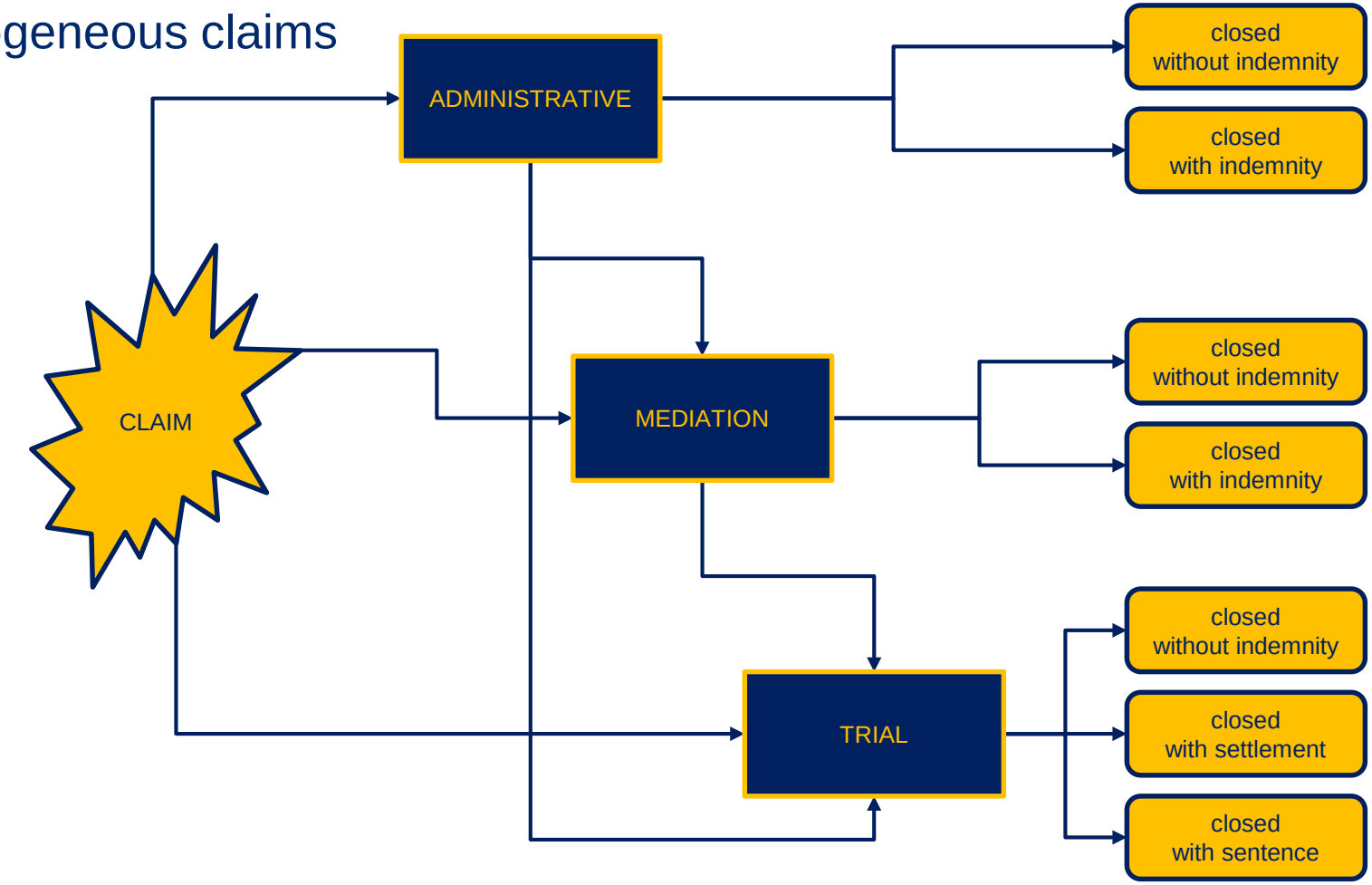
Measuring Claims Inflation: an Argentinean Case Study

Frank Cuypers

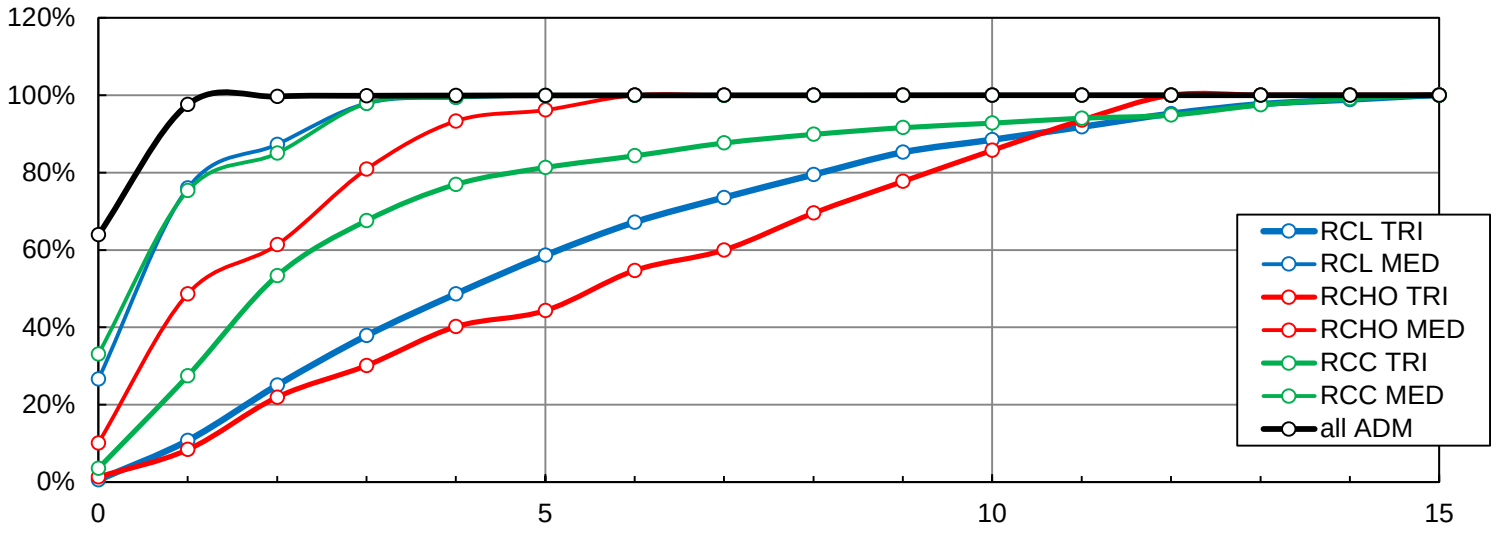
Motor Liability in Argentina

- Homogeneous portfolio ≠ homogeneous claims
- Claims type segmentation
  - Material damage (RCC)
  - Bodily injury (RCL)
  - Death (RCHO)
- Claims legal segmentation
  - Administrative (ADM)
  - Mediation (MED)
  - Trial (TRI)

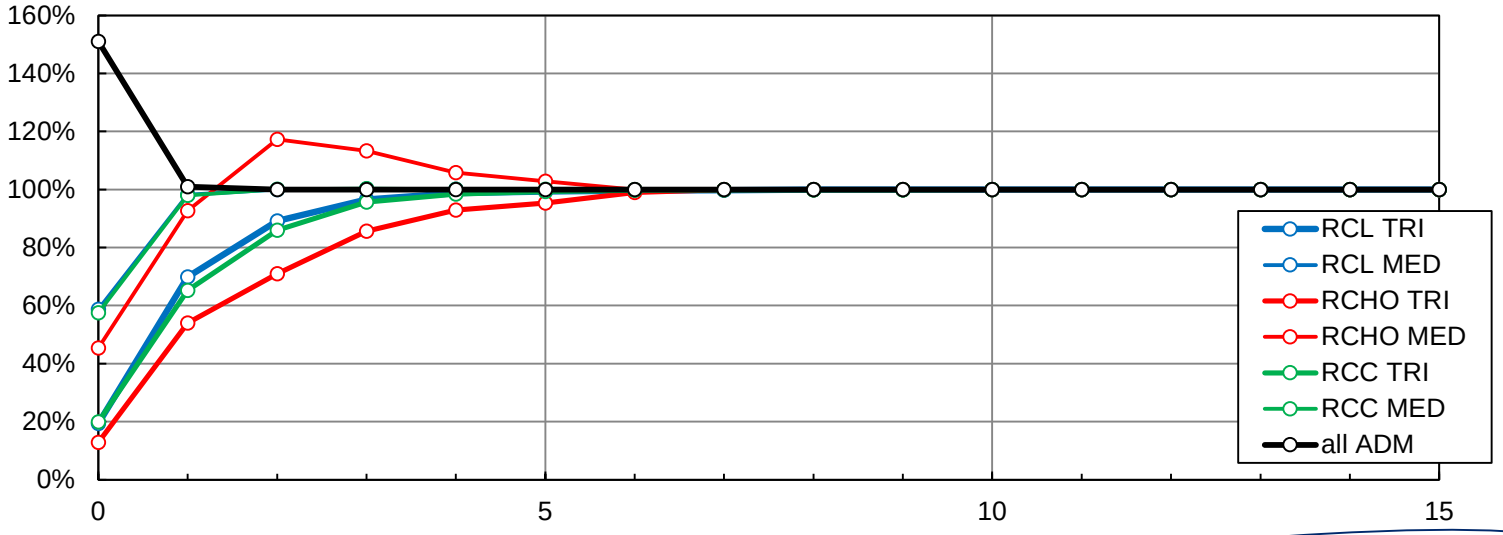


Claims Durations

- Long tail business

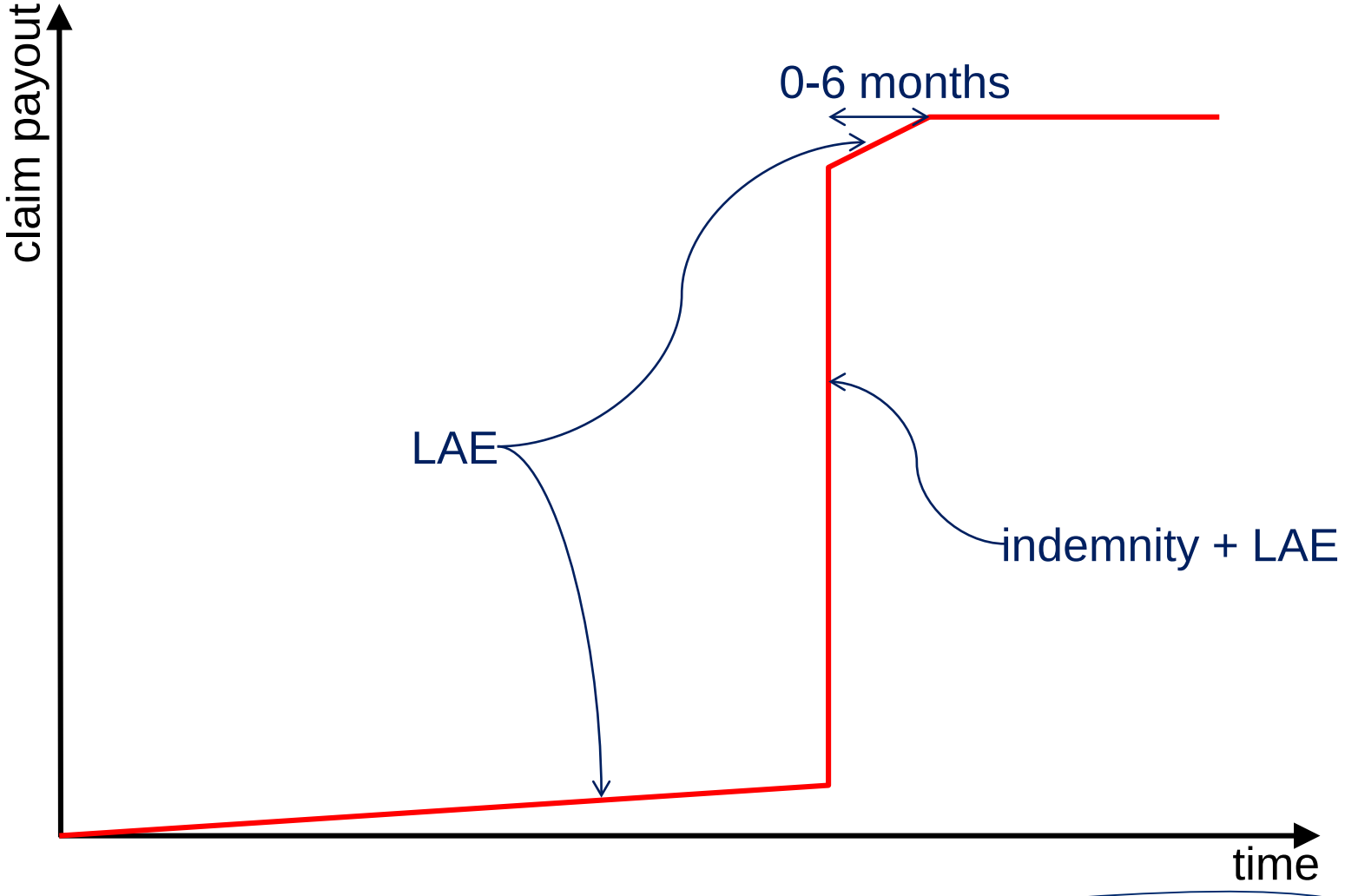


- Little IBNYR

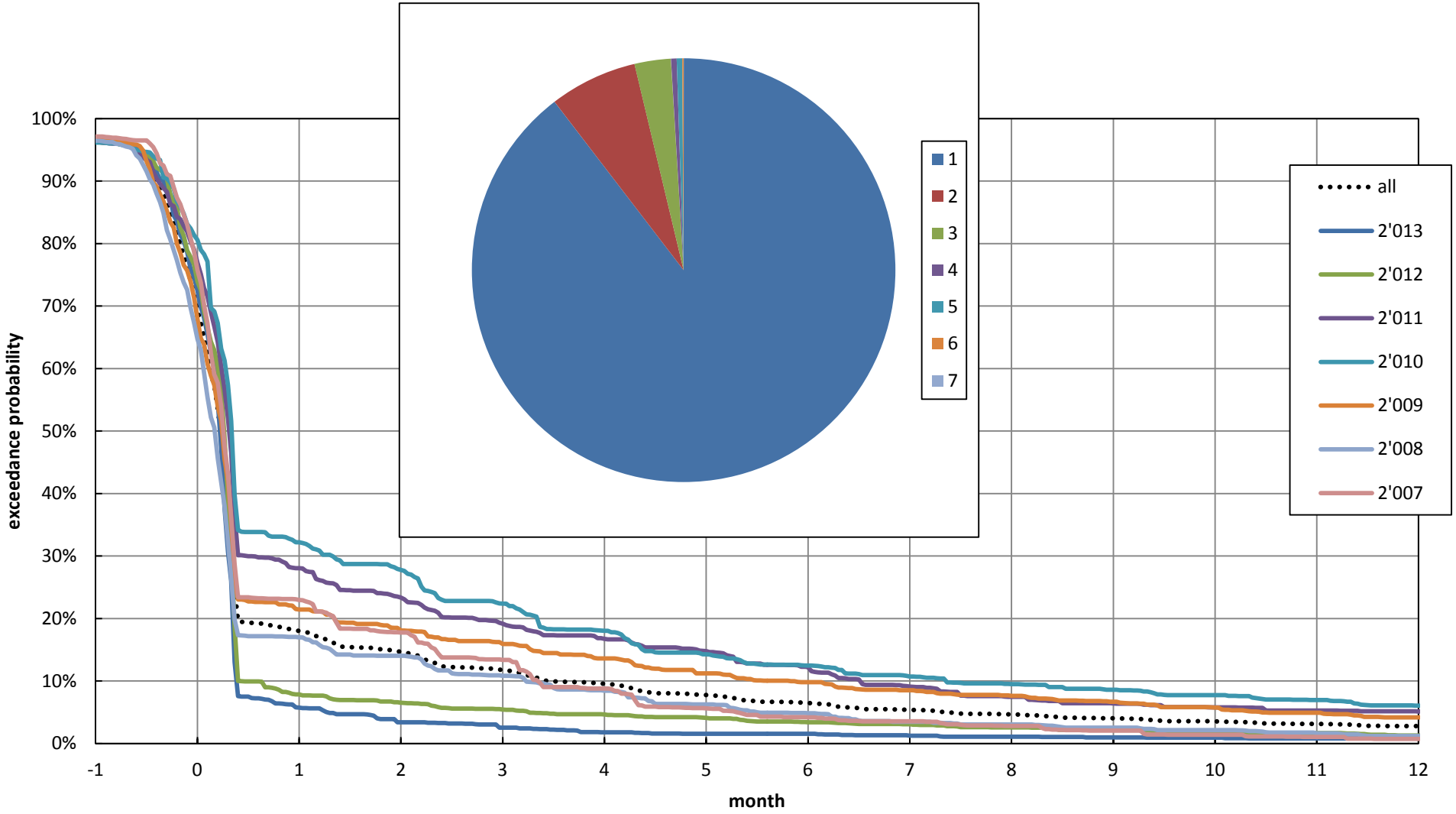


Claims Timing

- Payout mostly at settlement
  - Lump sum + expenses
  - No medical treatments
  - No annuities



Claims Timing

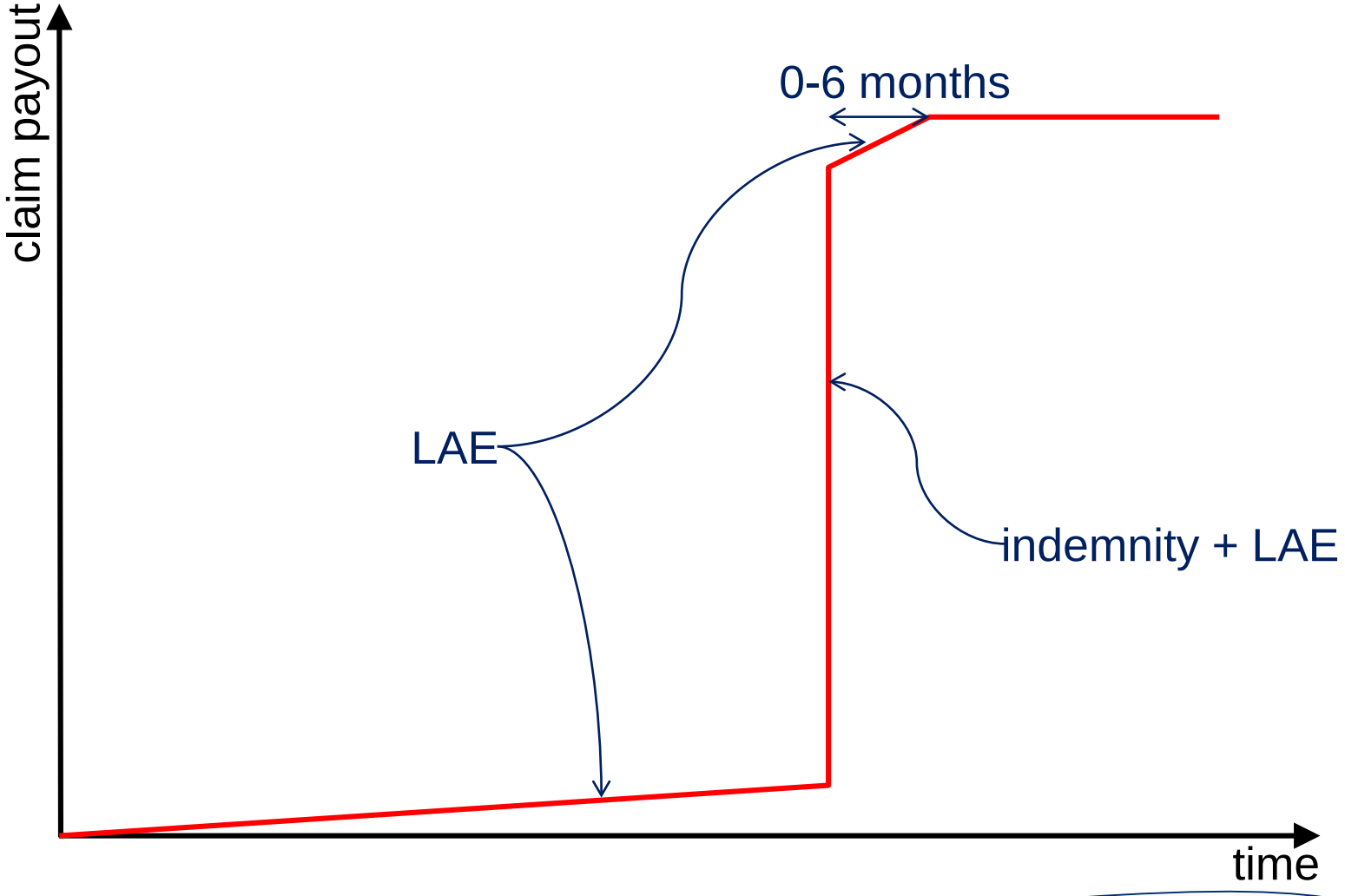


Claims Timing

- Payout mostly at settlement
  - Lump sum + expenses
  - No medical treatments
  - No annuities

- Define a claims „mortality“ table:

$q_x \rightarrow \Gamma_{s|n}$ = probability
to settle in year s
if still open in year $n \leq s$

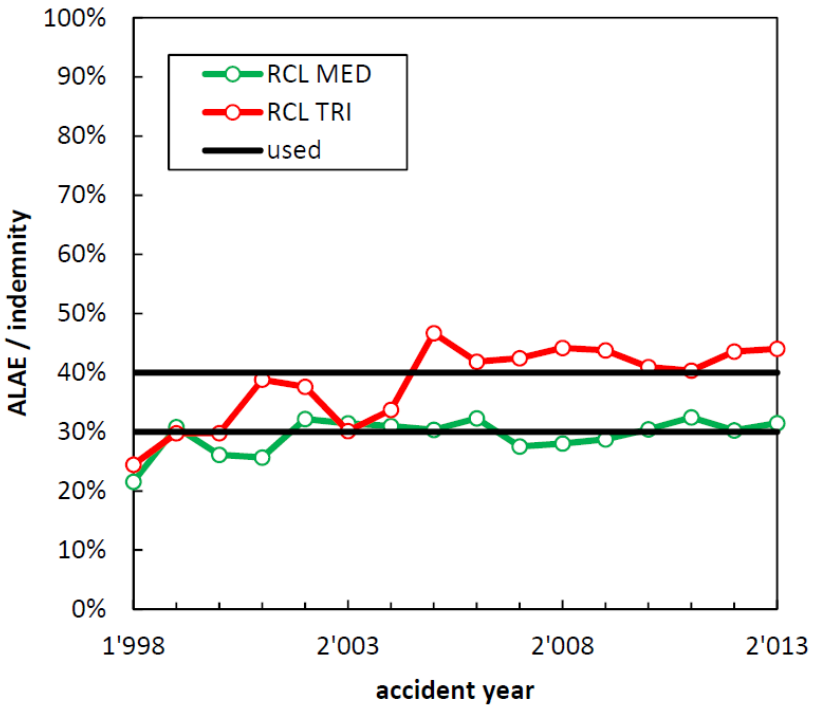


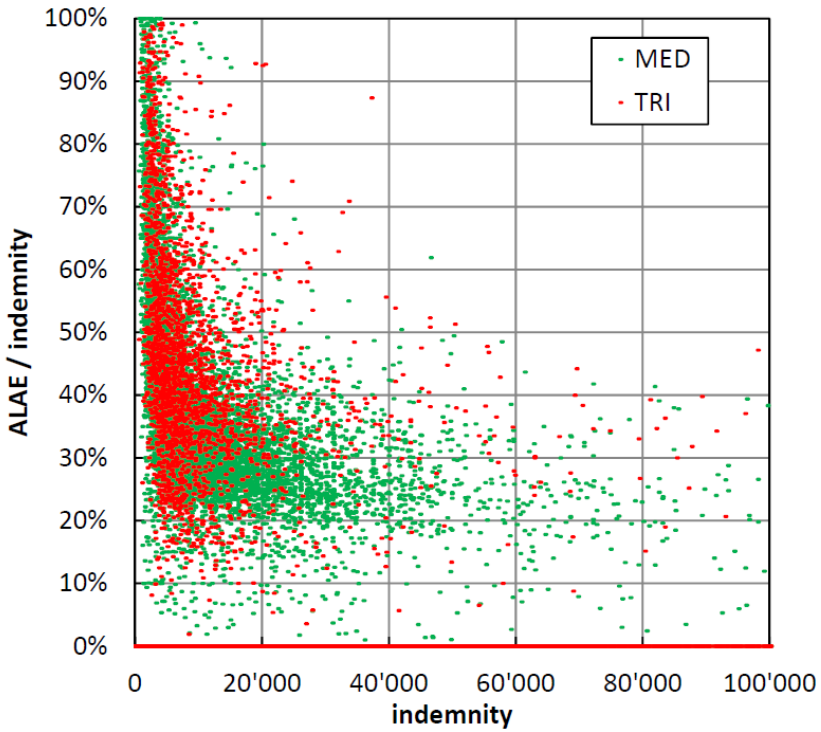
Claims Reserves

- Statutory reserves
  - Strict prescribed mechanic procedure

  ⇒ Useless

- ALAE
  - Individualy volatile
  - Stable on average

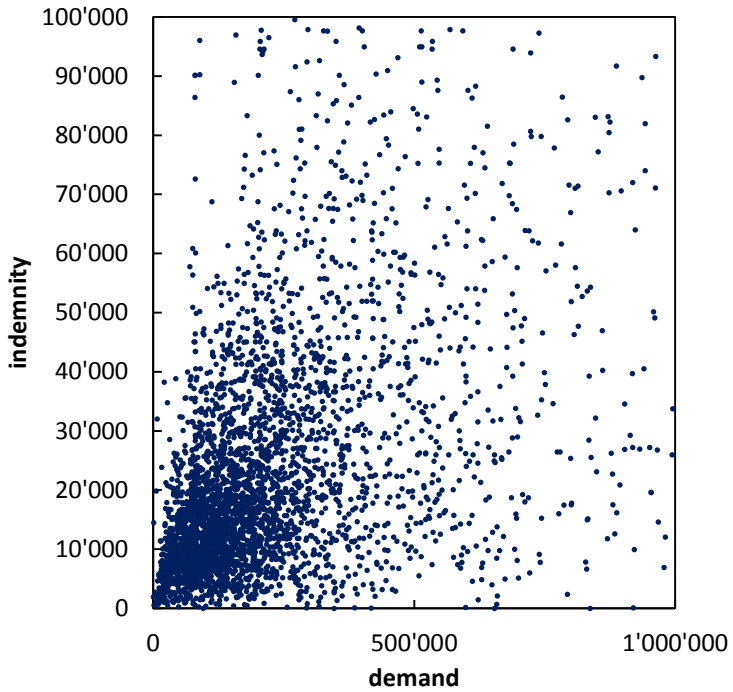


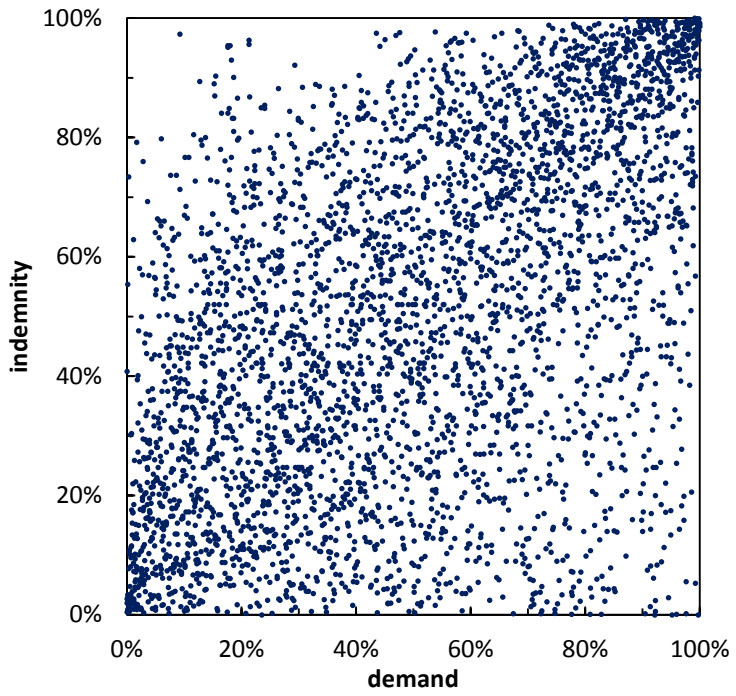


Claims Predictor: Plaintiff‘s Demand

- Nearly independent from indemnity

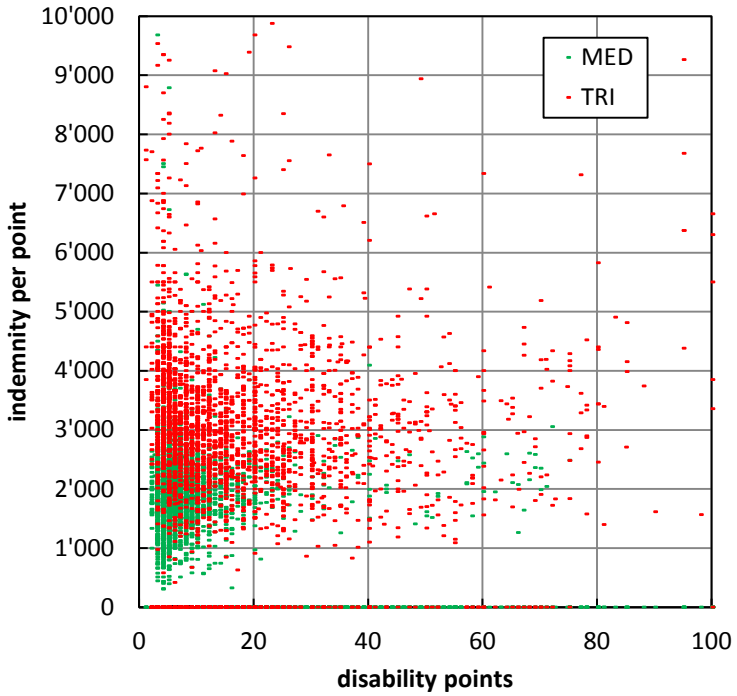
⇒ Useless

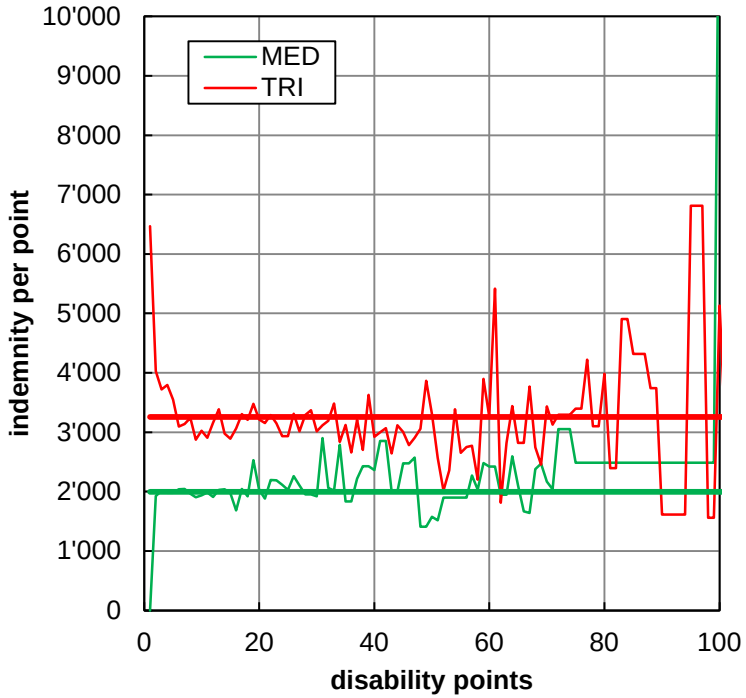




Claims Predictor: Disability Points

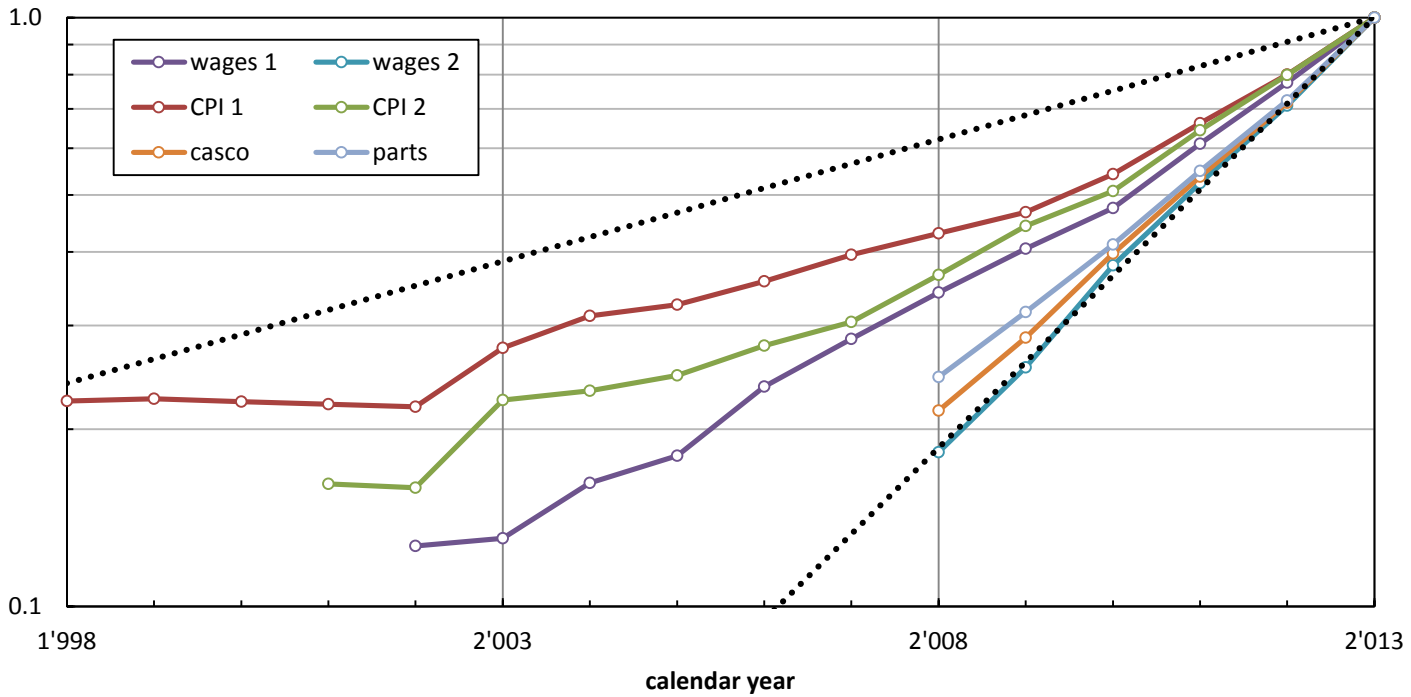
- Only for bodily injury (physical + psychological)
- Volatile
- Average nearly proportional to indemnity
- Awarded points increase with claim‘s duration
  - Forensic physicians fees proportionate to indemnity!





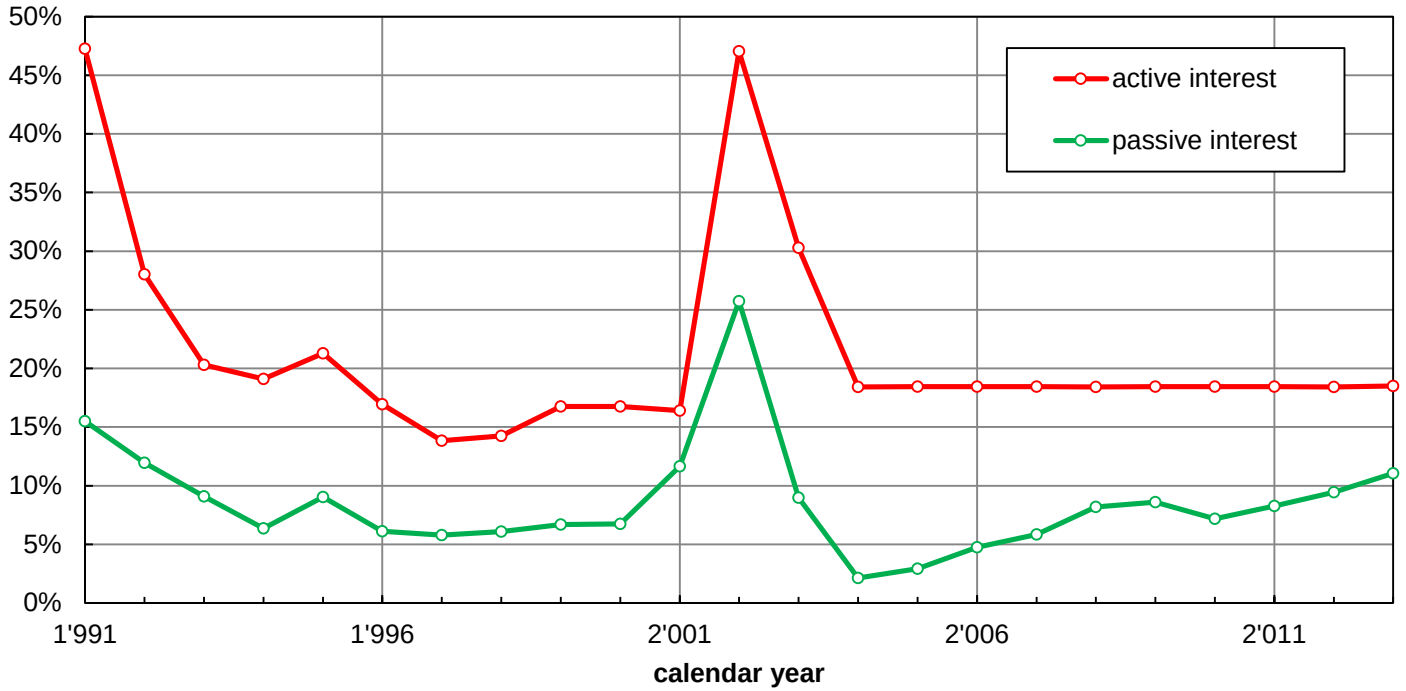
Claims Inflation

- Which inflation?
- Government statistics
  - Falsified
- Commercial statistics
  - Numerous
  - Inconsistent



Claims Interests

- Granted by courts
  - Passive = if plaintiff wealthy
  - Active = if plaintiff must borrow
- In-between interests exist
- Accounted for in settlements
  - But inconsistently
- Not compounded!



Claims Procrastination

- Complex claims take longer

- Procrastination increases indemnity
  - Lawyers fees
  - Forensic physicians
  - Award of psychological disability points
  - …

- Adds up *de facto* to the effect of claims interests:

The longer it takes a claim to settle,
the higher the indemnity

Claims Normalization

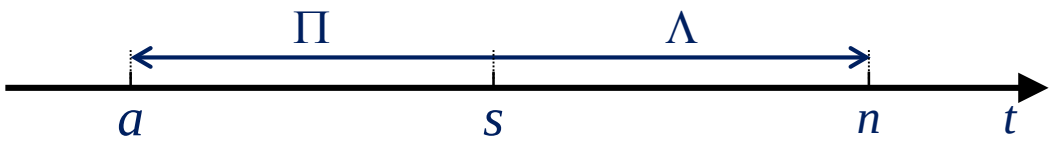
- Hypothesis:
  - Interest & procrastenation independent of settlement year
  - Inflation independent of duration

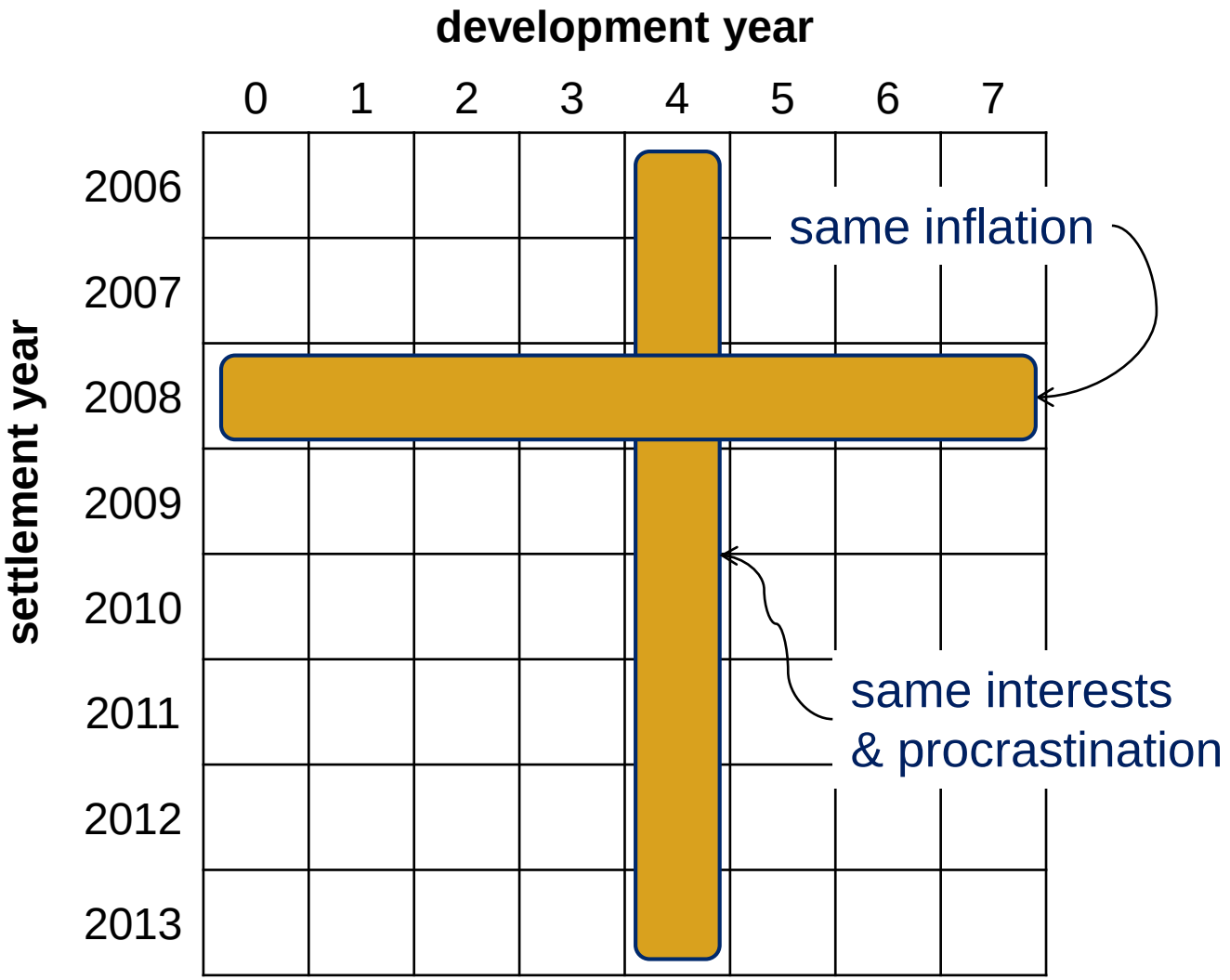
⇒ Normalize indemnities to compare claims:

$$X \rightarrow \tilde{X} = \Lambda_n^s \, \Pi_a^s \, X$$

inflation

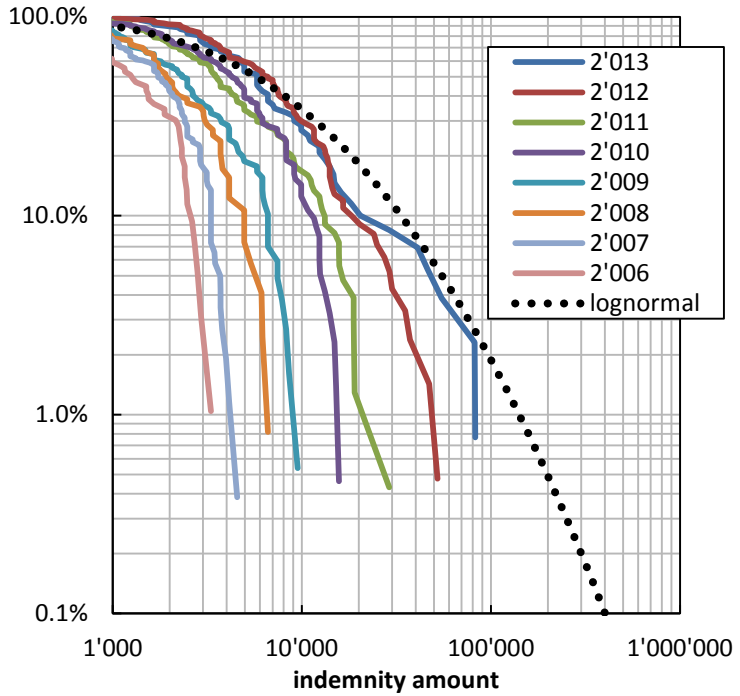
interests & procrastination





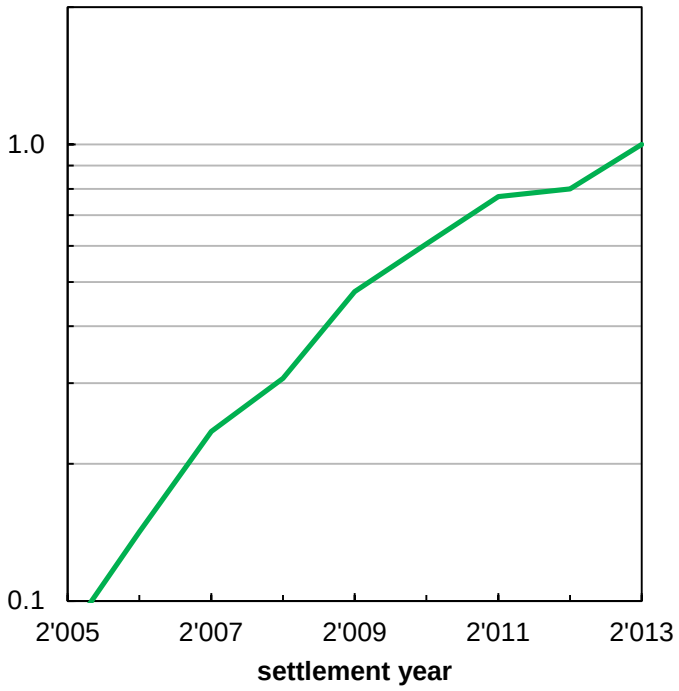
Inflation

SY 2 as-is

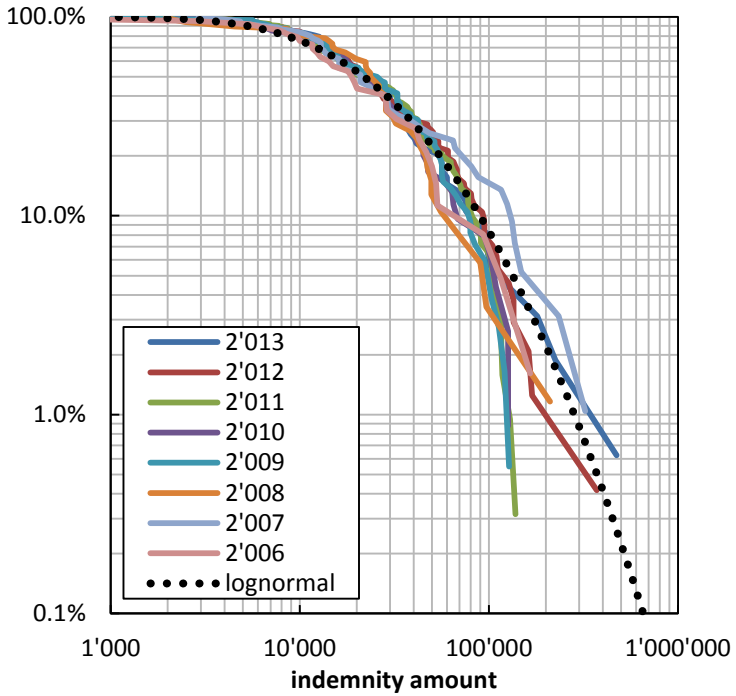


Normalize indemnities

- To current callendar year
- Kolmogorov-Smirnov fit



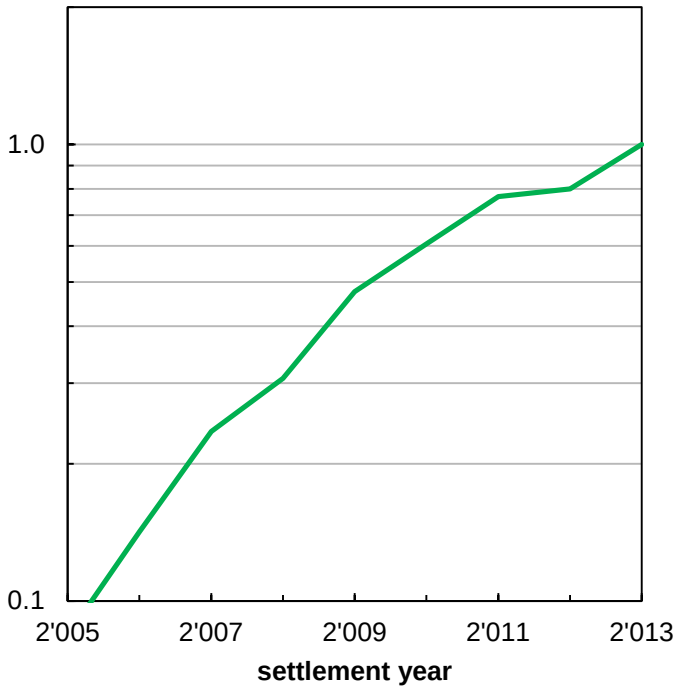
SY 2 as-if

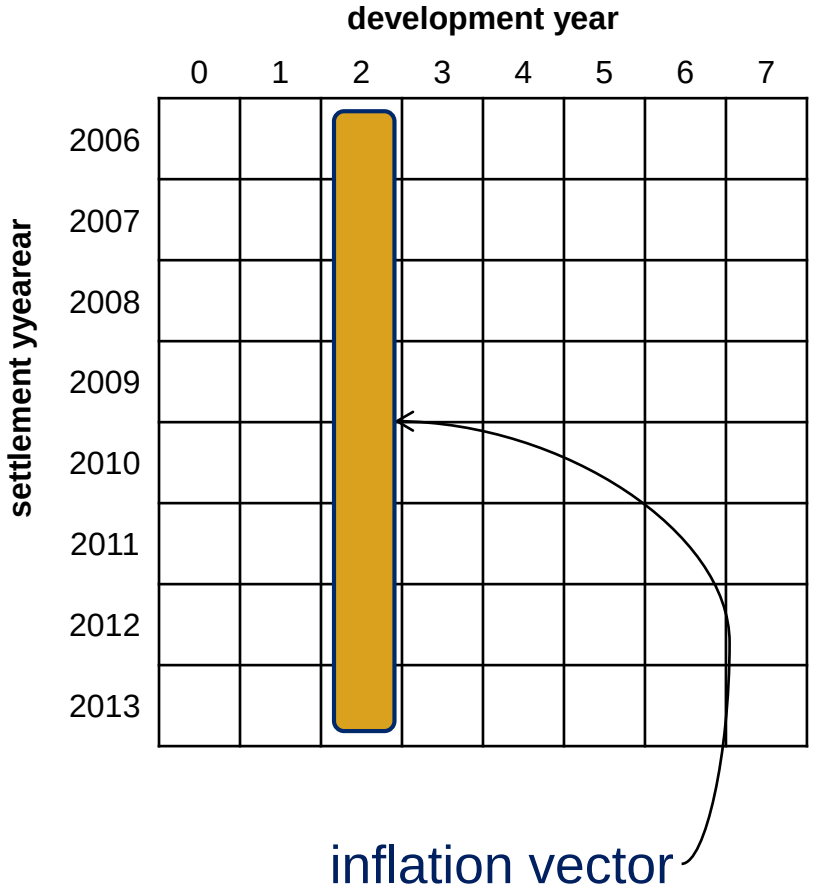


Indemnities survival probabilities

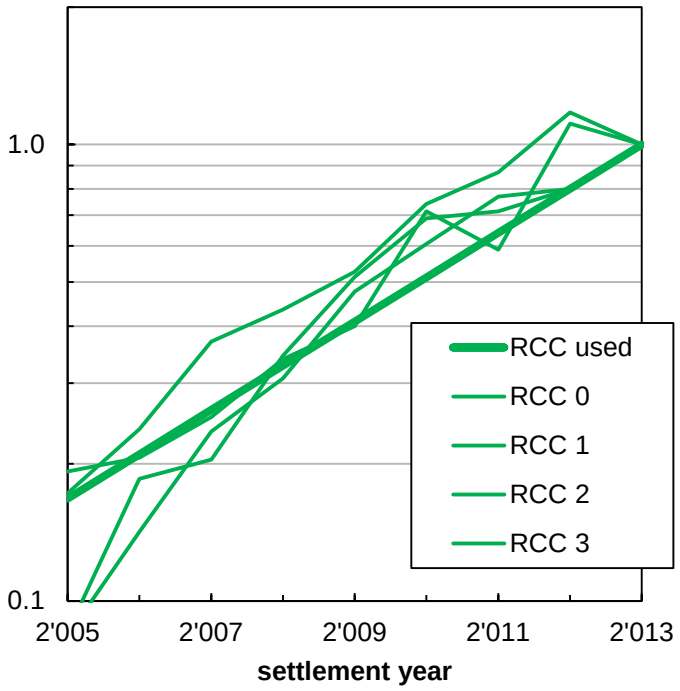
- Different scales according to accident year
- Similar lognormal shape

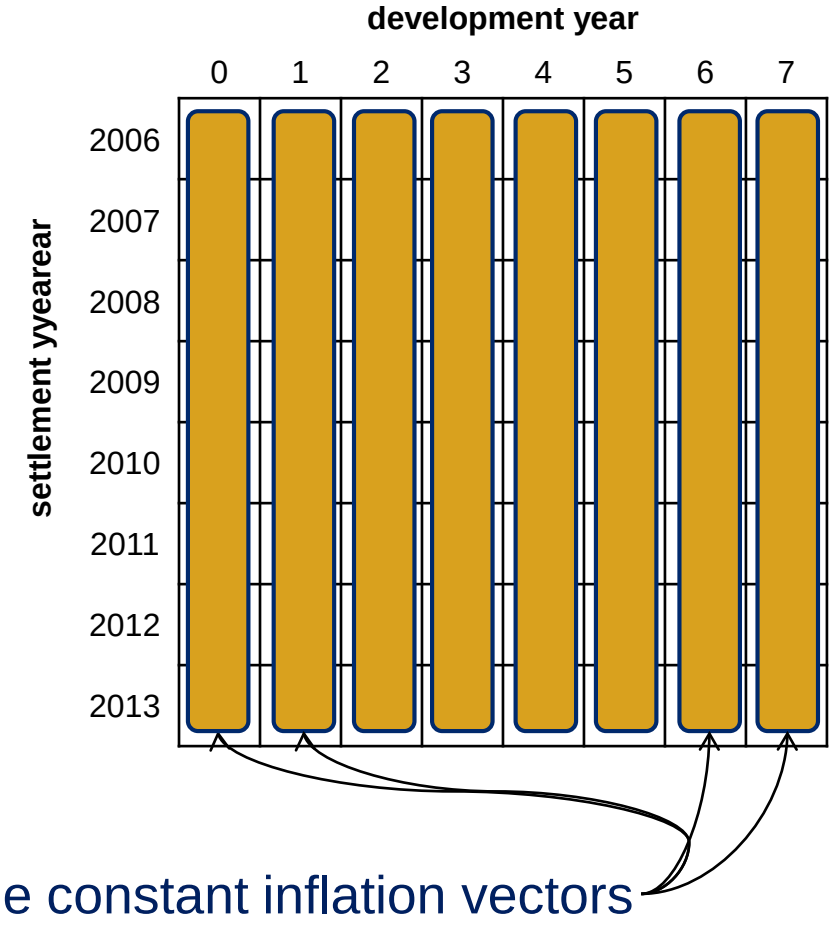
Inflation


1.0
0.1
2'005
2'007
2'009
2'011
2'013
settlement year


development year
0
1
2
3
4
5
6
7
settlement yyearear
2006
2007
2008
2009
2010
2011
2012
2013
inflation vector

Inflation





same constant inflation vectors

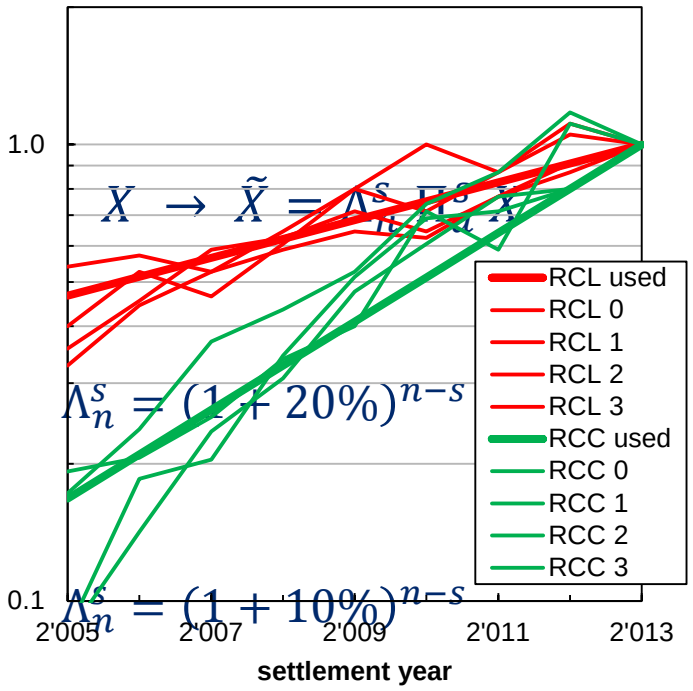
Inflation

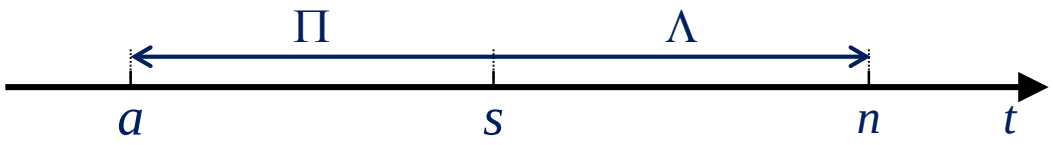
- 2 different claims inflations
  - RCC material damage & death
  - RCL bodily injury

- Claims normalization

  - RCC

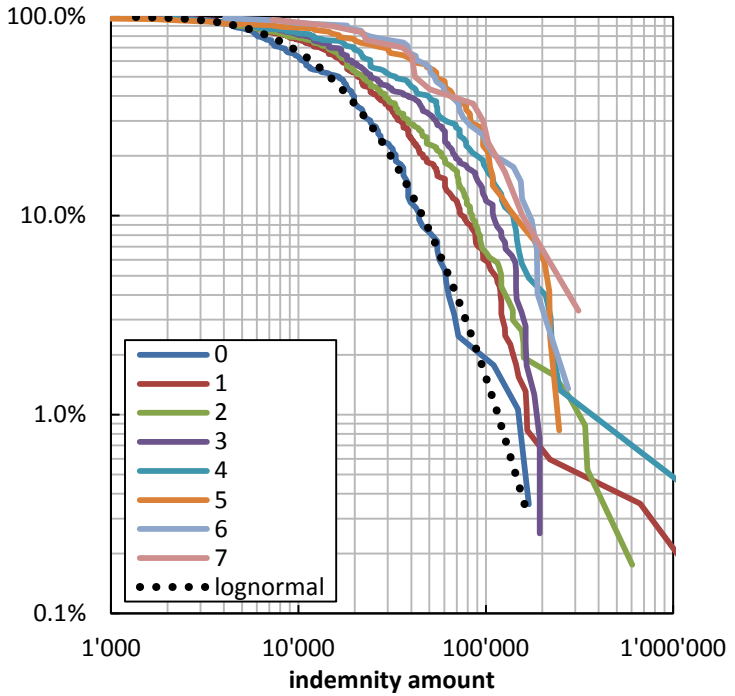
  - RCL





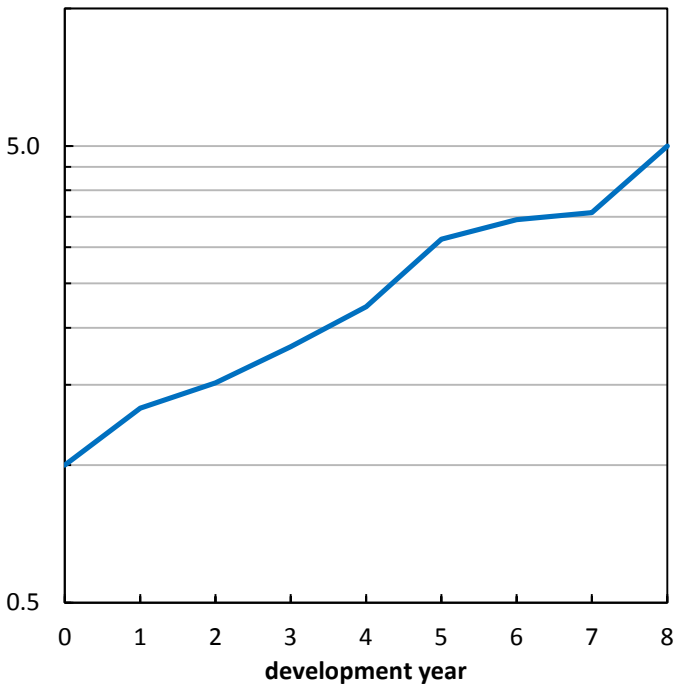
Interests & Procrastination

AY 2006 as-is

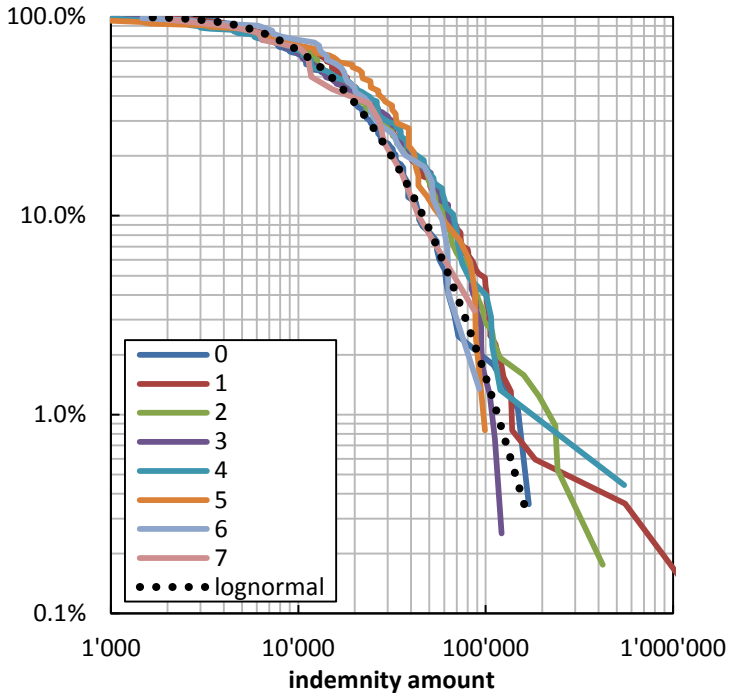


Normalize indemnities

- To settlement year 0
- Kolmogorov-Smirnov fit



AY 2006 as-if



Indemnities survival probabilities

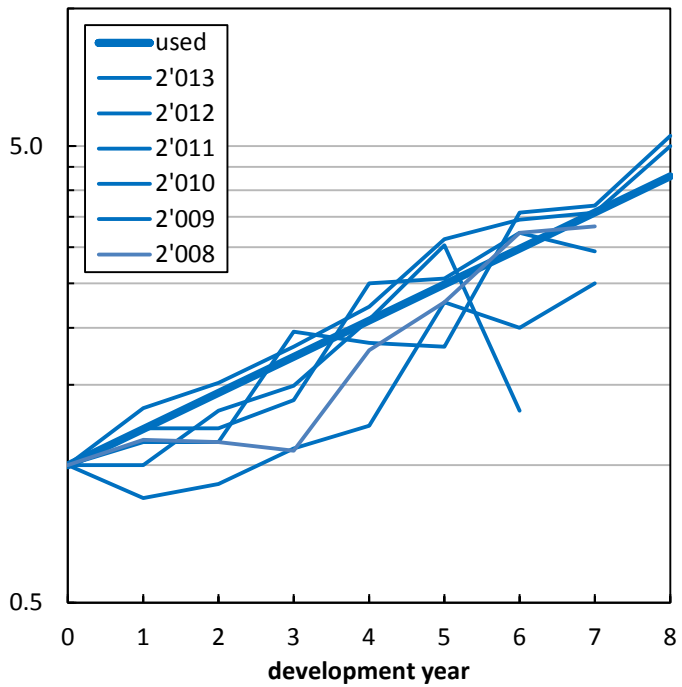
- Different scales according to settlement year
- Similar lognormal shape

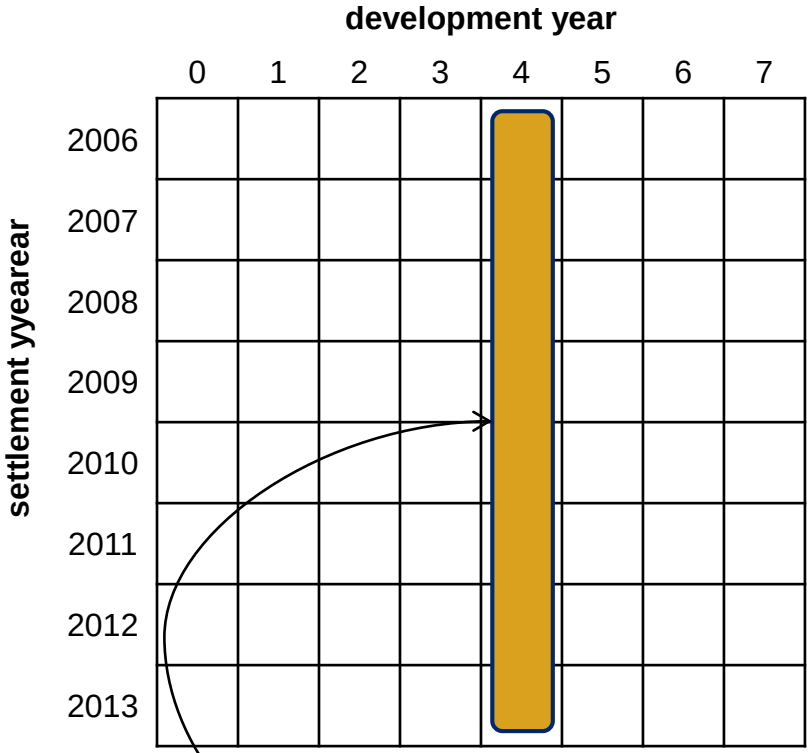
Interests & Procrastination

- Claims normalization

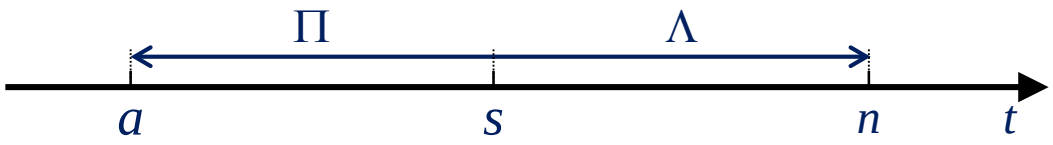
$$X \rightarrow \tilde{X} = \Lambda_n^s \, \Pi_a^s \, X$$

  - $\Pi_n^s = (1 + 20\%)^{a-s}$



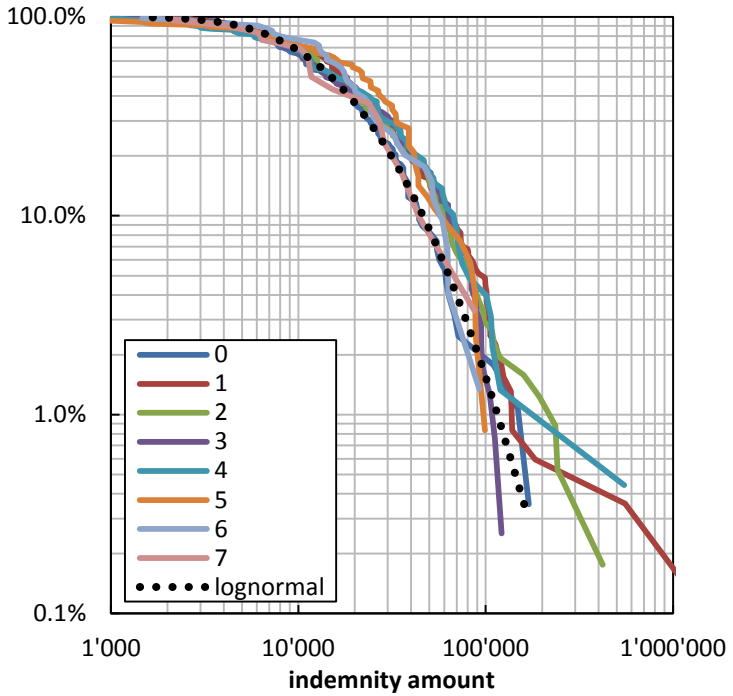


same interests
& procrastination



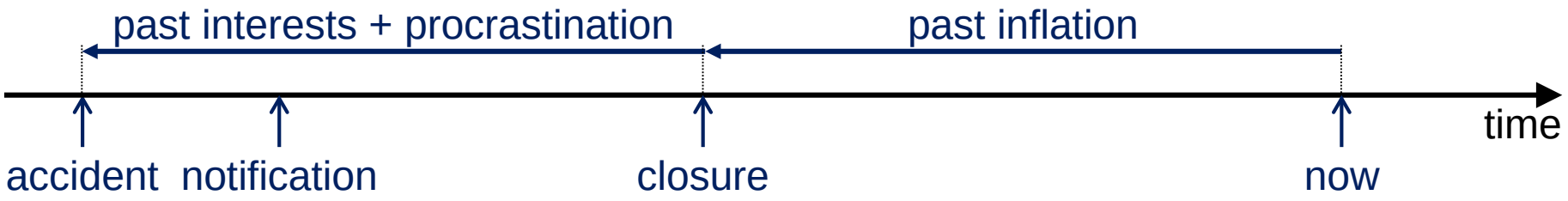
Large Claims

- Whatever AY, SY, DY
  - Good fit to lognormal
  - No need to separate attritional & large claims

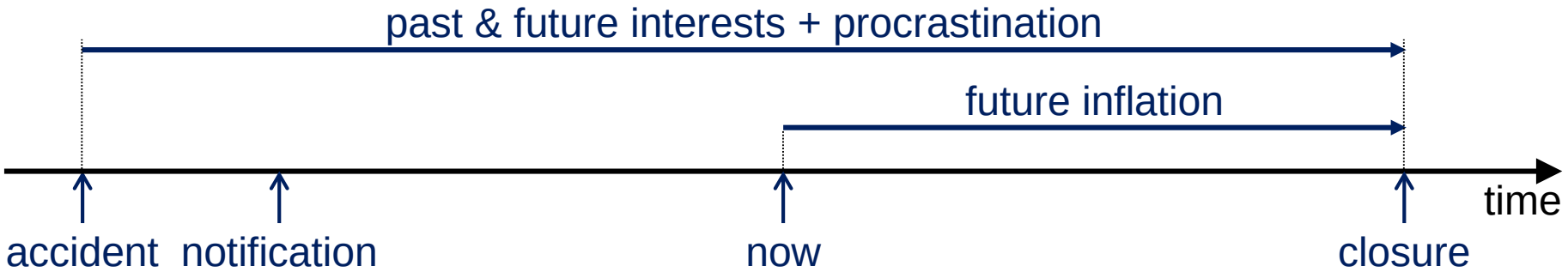


Reserves

as-is → as-if



current → ultimate



Models

Runoff **Exposure** **Decay** **Disability** **LD** **BF** **…**

Models

	Runoff	Exposure	Decay	Disability	LD	BF	...

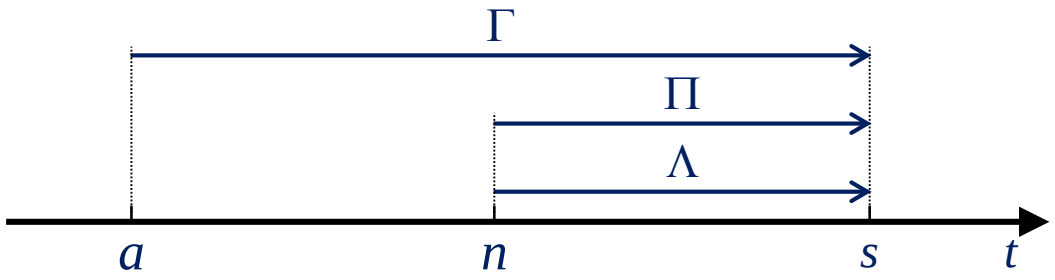
Models & Assumptions

	Runoff	Exposure	Decay	Disability	LD	BF	…
Policy limits		✓	✓	✓	✓	✓	
ALAE		✓	✓	✓			
Payout timing	✓	✓	✓	✓			
Procrastination	✓	✓	✓	✓			
Disability points				✓			
Case reserves	✓				✓	✓	
…							

Model: Runoff

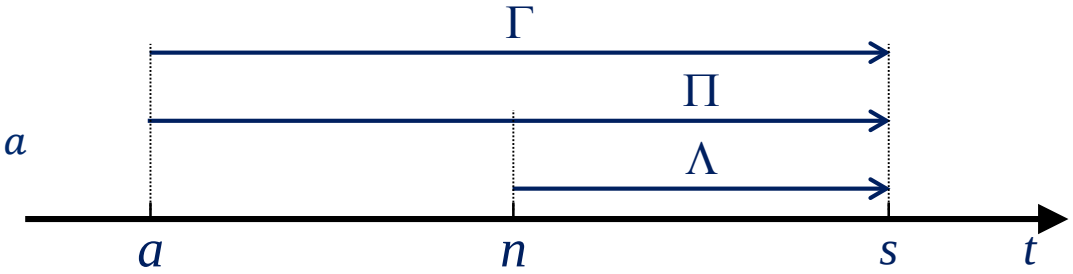
- Runoff

$$R^a = (CR^a + IBNYR^a) \sum_{s \geq n} \Lambda_s^n \, \Pi_s^n \, \Gamma_{s-a|n-a}$$



- Exposure

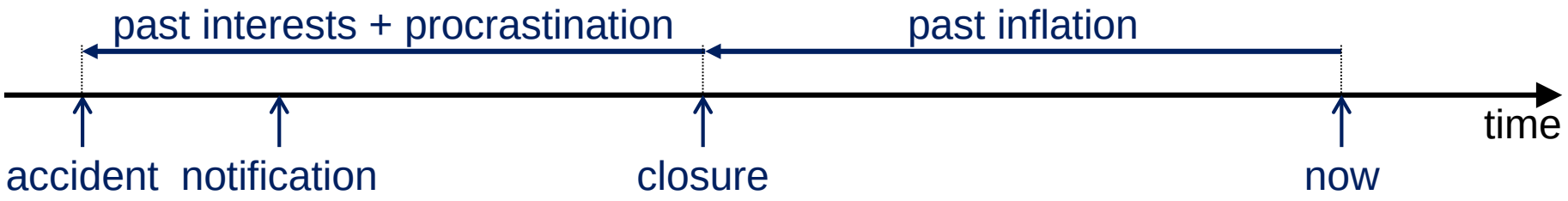
$$R^a = (1 + ALAE)\left(E^a \tilde{X} - P^a\right) \sum_{s \geq n} \Lambda_s^n \, \Pi_s^a \, \Gamma_{s-a|n-a}$$



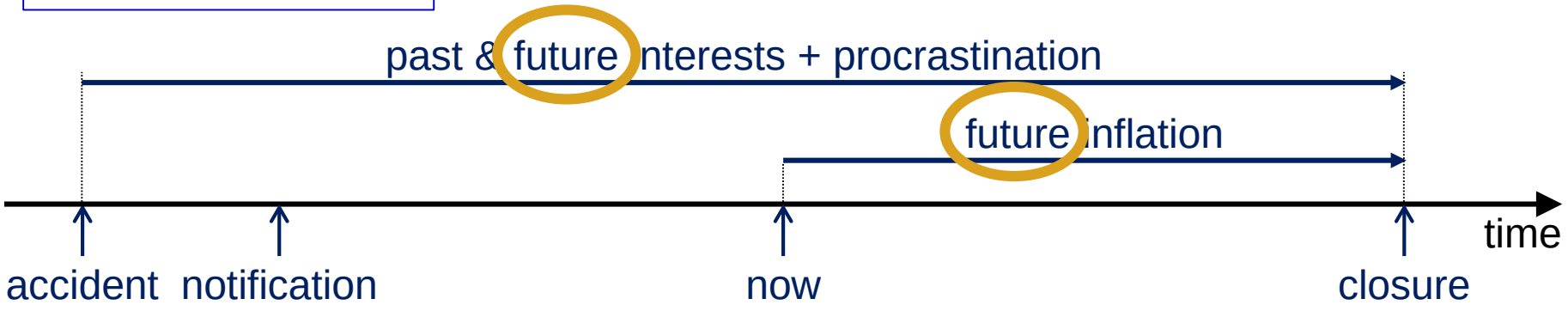
- …

Reserves

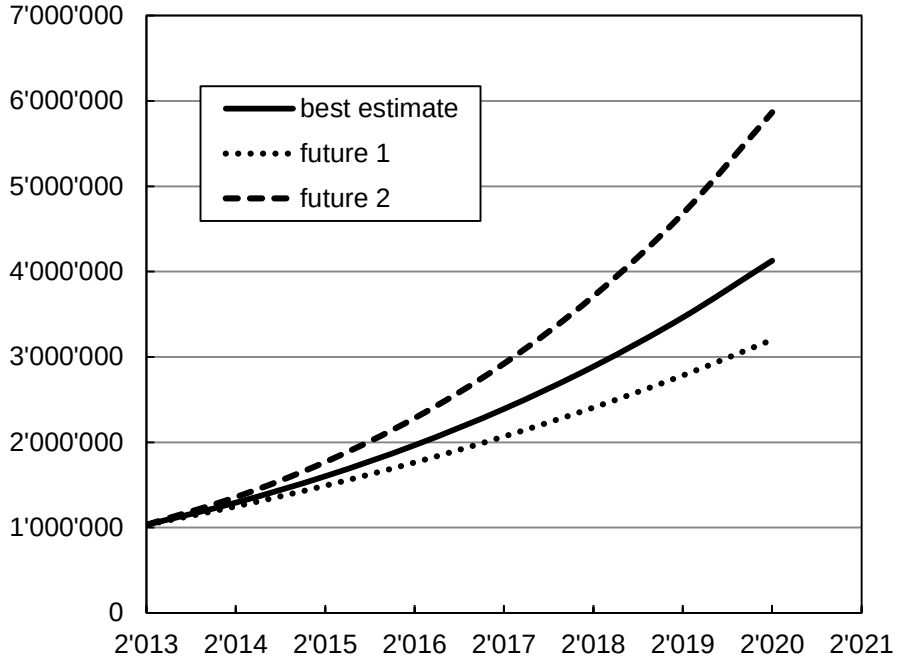
as-is → as-if



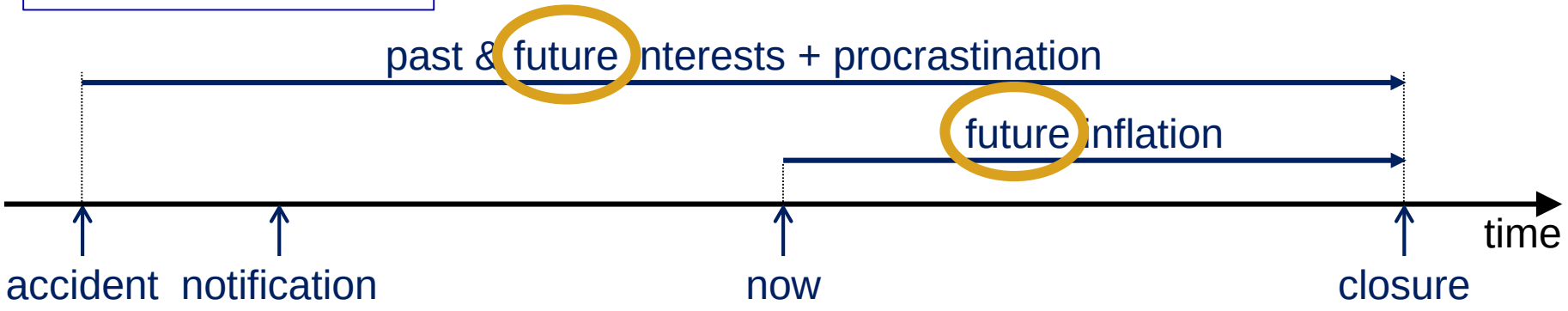
current → ultimate



Reserves



current → ultimate



Forecast the Future

Conclusions

- Argentina is complex
- ESG are important
- AvE are important
- Actuarial techniques are not science, they are engineering

… et Carthago delenda est!

Reserving

Different models depending on

- data availability / quality
- line of business / market
- processes / products
- …
- actuarial judgment

→ 1st moment of a distribution

💣 standard reserving model

Solvency II

Different models depending on

- data availability / quality
- line of business / market
- processes / products
- …
- actuarial judgment

→ nth moment of a distribution

☠ standard solvency formula

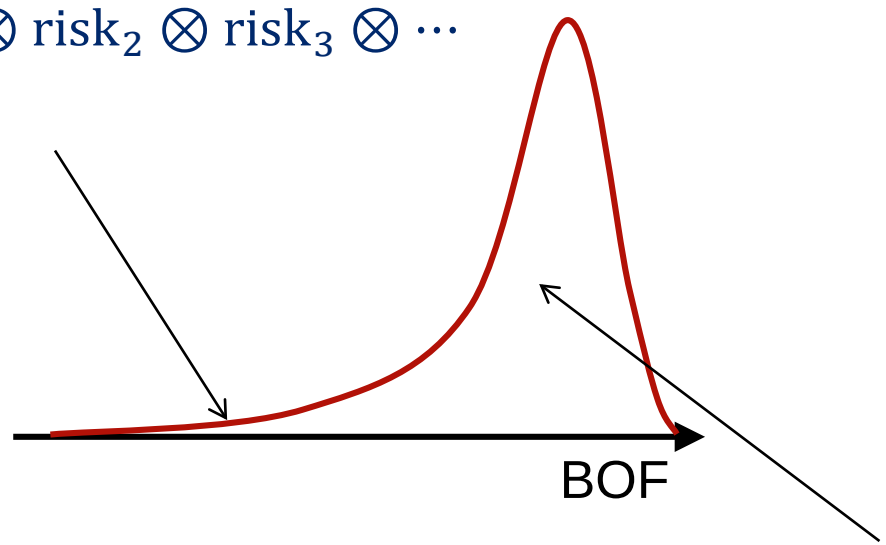
… et Carthago delenda est!

Internal models

- Numerical aggregation of realistic distributions

$$SCR \leftarrow \mathrm{risk}_1 \otimes \mathrm{risk}_2 \otimes \mathrm{risk}_3 \otimes \cdots$$

- Probe the true tail



Standard Solvency II formula

- Analytic linear approximation

$$SCR \leftarrow \sigma^2 = \sum \rho_{ij}\sigma_i\sigma_j$$

- Probe the tail with 2nd moments

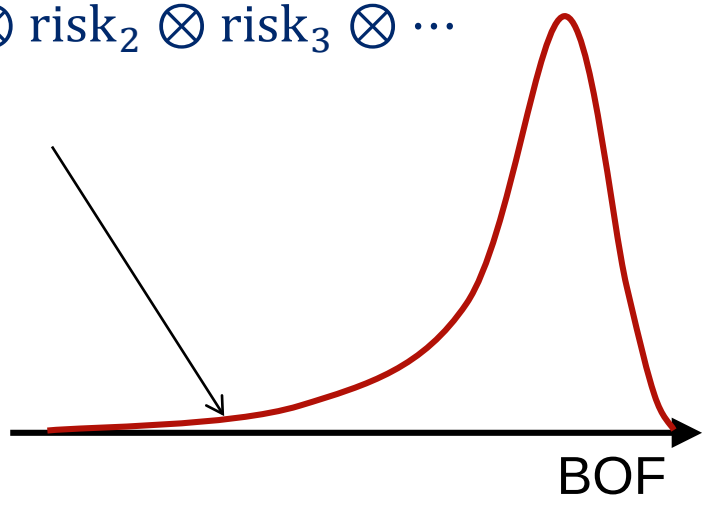
… et Carthago delenda est!

Internal model

- Numerical aggregation of realistic distributions

$$SCR \leftarrow \mathrm{risk}_1 \otimes \mathrm{risk}_2 \otimes \mathrm{risk}_3 \otimes \cdots$$

- Probe the true tail



Cut along dotted line

Lecturer’s Coordinates

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