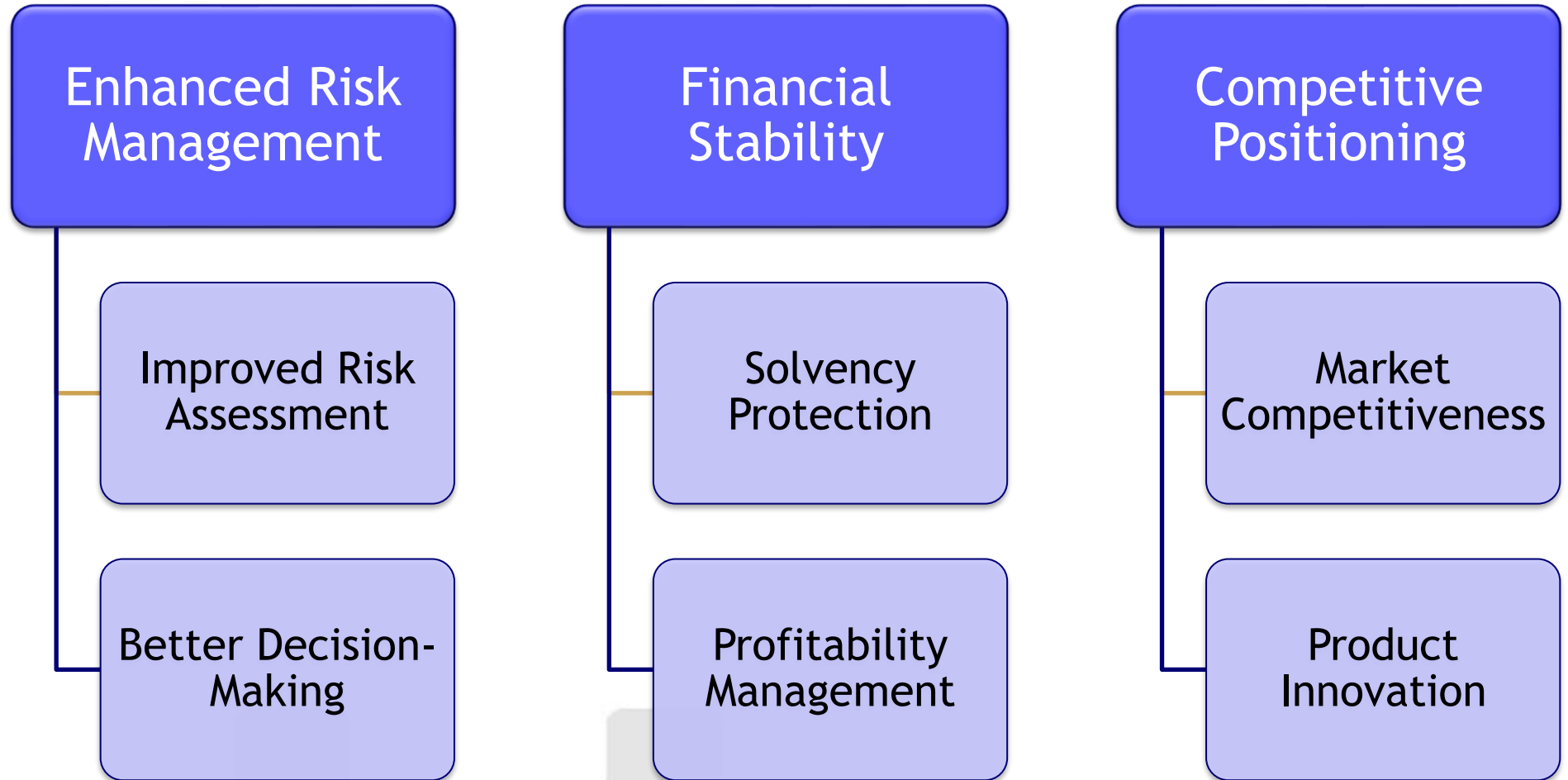
Reasons for modelling Reinsurance

- Allow to hold appropriate level of reserves showing correct profitability
- Hold appropriate level of solvency capital
- If the mortality assumption is revised to consider the increased Reinsurance rates, the impact of MAD will further increase the liability and affect the profitability and Solvency Capital requirement
- Even if the Reinsurance rate increase is still within the acceptable range, modelling now will help offset the impact of Reduced Premiums on Profitability

Reasons for modelling Reinsurance

- It may help in assess the impact of recent developments on EV
- Help in more accurate regulatory reporting and may also help if new regime of RBC is adopted
- Can be looped back in future pricing of products leading to innovative products
- May help better design future Reinsurance strategy
- If significant growth in expected in future business, modelling will allow better assessment of the mortality risk and the capital requirement

Implications of modelling Reinsurance



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Regulations

- As per Form KT1 (Annexure Actl-6) of IRDAI (Actuarial, Finance and Investment Functions of Insurers) Regulations, 2024; insurer needs to submit financial statements which demonstrate RSM for the company under each type of business.

$$\text{RSM} = (\text{Mathematical Reserves before Reinsurance} \times K1 \times \text{First Factor for RSM}) + (\text{Sum At Risk before Reinsurance} \times K2 \times \text{Second Factor for RSM})$$

Where $K1 = \text{Max} (0.85, (\text{Mathematical Reserves after Reinsurance} / \text{Mathematical Reserves before reinsurance}))$ and

$K2 = \text{Max} (0.5, \text{Sum at Risk after reinsurance} / \text{Sum at risk before reinsurance})$

Regulations

- IRDAI (Actuarial, Finance and Investment Functions of Insurers) Regulations, 2024, Part III of Schedule-I:
 - Clause (A)5.(9): In case the mathematical reserve is calculated allowing for outgo in respect of reinsurance premium and credit taken for claim recoveries from reinsurer, the valuation basis and methods shall be as per the part III of Schedule - I.

Guidance to be considered

APS 1:

- The assumed value for each valuation parameter should consist of a margin for adverse deviation such that its addition to the expected level results in an increase in the reserve. (Extract from Section 8.5)
- The investigation and valuation must take into account the company's reinsurance arrangements and if they are considered to be inappropriate or inadequate, it must be advised to modify them to protect the policyholders' interests. The possibility of reinsurance company failing to meet its obligations or lapse of contract or prove to be unenforceable in certain circumstances may also have to be considered. (Extract from Section 8.11)

Guidance to be considered

APS 7: When revising the Mortality assumption

- Minimum Adverse Scenarios: For assurances: experience is 10% worse than current best estimate assumptions (Extract from Section 7)

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Next Steps: Not modelling

- Divergence between Reinsurer's and company's experience:
 - Negotiate rates with Reinsurer using experience data
 - Evaluate/improve underwriting process for selective portfolios so that mortality experience is improved
- Evaluate and increase the company's retention limits if internal experience is better than the reinsurer's assumptions thereby reducing cession costs and rely less on costly reinsurance, potentially leading to better profitability
- Revisit the current reinsurance structure. E.g. check for Quota Share vs. Surplus Arrangement Mix. Negotiate for flexible structures or blended arrangements that optimize capital relief and premium outgo
- Introduce diversification in the reinsurance arrangements.

Next Steps: Modelling

- Build system capabilities to model reinsurance cash-flows
- Reinsurance Functionality
 - Ability to model multiple reinsurance arrangements per product
 - Support for dynamic reinsurance premiums based on underlying risk or experience
 - Capability to model ceding limits and retention levels
- Seamless interaction between actuarial models and reinsurance admin system
- Modelling enhancement may be taken up in phases instead of a one-time activity

Next Steps: Modelling

- Assumption setting and regulatory compliance
- Reinsurance Treaty Data
 - Treaty type (quota share, surplus, etc.)
 - Reinsurance premium rates, coverage limits, retention levels, and ceding arrangements
- Scenario and sensitivity testing (e.g., increase in reinsurer rates)
- Regulatory Reporting

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- Not Modelling may be an option if the reinsurance rate increase is not significant and there is no significant impact on solvency/ profitability or if the cost-benefit analysis suggests higher cost than benefit
- Not modelling can distort financial picture, especially under tighter margins
- Conversely modelling can be taken up in phases
- Modelling will help in more accurate regulatory reporting and may also help in compliance if RBC regime is adopted
- Modelling Reinsurance may help in designing of future Reinsurance strategy in a better way
- In the era of technical advancement, Reinsurance modelling should not be a difficult choice since it will take the company one step closer to accurate reserve and solvency calculation!

“Thank You”



Questions

