



Solvency II and Technical Pricing

Prepared by Anne Chevalier, PartnerRe

Chief Pricing Actuary, Specialty Lines

September 15, 2008

Goal of the presentation

Price elements of an insurance product

Solvency II

- Important elements of Pillar I
- Potential impact on pricing
- Risk-based capital under Solvency II

Illustration through a case study

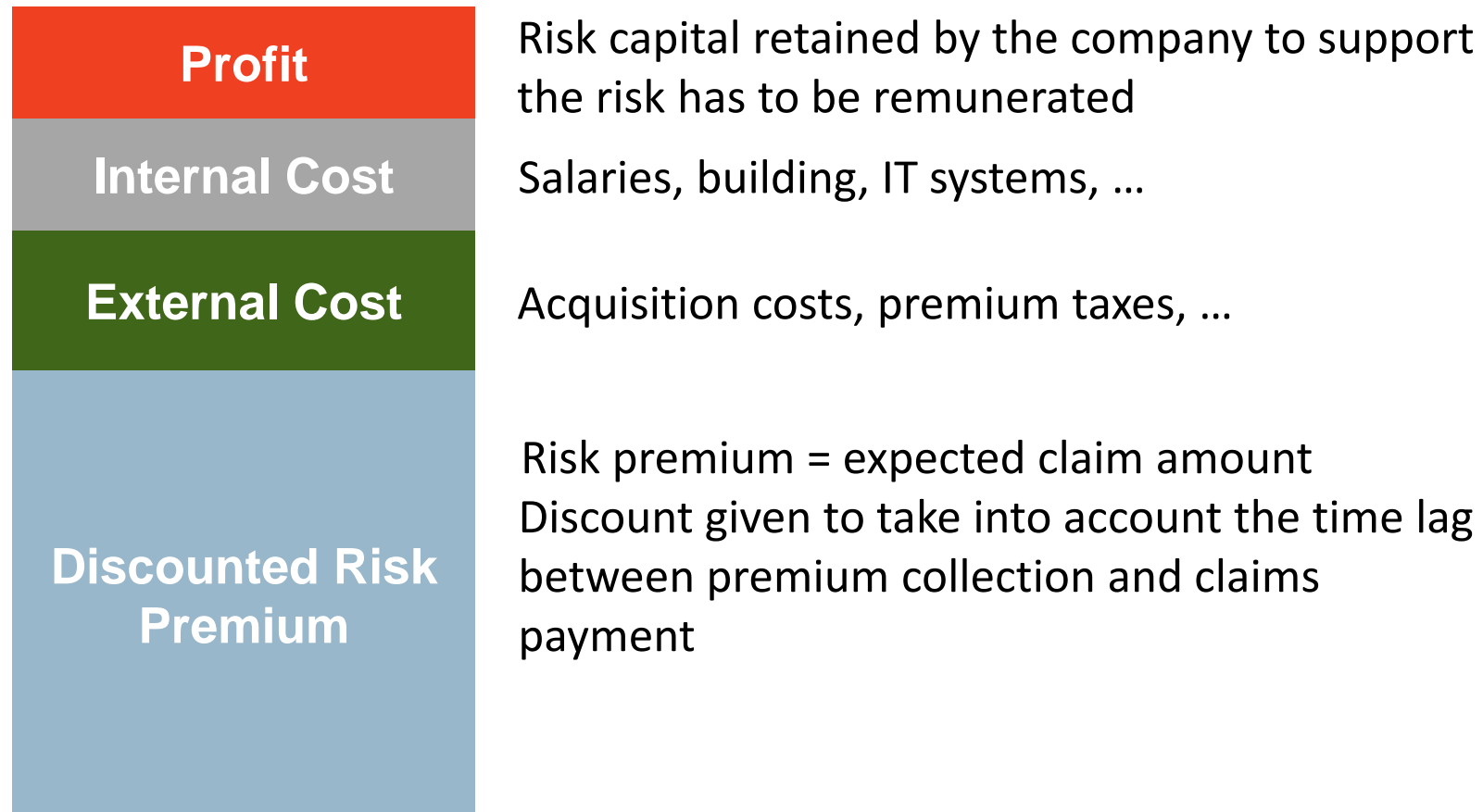
Goal of the presentation

- Potential impact of Solvency II on the technical price of an insurance product
- Case study illustrating theoretical considerations

Focus on Pillar I (quantitative approach)

Solvency II and Technical Pricing

Price Elements of an Insurance Product



Solvency II and Technical Pricing

Important Elements of Pillar I

1. **Risk-based capital** – also called Solvency Capital - required
 - Should reflect all the risks faced by an insurance company
 - Companies encouraged to develop their own “internal” model
2. **Diversification** new key element
3. Concept of “Minimum capital requirement”
 - Level of capital below which an insurers operation present an unacceptable risk for policyholder under regulator’s view
 - Not relevant for pricing
4. Reserves to be discounted (complex topic)

Risk-based capital allocated to individual insurance product

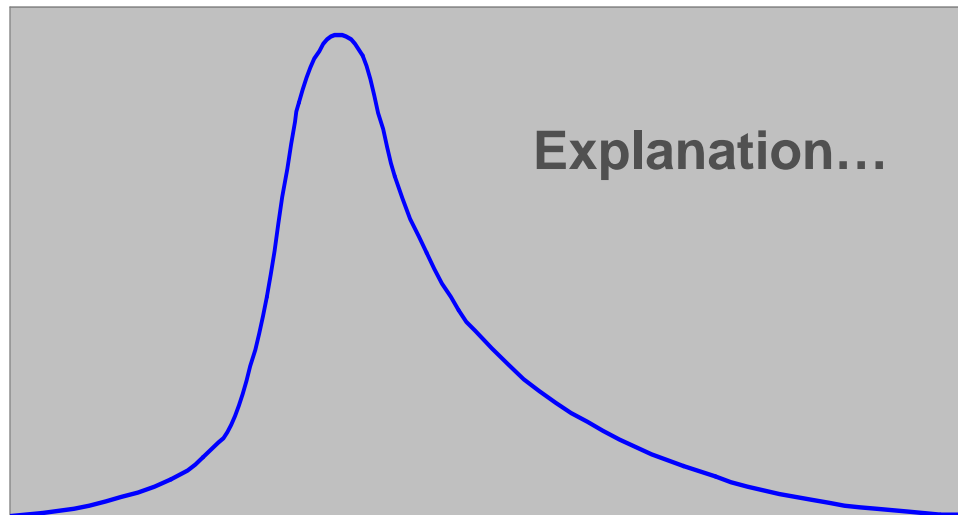
Consequences

- Volatile and non-diversifying business should become more expensive
- An insurance product within a well diversified portfolio needs less capital

→ **Sophisticated actuarial models
and data quality are a must!**

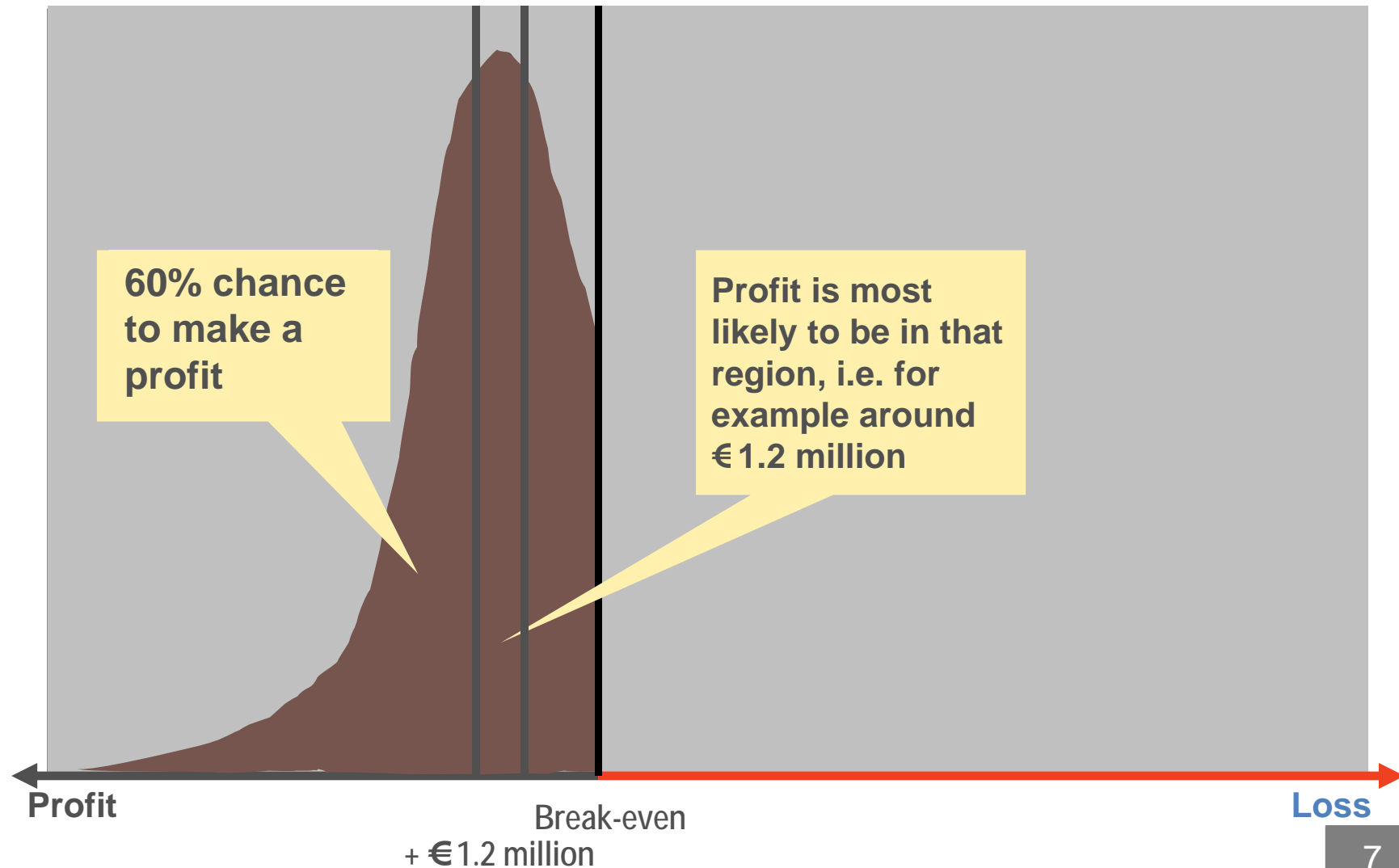
Standard methodology to calculate risk-based capital

- Value at Risk (“VaR”)



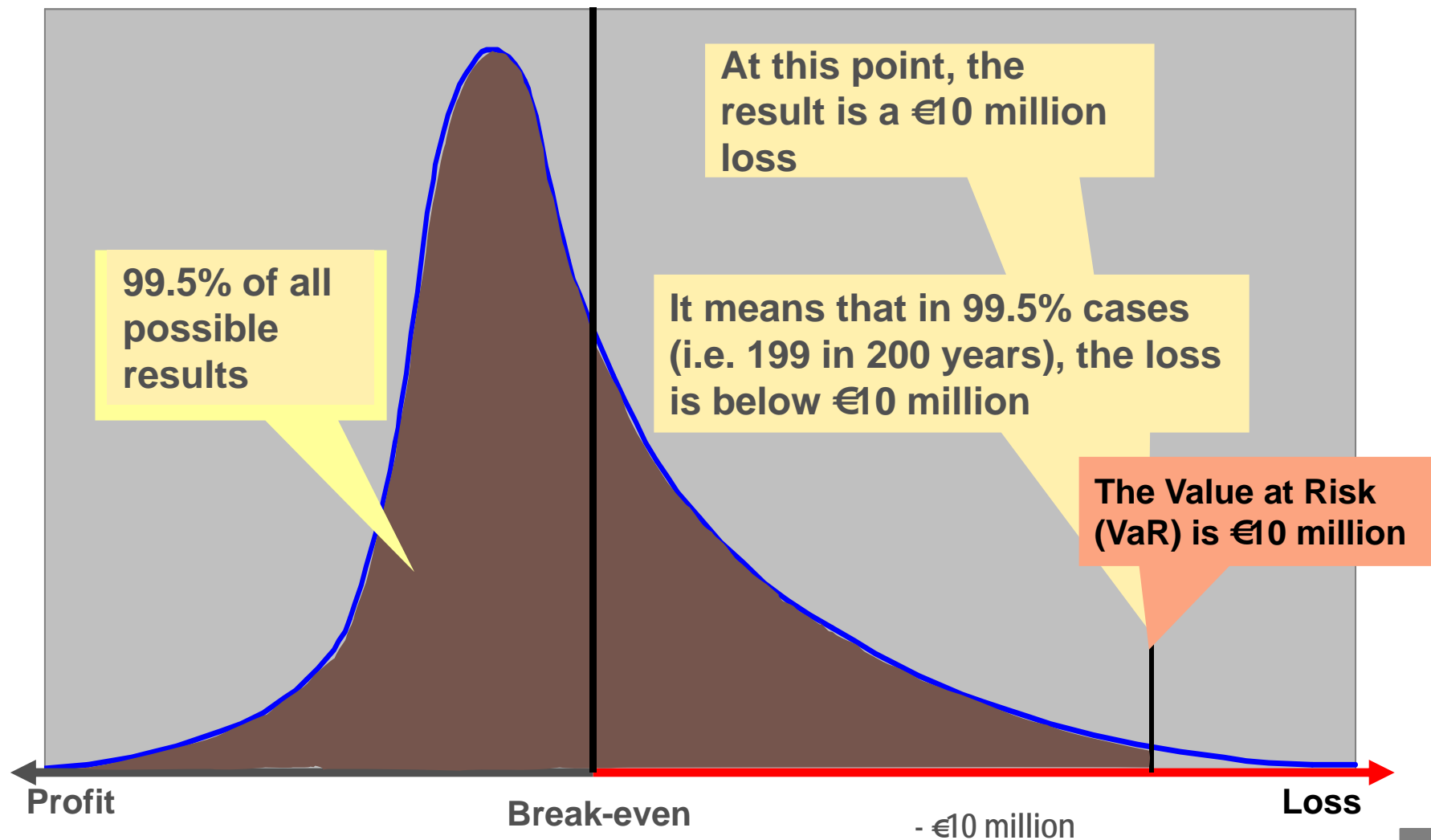
Solvency II and Technical Pricing

Result distribution of an insurance company



Solvency II and Technical Pricing

Result distribution of an insurance company



Recapitulation

- Value at Risk 99.5% – “VaR 99.5%”
 - Is the capital necessary to cover all losses that should occur in 99.5% of cases
 - Recommended risk measure under Solvency II

Solvency II and Technical Pricing

Illustration Through a Case Study

Portfolio of a reinsurer: two treaties

- Cargo quota-share
 - Well balanced; low treaty limit; past result very stable
- Hull quota-share
 - Unbalanced risk profile; high treaty limit; volatile results
- For the sake of simplicity: no accumulation potential between the two treaties

Underwriting year 2008

- Covers policies written by the cedant between January 1, 2008 and December 31, 2008

Ideally, statistics to be provided for at least ten years, split by business segment and geographical region

Premium

- Historical premium evolution and estimation for the year to come
- Historical premium rates

Loss history

- Large losses above a defined threshold
- Total losses by underwriting year

Risk profile

Qualitative change of the portfolio:

- Conditions, geographical split, limits, deductible, underwriting philosophy...
- Composition of the portfolio

Adjustment of historical cedant's premiums and claims to 2008 level

Expected loss ratio estimation

- Attritional loss ratio
- Large loss ratio
- Event loss ratio

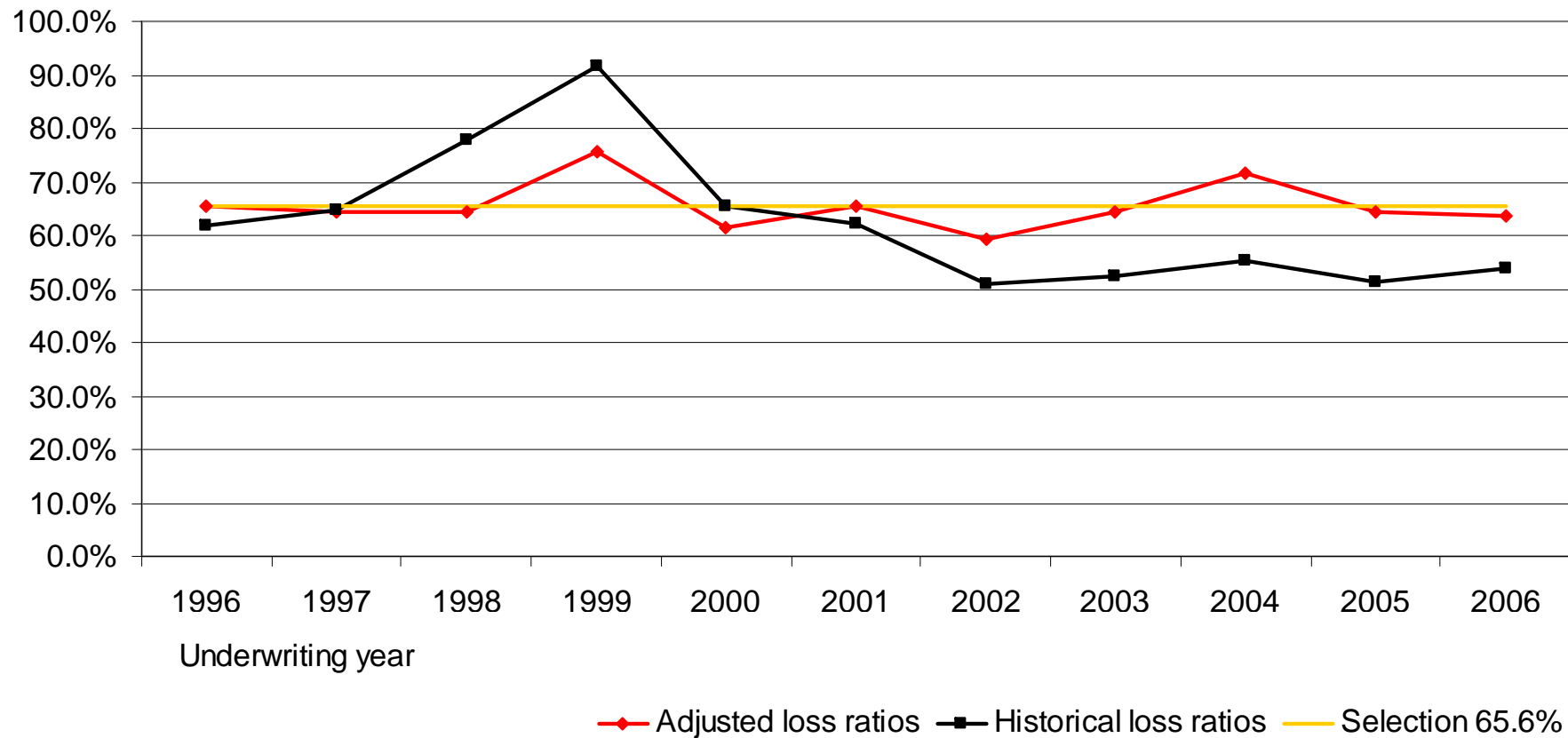


Other cost components (commission, internal costs)

Allocation of risk-based capital and calculation of return on capital

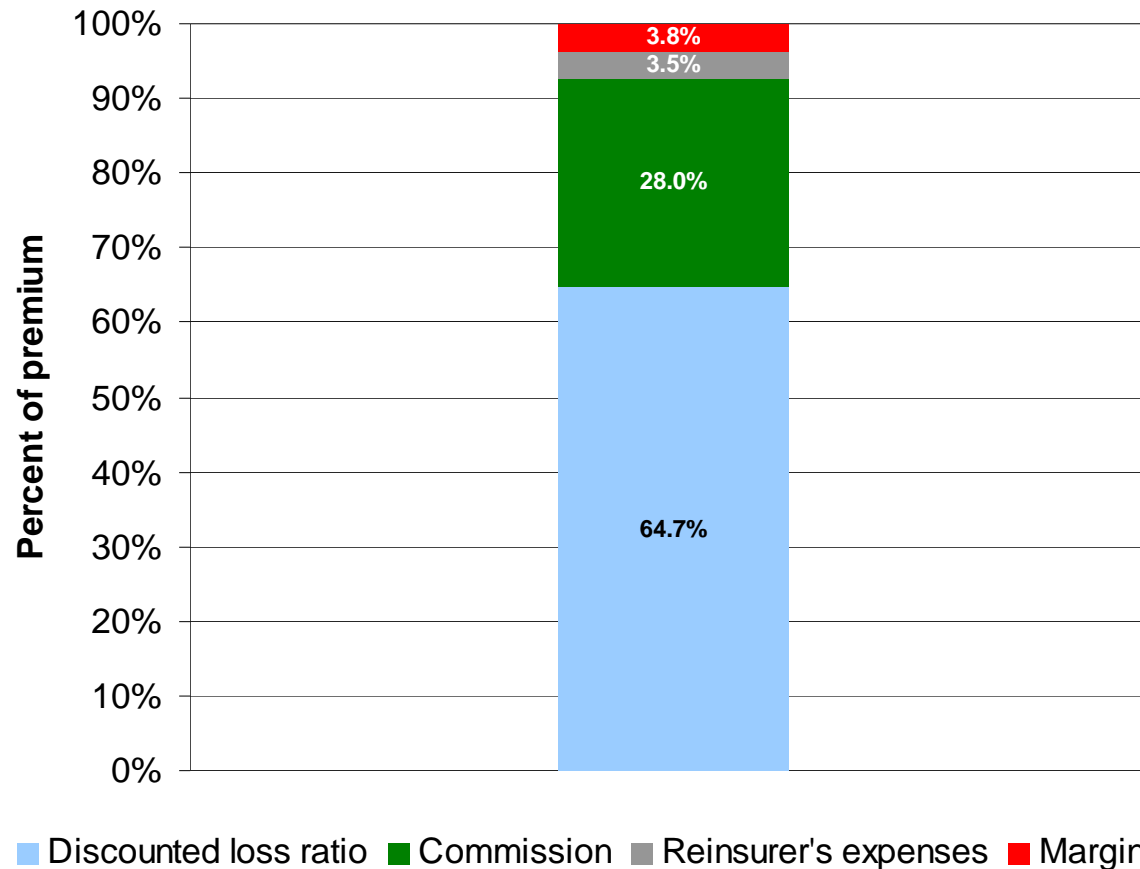
Solvency II and Technical Pricing

Cargo Quota-Share – Estimation of Loss Ratio



Solvency II and Technical Pricing

Cargo Quota-Share – Intermediary Results



Figures in % of premium	
Premium in US\$ million	9.2
Expected loss ratio	65.6%
Discount	0.9%
Discounted loss ratio	64.7%
Commission *	28.0%
Reinsurer's expenses *	3.5%
Total	96.2%
Margin	3.8%

Margin = profit in percent of premium

*Case study uses a hypothetical commission of 28% and expense rate of 3.5%

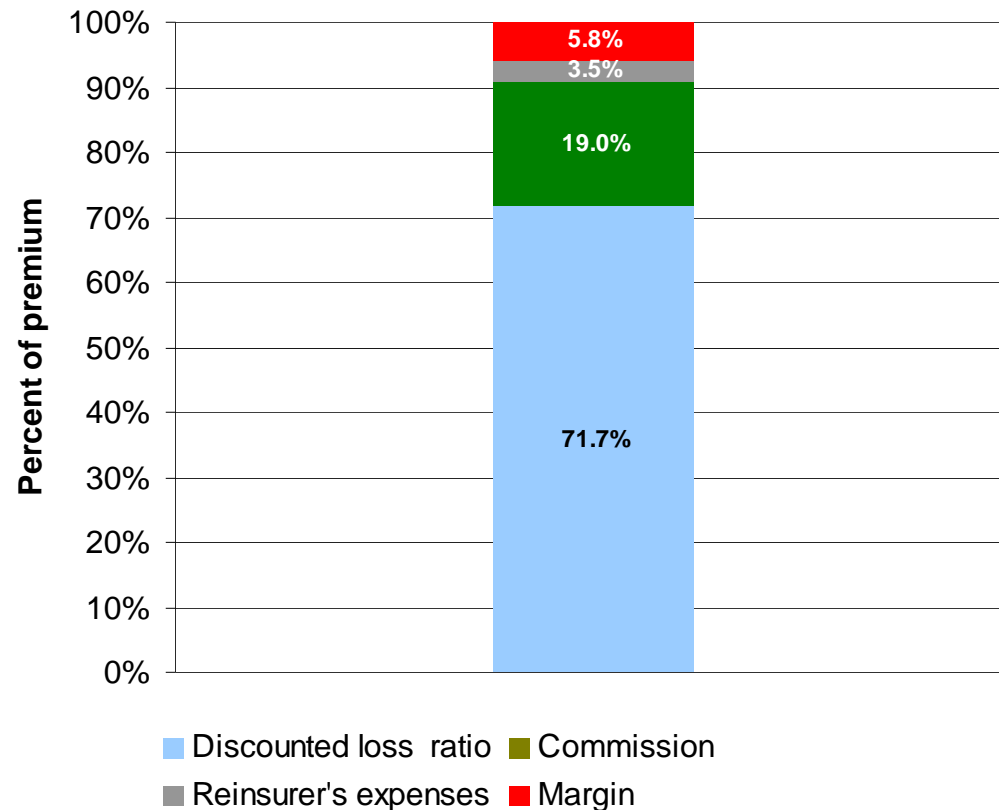
Solvency II and Technical Pricing

Hull Quota-Share – Estimation of Loss Ratio



Solvency II and Technical Pricing

Hull Quota-Share – Intermediary Results



Figures in % of premium	
Premium in mio \$	10
Expected loss ratio	72.3%
Discount	0.6%
Discounted loss ratio	71.7%
Commission *	19.0%
Reinsurer's expenses *	3.5%
Total	94.2%
Margin	5.8%

Margin = profit in percent of premium

*Case study uses a hypothetical commission of 19% and expense rate of 3.5%

Solvency II and Technical Pricing

Summary and Next Steps

Summary

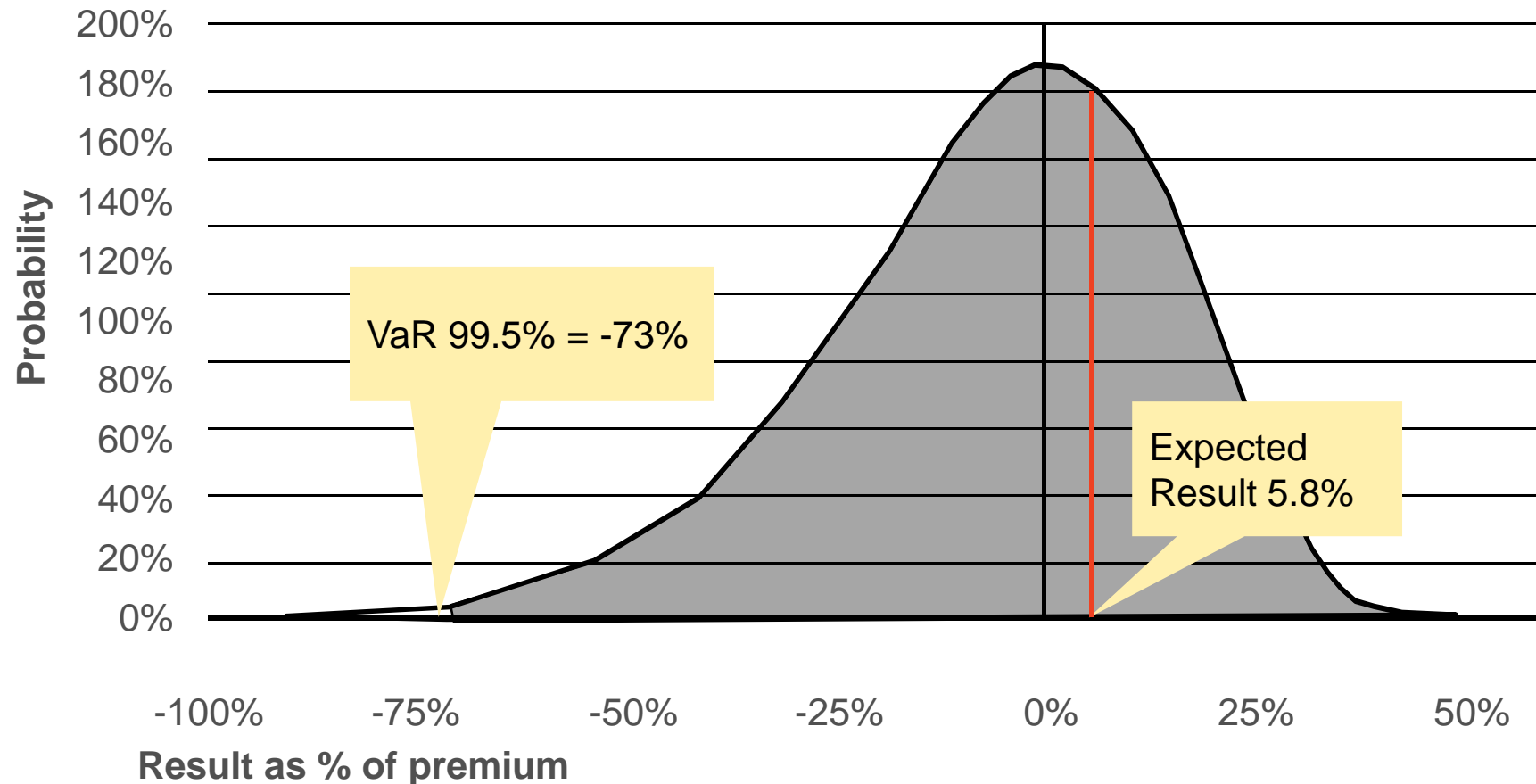
- Margin of hull treaty higher than that of cargo (5.8% versus 3.8%)
- Volatility of the hull portfolio obviously considerably higher

Next steps

- Allocation of risk-based capital to each treaty
- Return on capital calculation (profit as % of capital)
- Diversification benefit

Solvency II and Technical Pricing

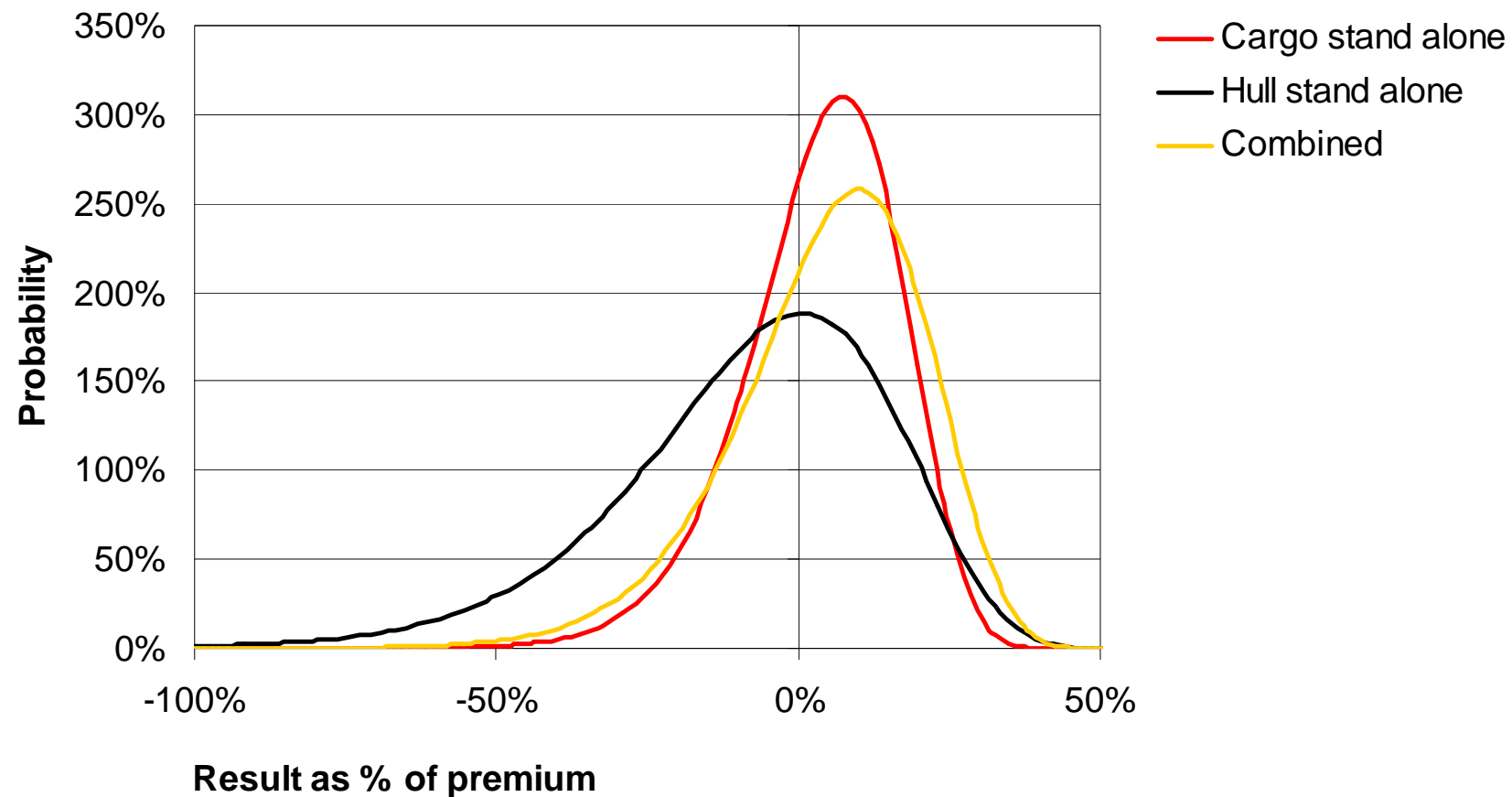
Risk-based capital for Hull business



In 99.5% of the cases the loss will be less than -73%.
Risk-based capital = 73% x Premium = 73% * 10 = 7.3 million

Solvency II and Technical Pricing

Result Distributions



Solvency II and Technical Pricing

Capital and Diversification Benefit

Amount in US\$ million	Cargo stand alone	Hull stand alone	Combined portfolio	Diversification benefit
Premium	9.2	10.0	19.2	
VaR 99.5%	-38%	-73%	-39%	
Risk-based capital	3.5	7.3	7.5	30%

$$1 - \frac{7.5}{3.5 + 7.3}$$

↗

Amount in US\$ million	Cargo	Hull	Total
Premium	9.2	10.0	19.2
Margin in percent	3.8%	5.8%	4.8%
Margin in mio \$	0.3	0.6	0.9
VaR 99.5%	-38%	-73%	-39%
Risk-based capital stand alone	3.5	7.3	10.8
Return on capital	10.1%	8.0%	8.6%
Risk-based capital after diversification			7.5
Return on capital after diversification			12.4%

More volatile business needs more capital

- With the same margin, profit will be lower

Diversification benefit is considerable

Despite complexity, companies encouraged to develop their own model

Solvency II and Technical Pricing

Anne Chevalier, Chief Pricing Actuary

PartnerRe



Questions?