

# Određivanje cijene reosiguranja viška štete za zelenu kartu / Pricing of Green Card XL Reinsurance

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1 Overview of the Pricing Process for Green Card XL

2 Simple Stochastic Model for Large Losses

3 Calculation of the Price for XL Reinsurance

4 Outlook on Refined Loss Modelling

5 Discussion

# Overview of the Pricing Process for Green Card XL

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1. Submission of pricing request by cedent / broker: description of portfolio, slip, (rates).
2. Creation of a **loss model** for single large losses.
3. Calculation of a **price for reinsurance** based on model and contract features.  
Possible: quotation for alternative layerings, using the same model.
4. Negotiations, finalization of the contract.

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# Simple Stochastic Model for Large Losses

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## Fictitious Example for Green Card XL Reinsurance

- **Reinsurance for 3 layers:**

1. Layer: 200.000 EUR xs 200.000 EUR
2. Layer: 600.000 EUR xs 400.000 EUR
3. Layer: unlimited xs 1.000.000 EUR.

- **Data:**

new contract period: 2009

same portfolio for 10 years

loss history for the years 1999 – 2008:

complete list of all losses above 100.000 EUR.

## What is the price for reinsurance?

Problem: We do not know the future losses.

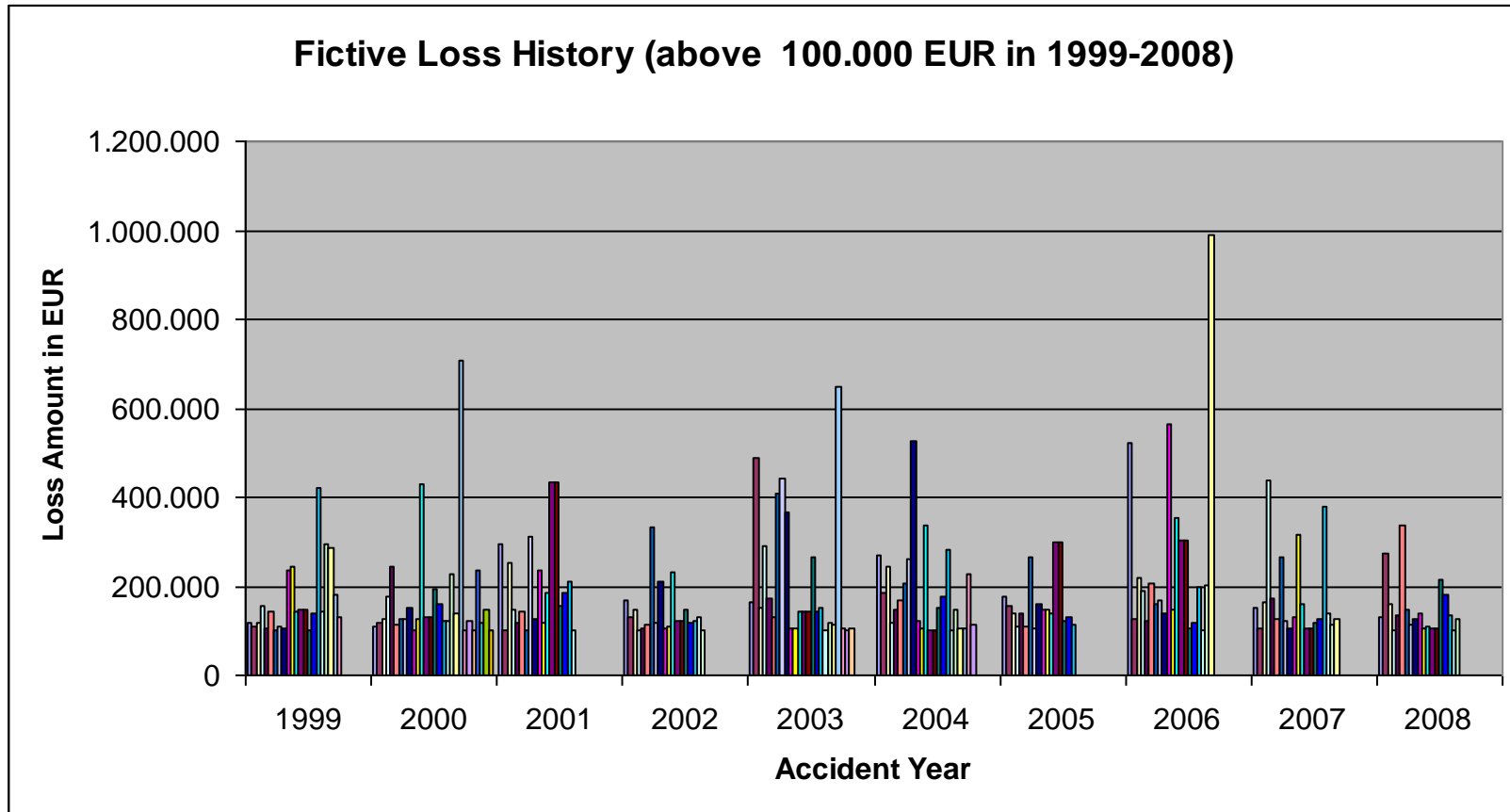
# Simple Stochastic Model for Large Losses

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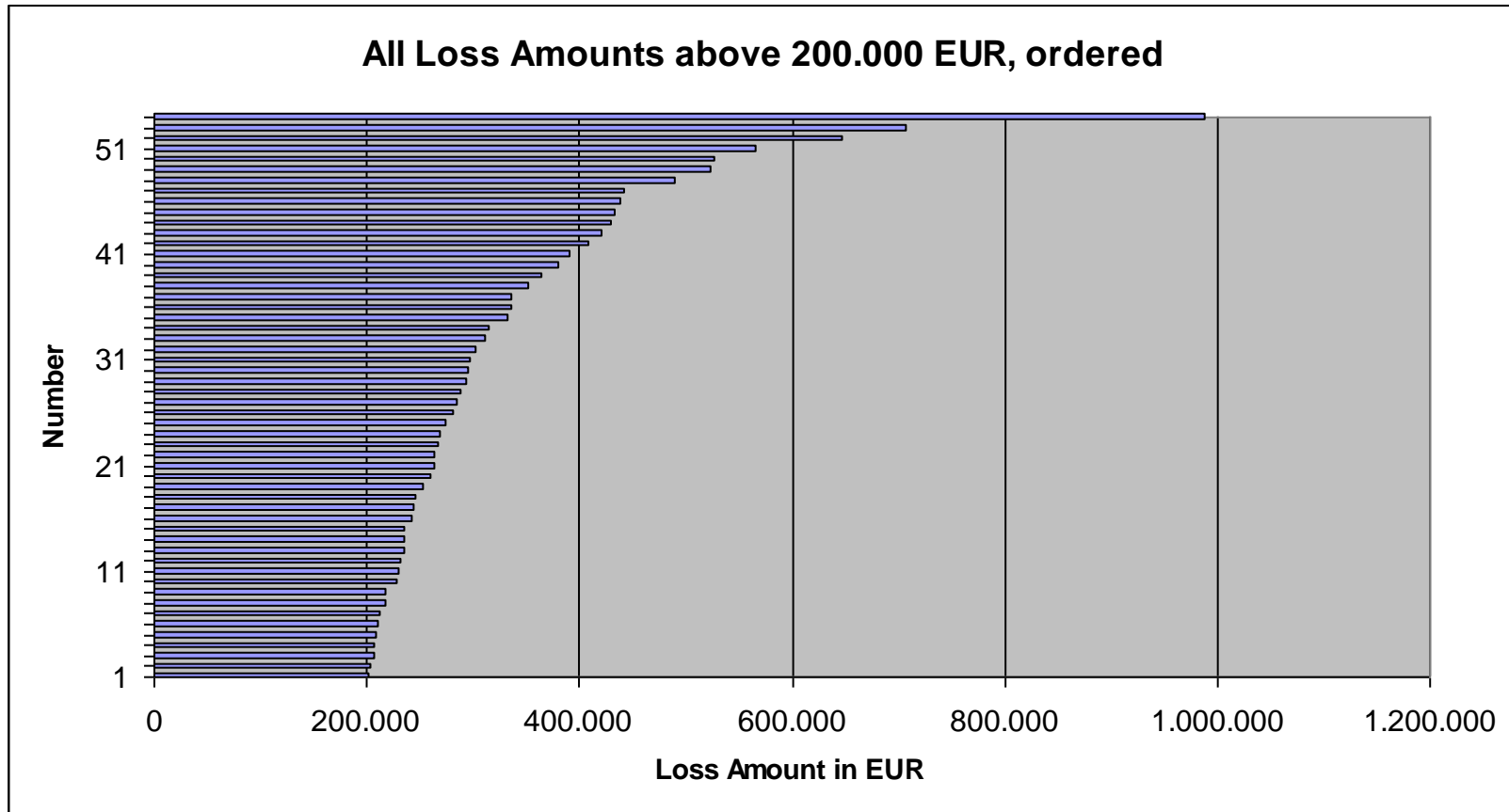
- Approach: Create and apply a **model** for the (future) losses, based on the loss history.
- What should the model predict?
  1. **number of losses** above the priority (200.000 EUR),
  2. the **severity (loss amount)** distribution.
- Assumptions (for simplicity):
  - no inflation of premiums or losses,
  - no development of losses (final incurreds are known).

➔ For more realistic assumptions, see below.

# Simple Stochastic Model for Large Losses

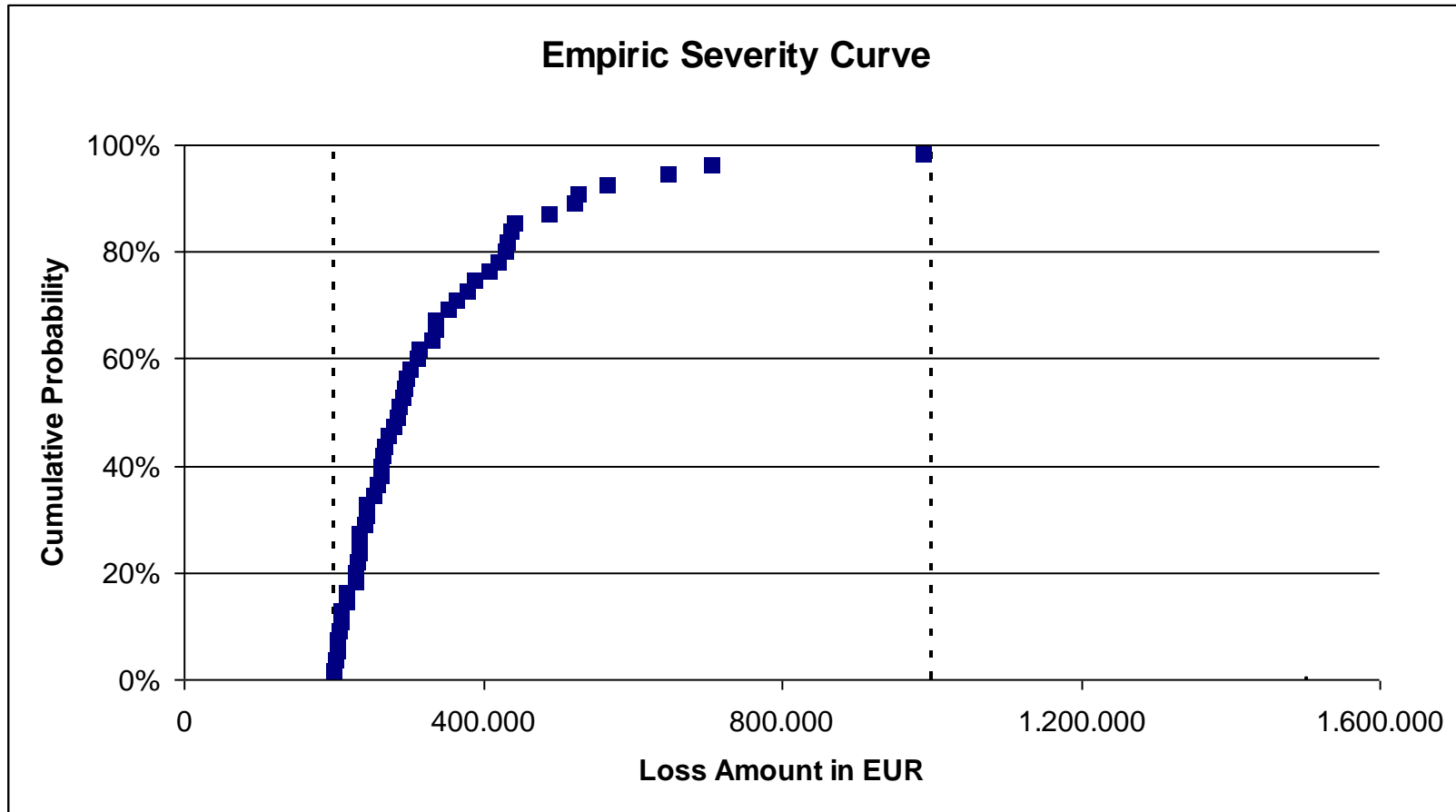


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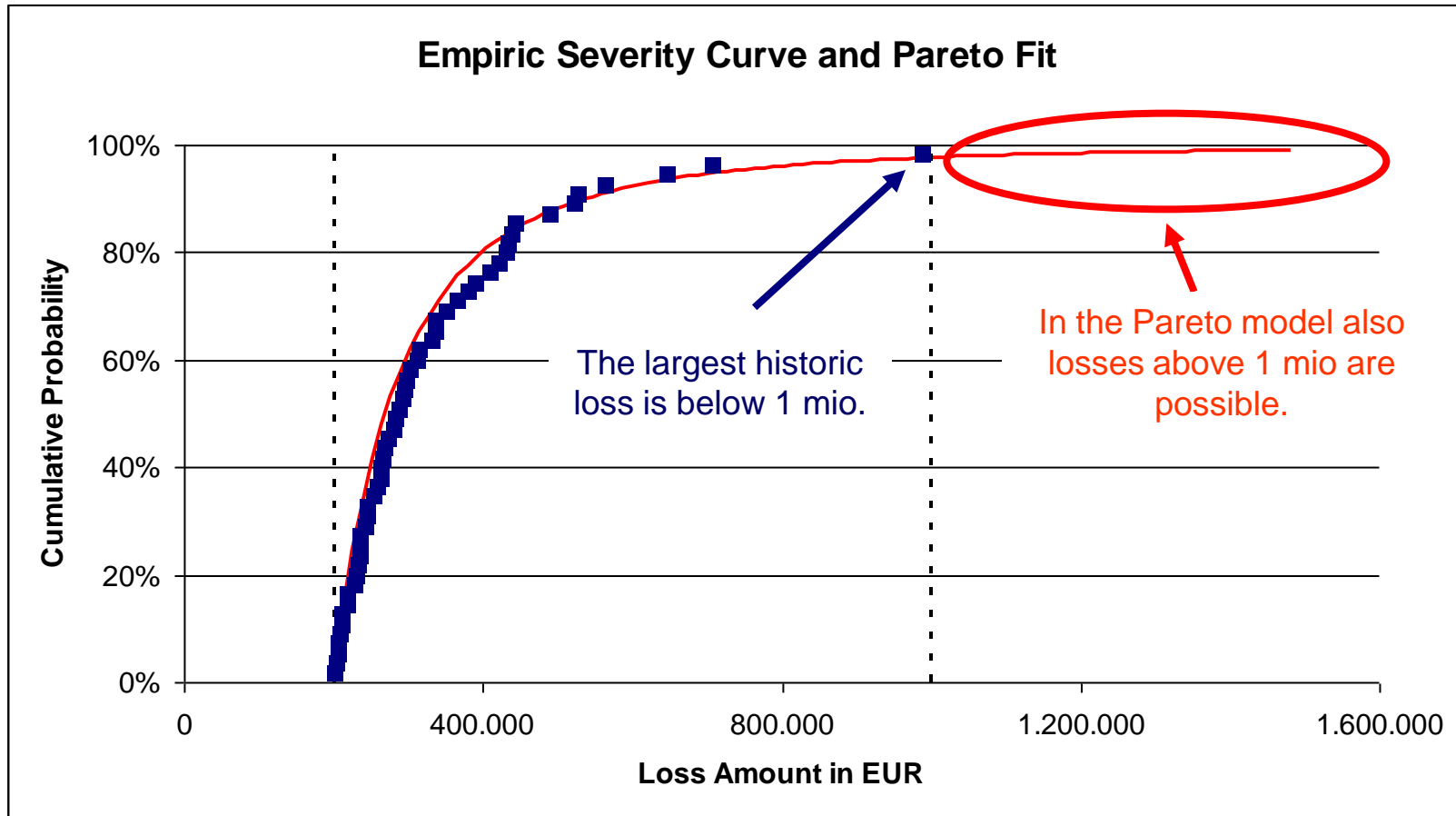




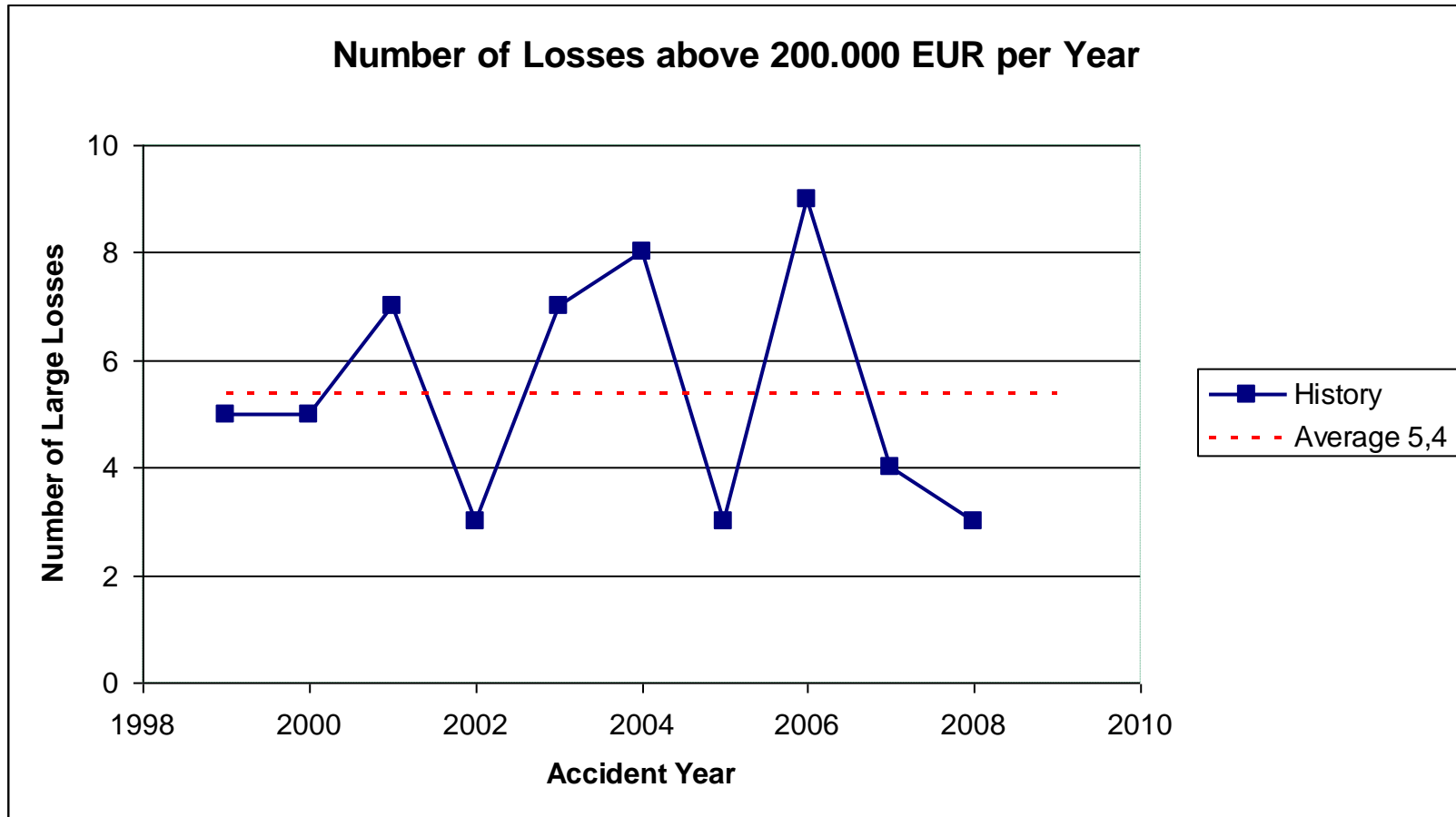
# Simple Stochastic Model for Large Losses



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→ We have estimated the parameters of a **frequency-severity-model**:

**1. Model threshold: 200.000 EUR**

**2. Frequency:**

average **5,4** losses (above 200.000 EUR) per year  
Poisson-distribution (not shown here)

**3. Severity** (loss amount)

Pareto-distribution

Pareto-alpha: **2,3**.

→ In this model even very large losses are possible, e.g. loss amounts above 5 mio EUR.

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Calculation of the Price for XL Reinsurance

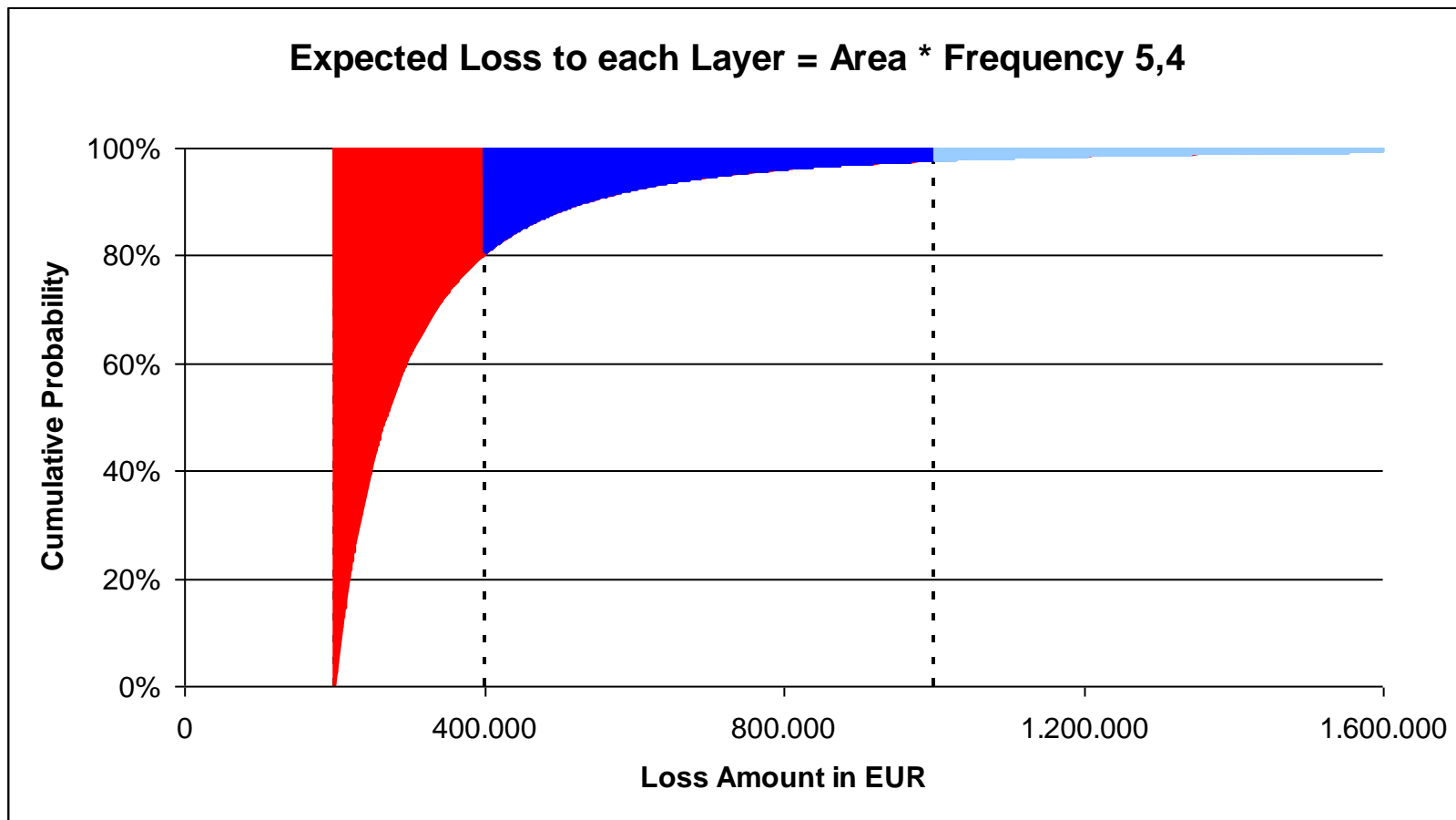
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Outlook on Refined Loss Modelling

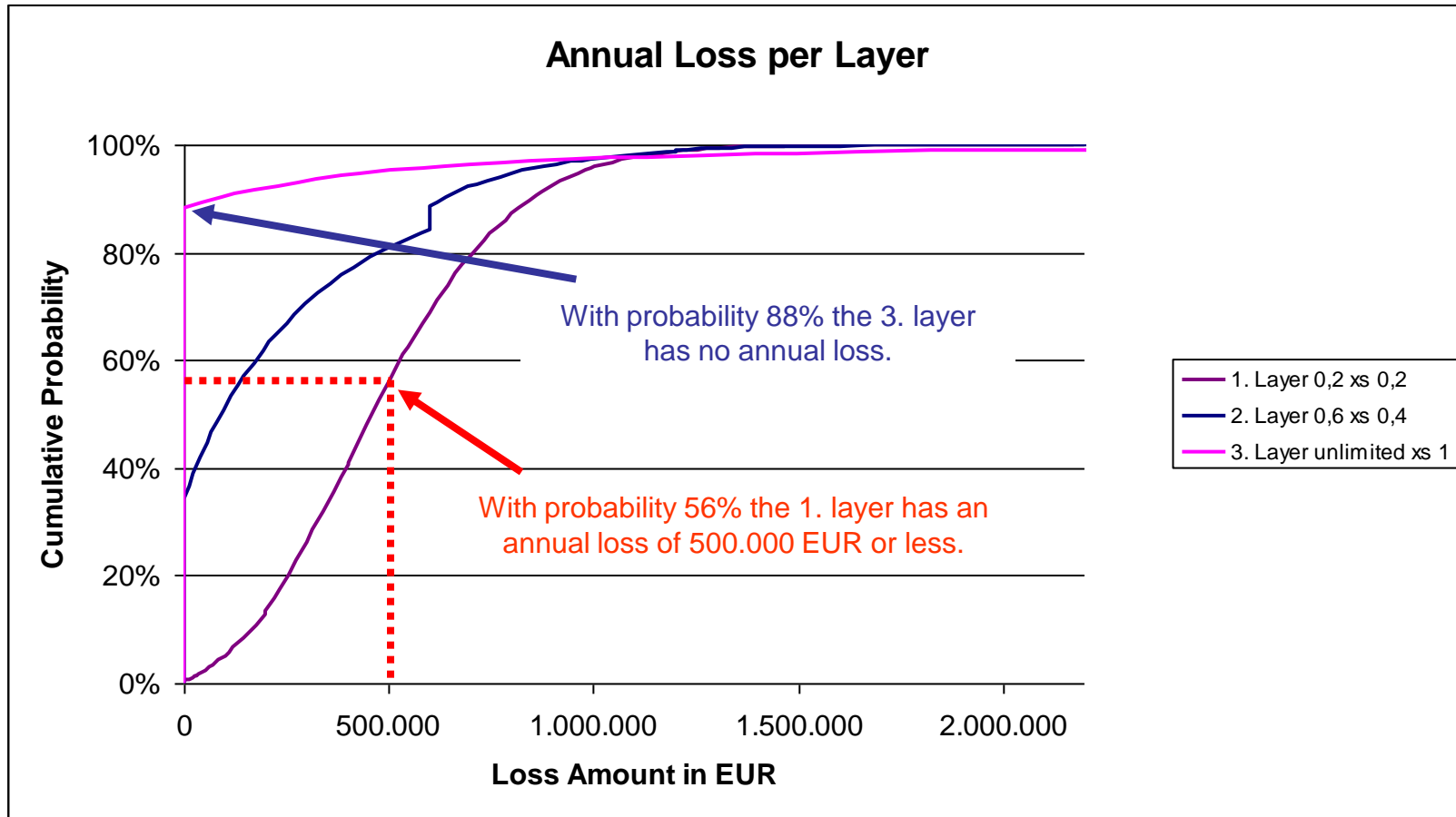
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Discussion

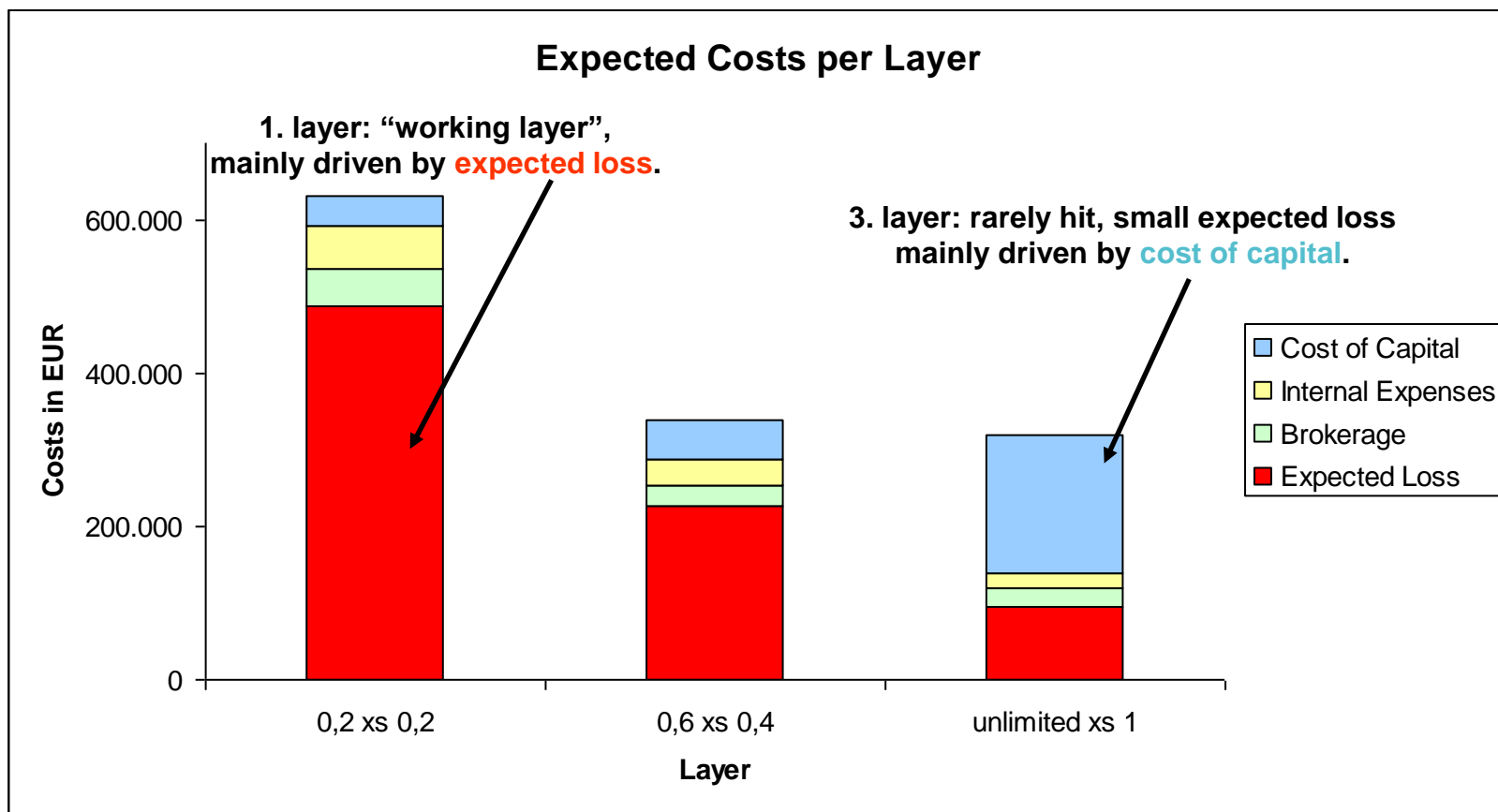
# Calculation of the Price for XL Reinsurance



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# Calculation of the Price for XL Reinsurance





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# Outlook on Refined Loss Modelling

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- **Loss Inflation:** How much would a historic loss cost today?  
→ Possible approach: loss amounts are inflated like the wages or medical costs in the country of occurrence.
- **Loss development:** Consider that the ultimate loss amount for an accident is unknown for a long time. Split of loss into paid and reserved. Discount of later payments, capital allocation for period of uncertainty.
- Application of **market models:** in particular if the cedent's data is sparse, not suitable for modelling; application to non-working layers.

# Outlook on Refined Loss Modelling

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- Separate models for different type of risks: **segmentation** by type of vehicle, destination
  - however: one needs a lot of good data for that.
- Comparison of historic portfolios:
  - Inflation of premiums, e.g. by **Premium Index** (tariff changes).
  - Preferred exposure measure: **number of vehicles** or vehicle years.

# Outlook on Refined Loss Modelling

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- Consideration of **structural changes**:
  - changes in the cedent's portfolio, e.g. from passenger cars to trucks, merger with another company, change in underwriting policy.
  - changes in law: higher limits, change in jurisdiction  
→ estimation of quantitative effect is difficult.

Facit: Refined Loss Modelling leads to a better estimation of the fair price for Reinsurance.

**The better the data** (level of information, number of reported years,...) **the better the model.**

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Hvala na pažnji!

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Thank you for your  
attention!

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