

1st SOUTH ASIAN ACTUARIAL CONFERENCE

12 – 13 JULY 2017

COLOMBO, SRI LANKA

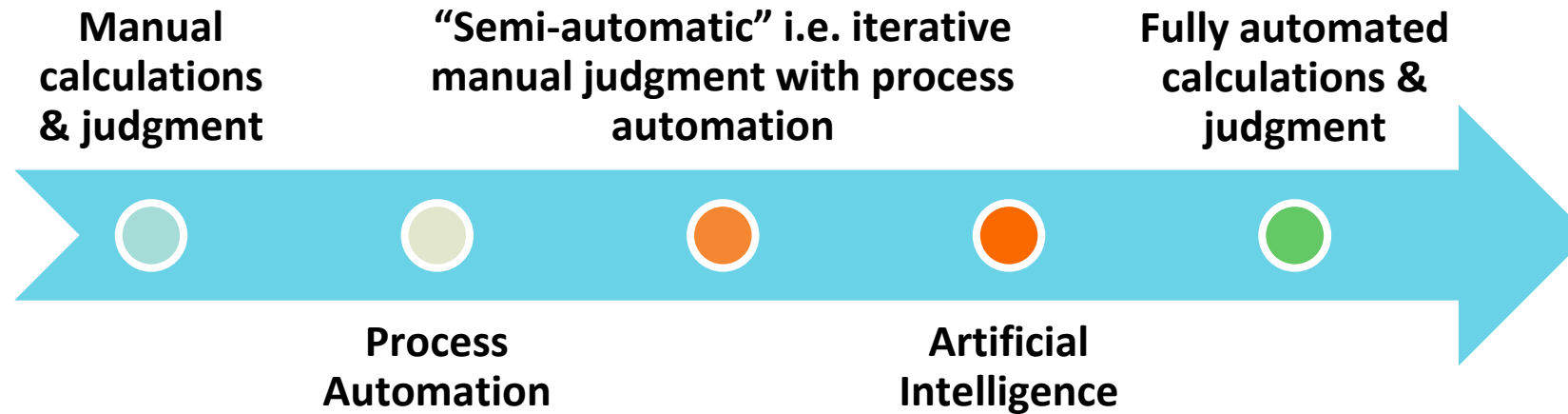
IBNR Robot

NICHOLAS YEO, FIA FASM FSA FSAS

SHU YI LIM

13 July 2017

Evolution of Actuarial Work



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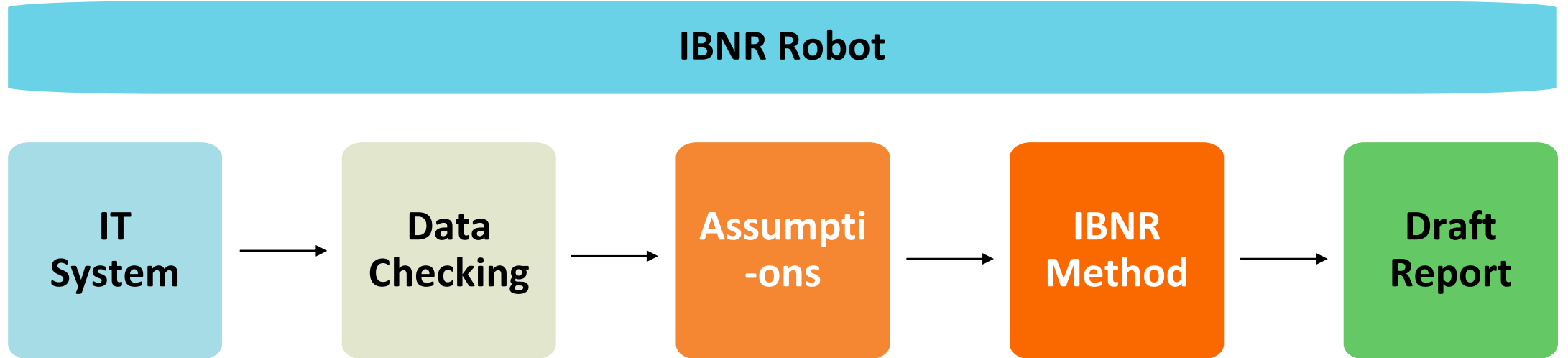
Objective of IBNR Robot

The starting point of an actuarial reporting exercise shall be the download of a draft actuarial report from the IT system, not a download of raw policy and claims data.

The actuarial team shall work to analyse this draft report, apply critical judgment and deliver useful recommendations to the business. The actuarial team shall not be involved in producing the draft report.

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IBNR Robot workflow



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Main Applications of Artificial Intelligence in Actuarial Work

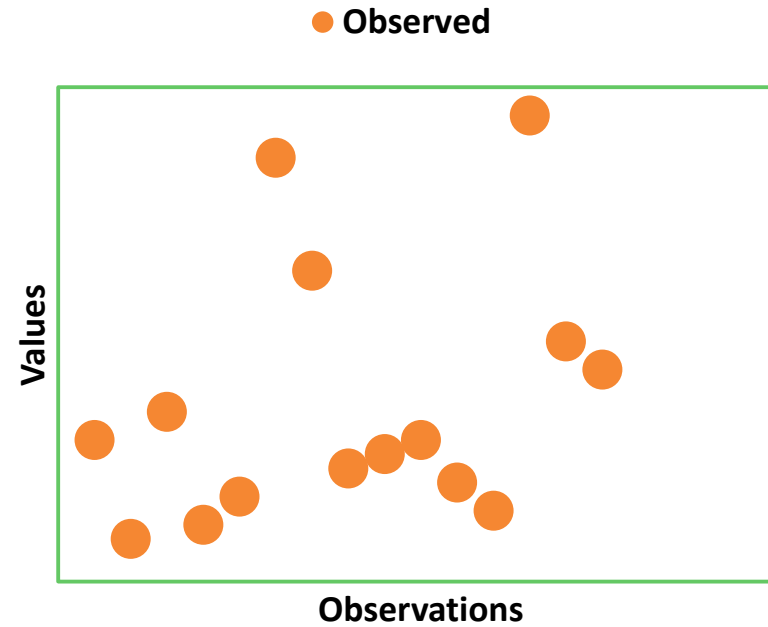
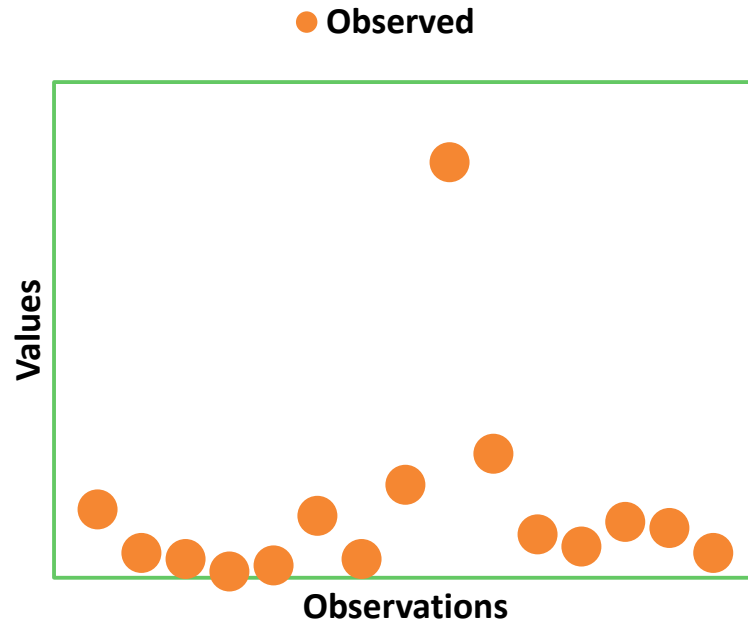
**Deal with
unusual data
values**

**Select
parameters for
actuarial models**

**Select most
appropriate
actuarial method**

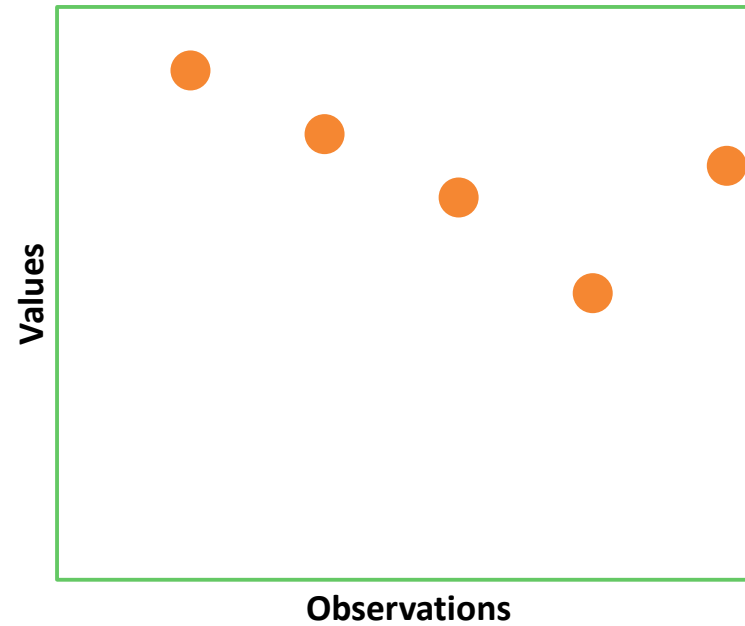
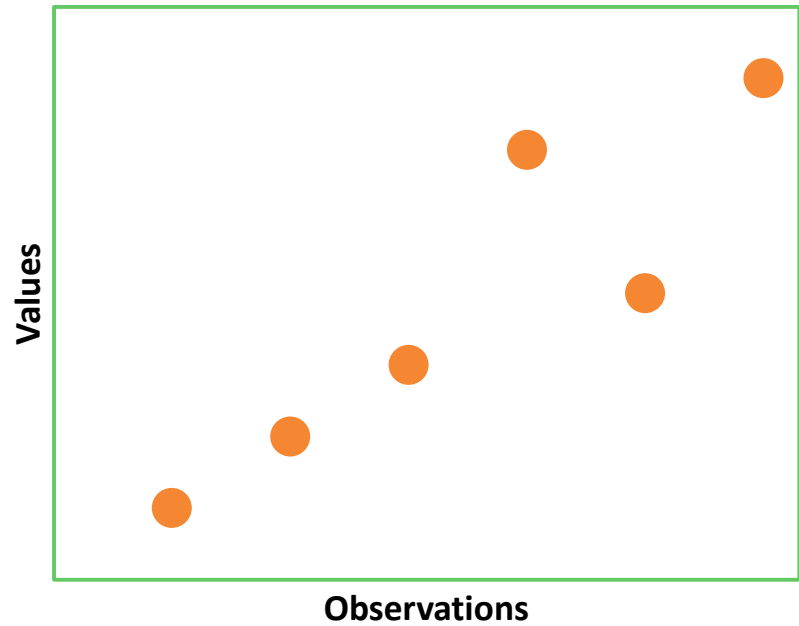
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Artificial Intelligence Unusual Value Treatment



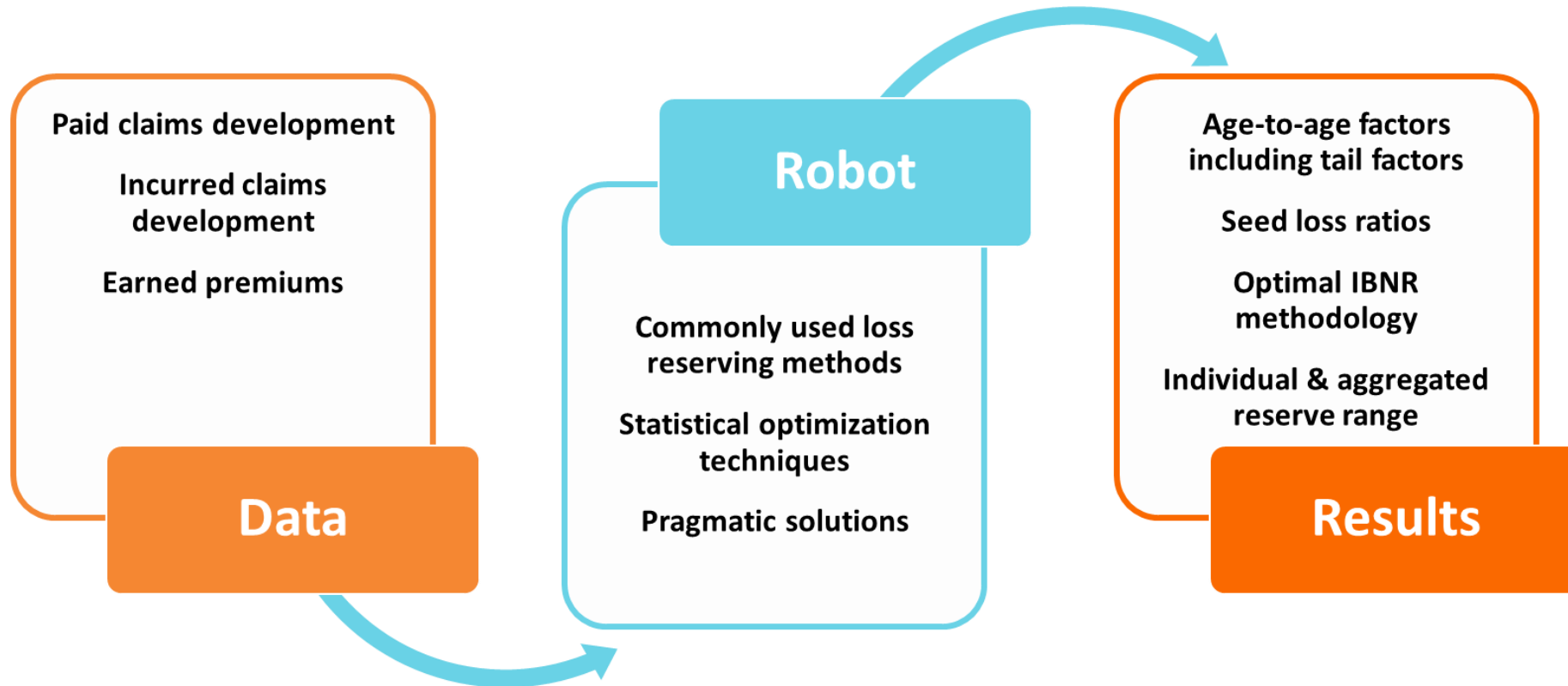
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Artificial Intelligence Pattern Identification



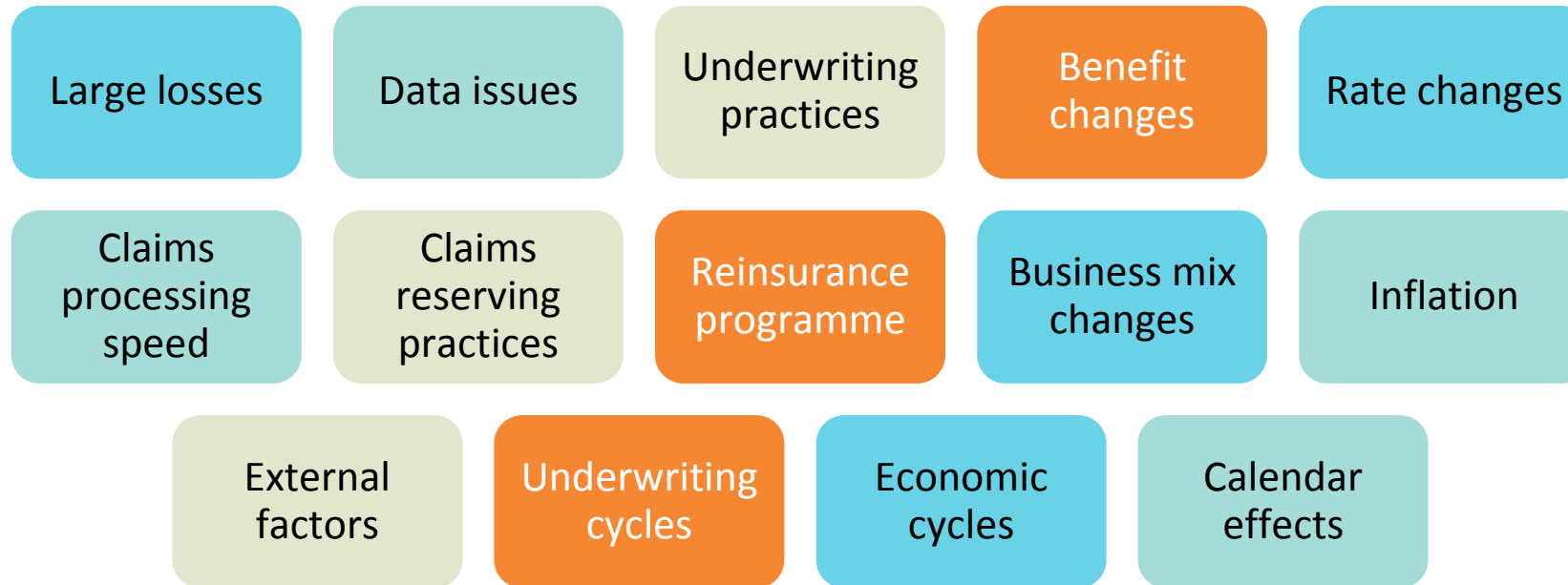
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IBNR Robot – How does it work?



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IBNR Robot – What can it do?



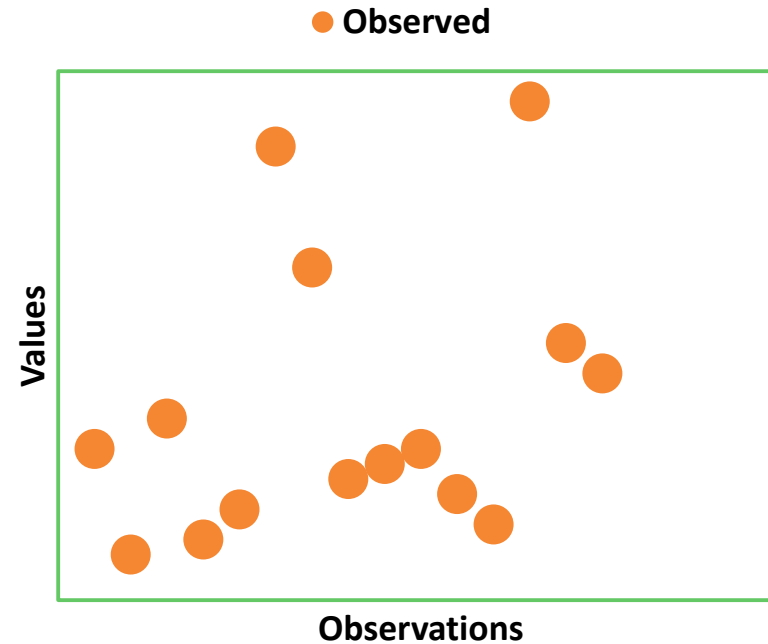
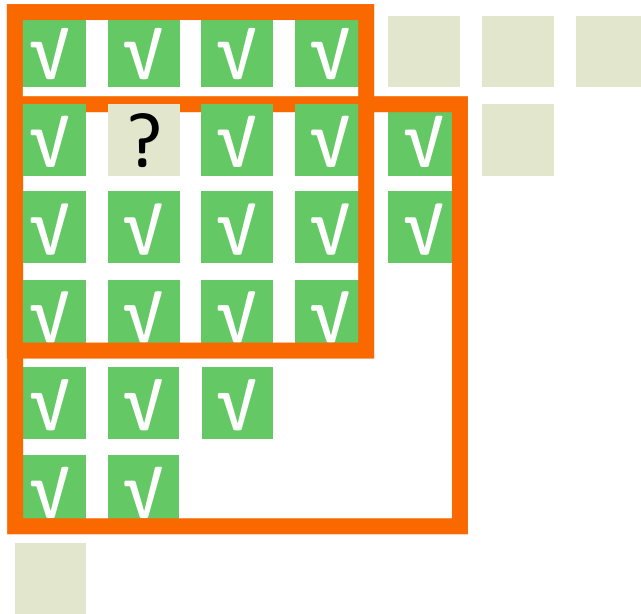
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A. Link Ratio Method

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1. Data Acceptance Replacement Test on Cumulative Claims Ratio

Objective: Reduce Distortions from Input Data Errors



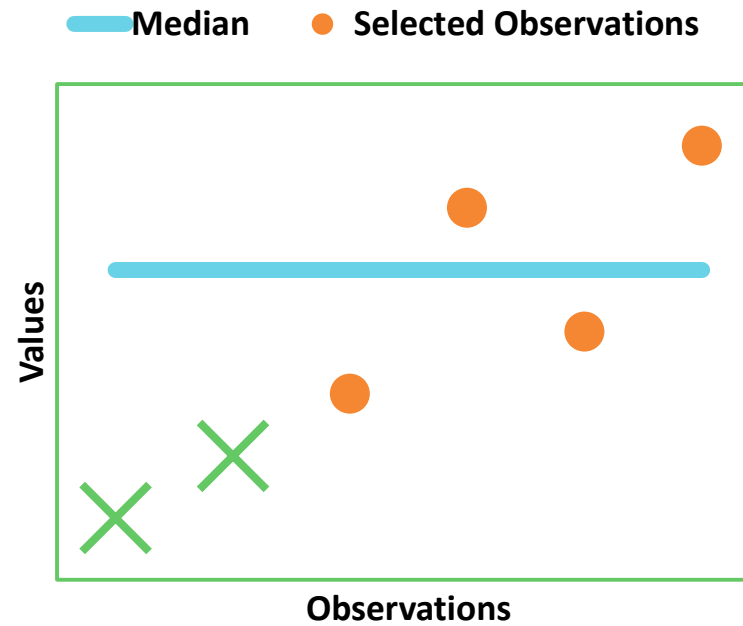
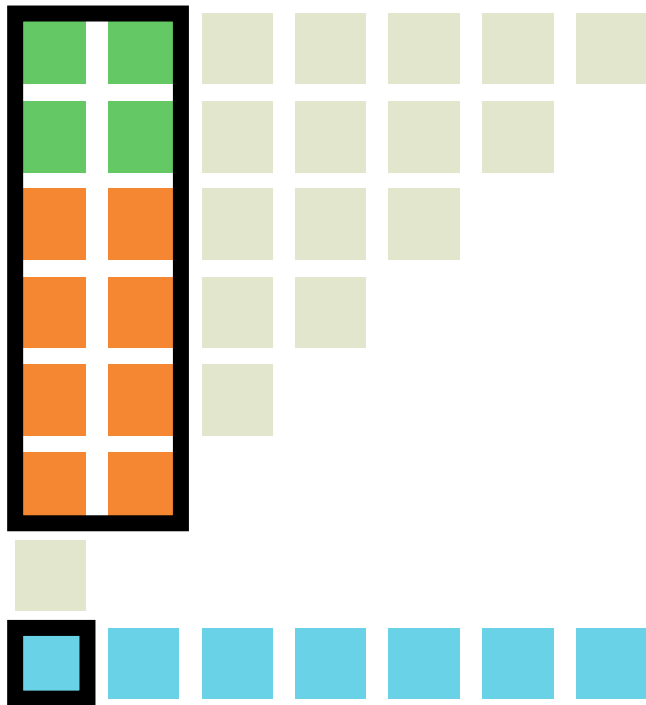
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Birds of a Feather Flocks Together



2. Development Factors Runs Test

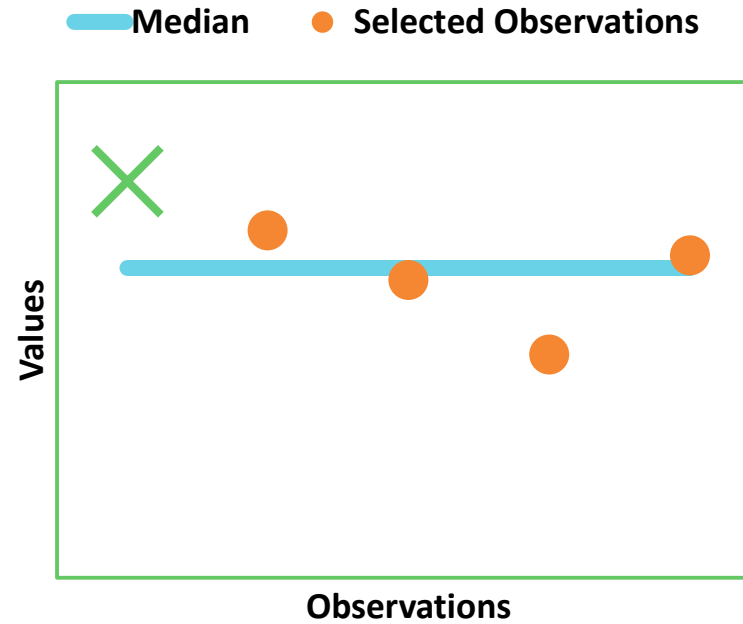
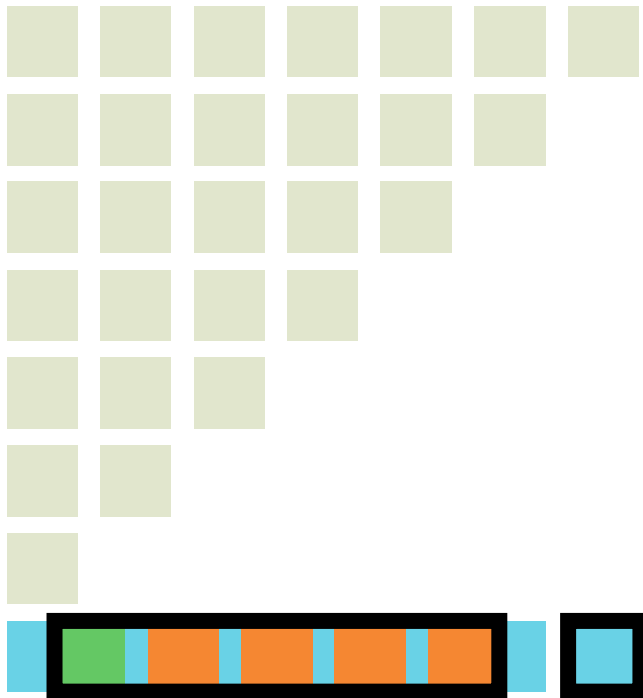
Objective: Optimise Relevance and Credibility Effects in Development Factors



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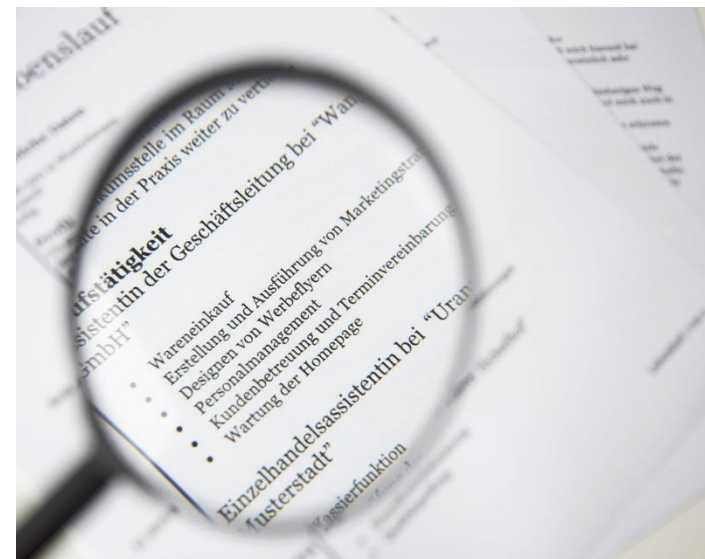
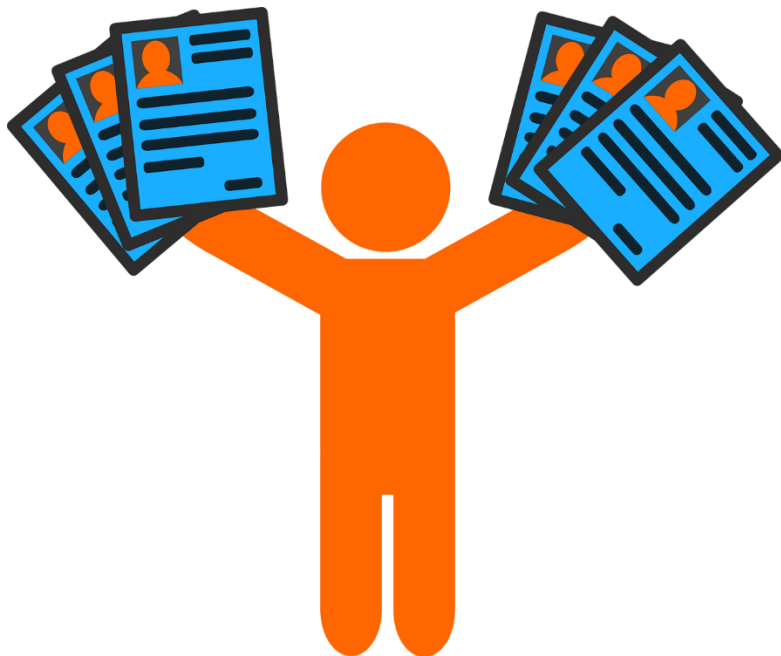
3. Decay Factors Runs Test

Objective: Optimise Relevance and Credibility Effects in Tail Factor



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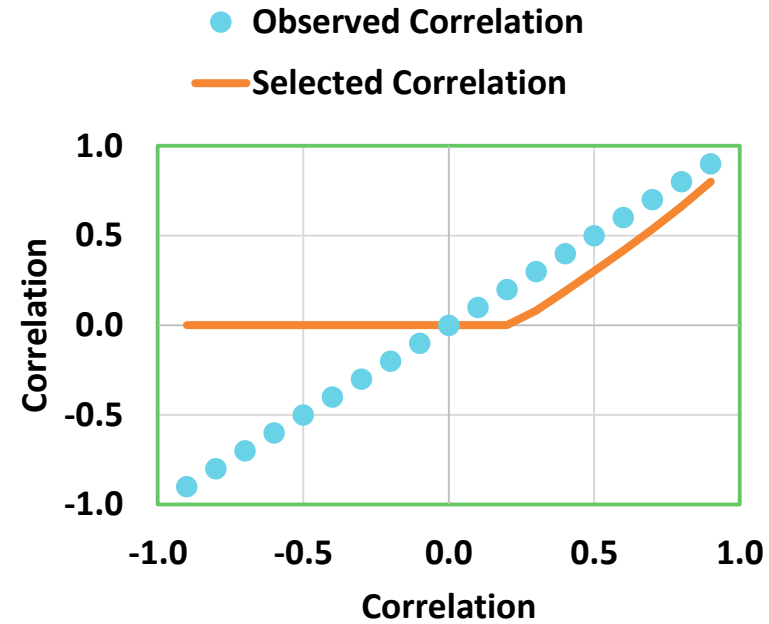
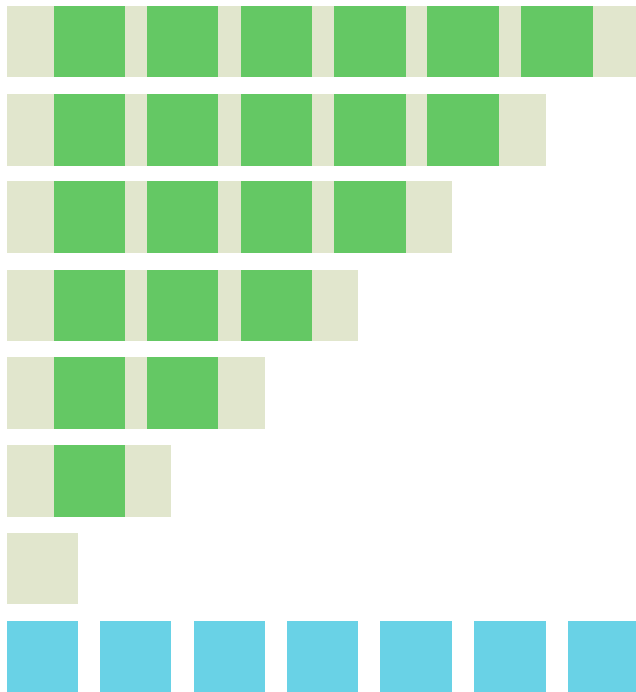
Include or Exclude?



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4. Significance Test on Correlation Between Methods

Objective: Optimise Standard Deviation Estimate



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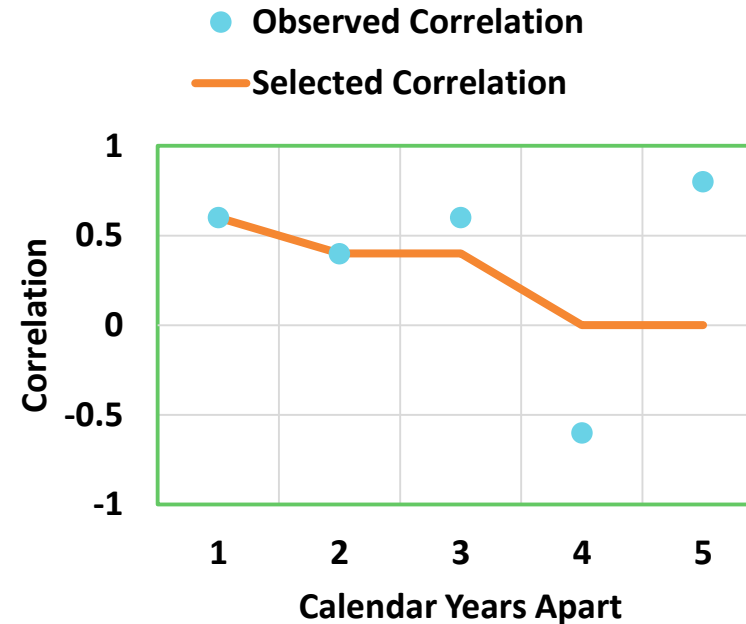
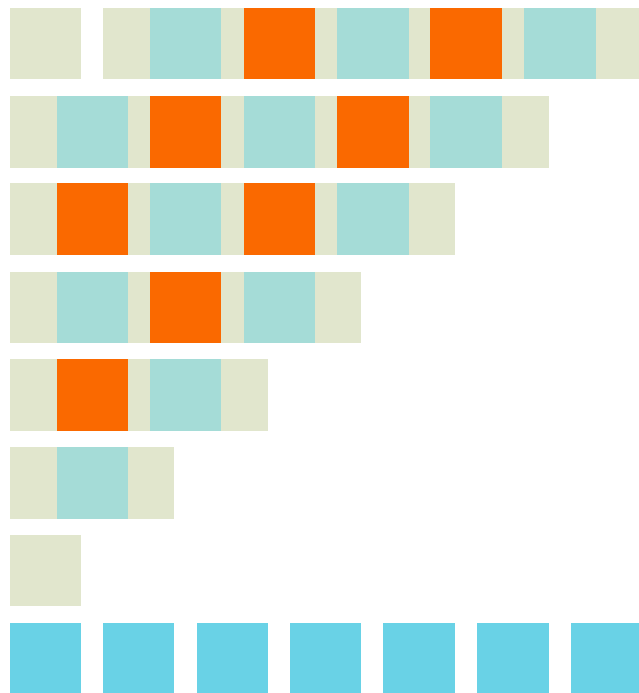
Similar but Different



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5. Significance Test on Correlation Between Calendar Years

Objective: Optimise Standard Deviation Estimate



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Alike or Unlike?



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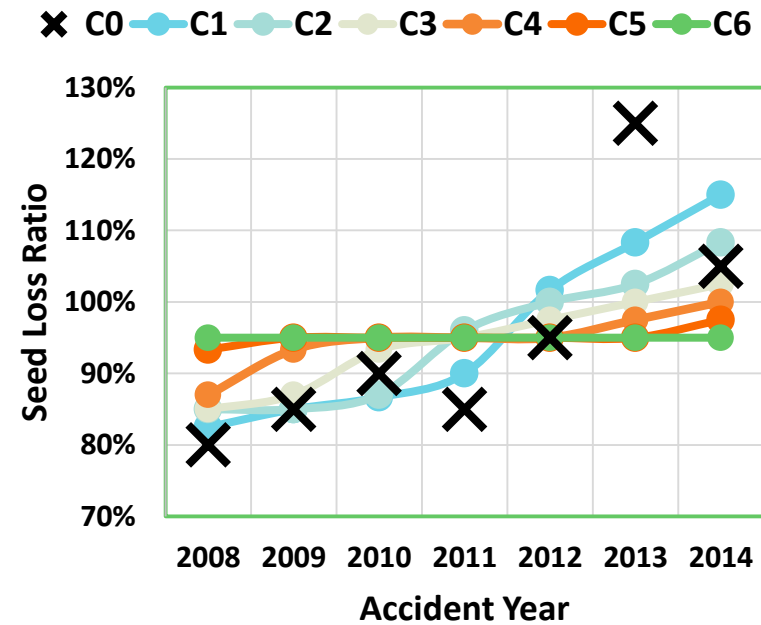
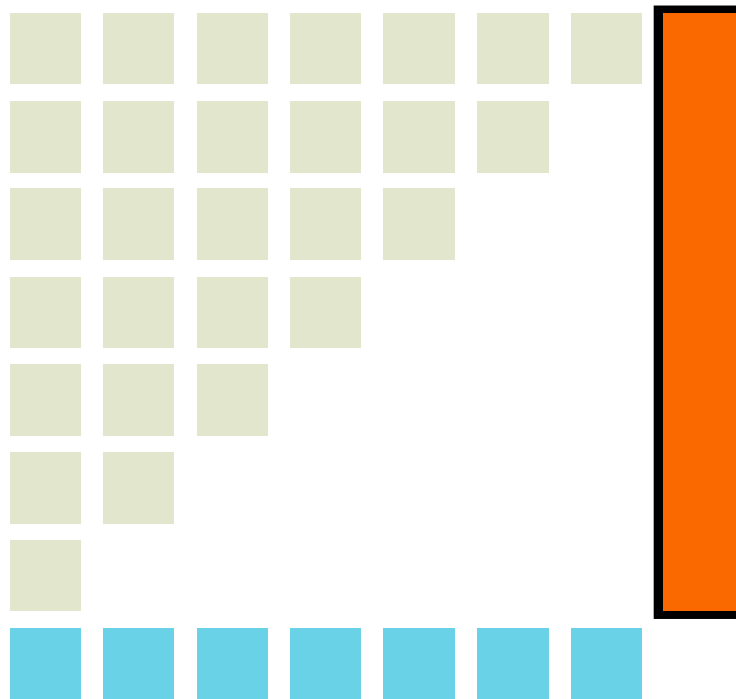


B. BF Method

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6. Seed Loss Ratios Generation

Objective: Optimise Homogeneity Effects Between Accident Years



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Trial and Error



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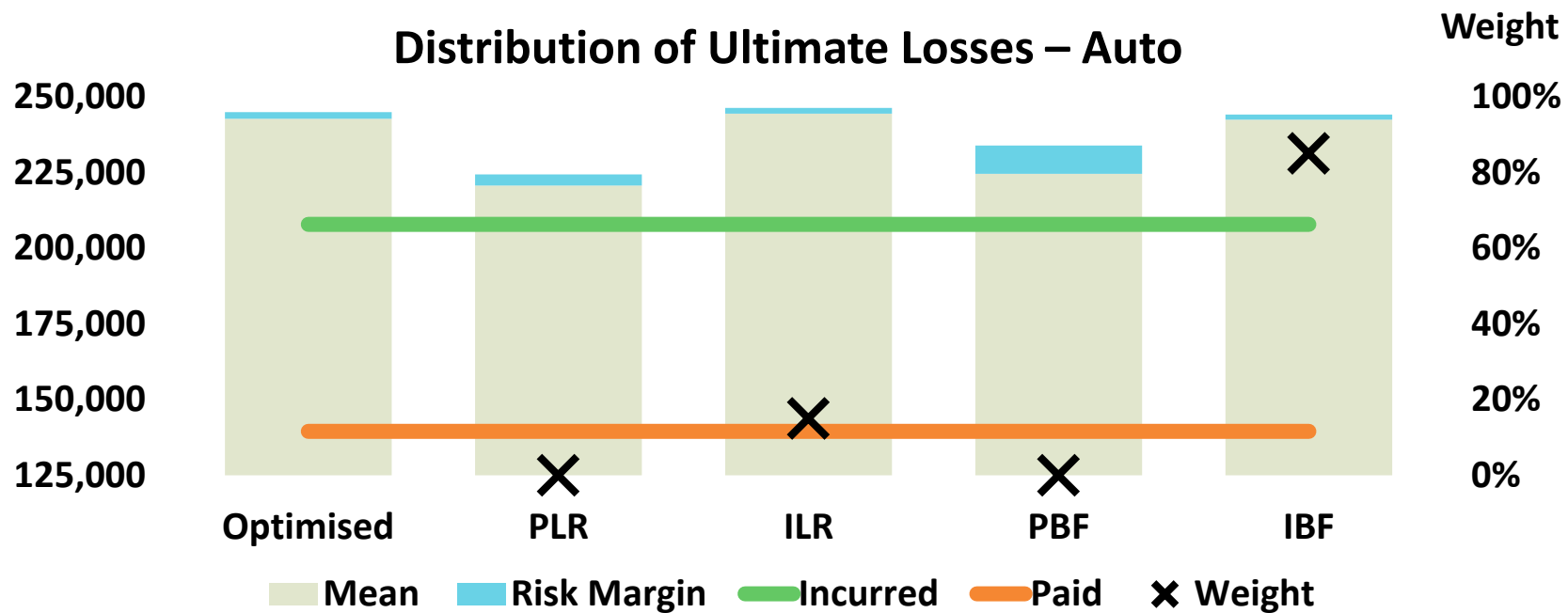
C. Putting it together

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7a. Repeat Steps 4 & 5 for BF Method

7b. Apply Method of Lagrange Multiplier

Objective: Optimise Individual Class Ultimate Loss Estimate

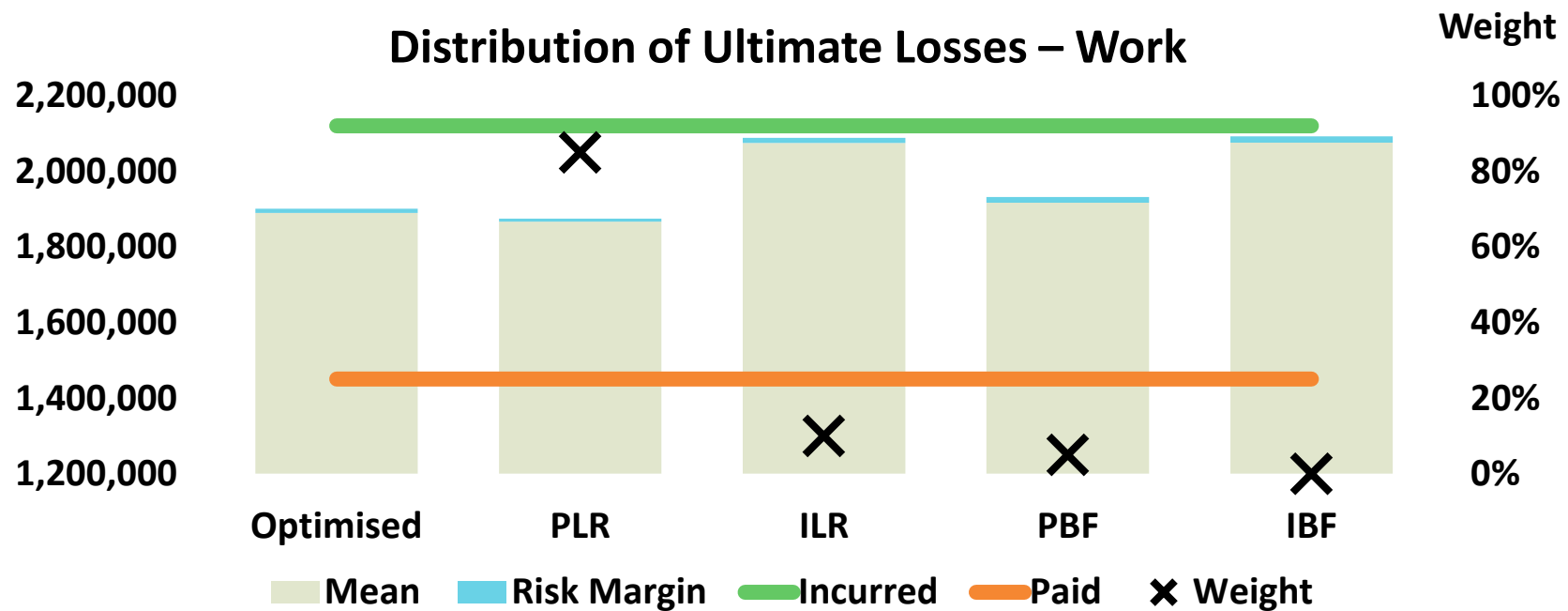


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7a. Repeat Steps 4 & 5 for BF Method

7b. Apply Method of Lagrange Multiplier

Objective: Optimise Individual Class Ultimate Loss Estimate

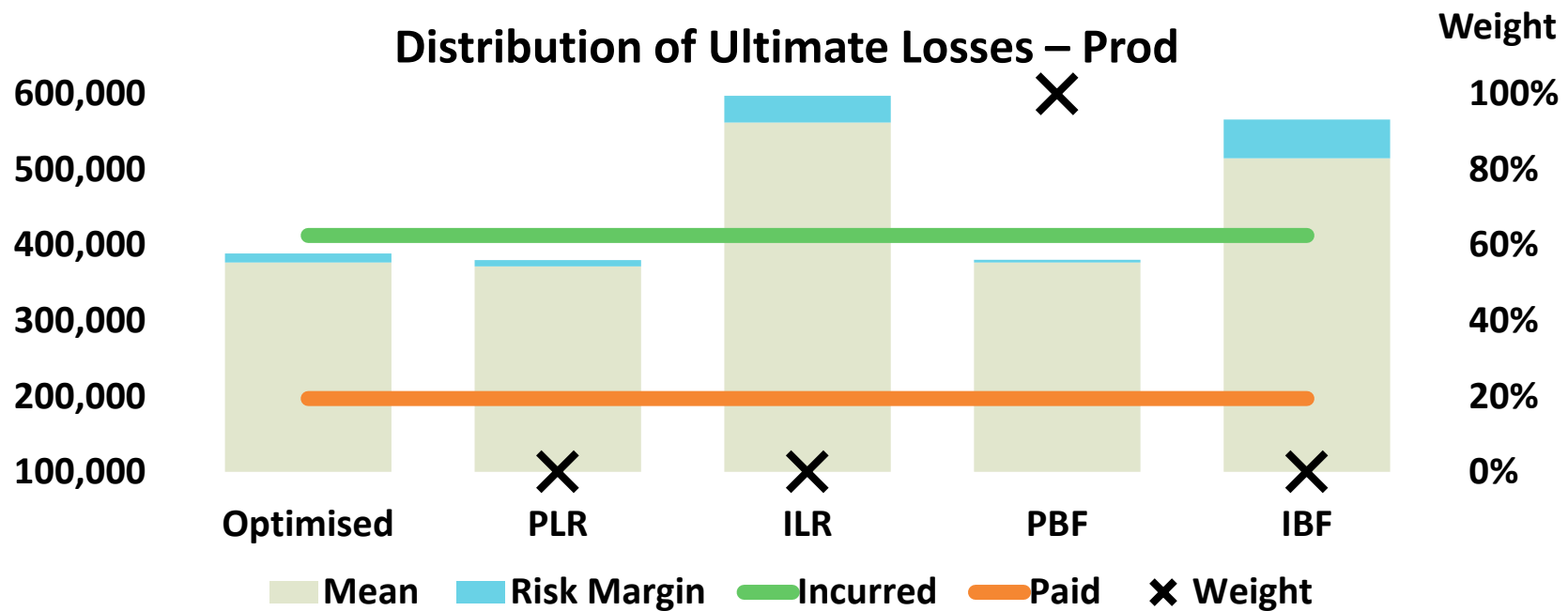


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7a. Repeat Steps 4 & 5 for BF Method

7b. Apply Method of Lagrange Multiplier

Objective: Optimise Individual Class Ultimate Loss Estimate



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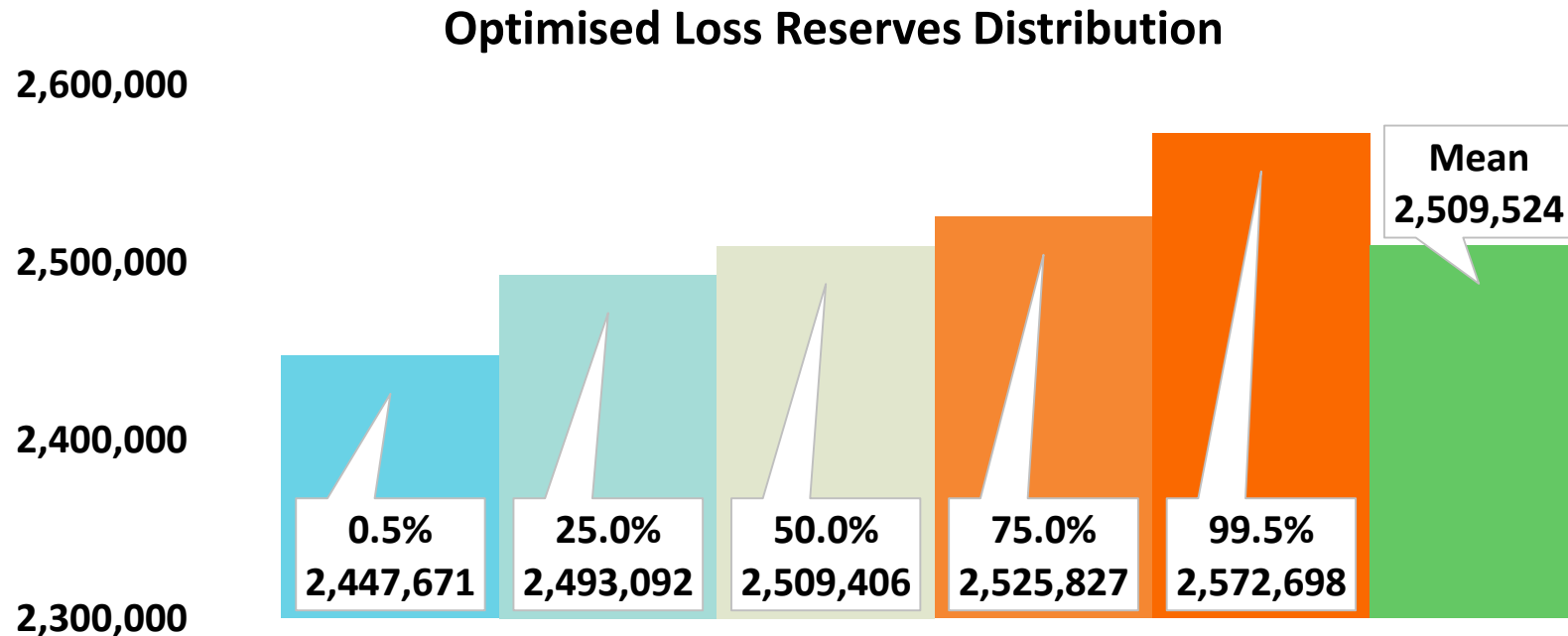
Consistency is the Key



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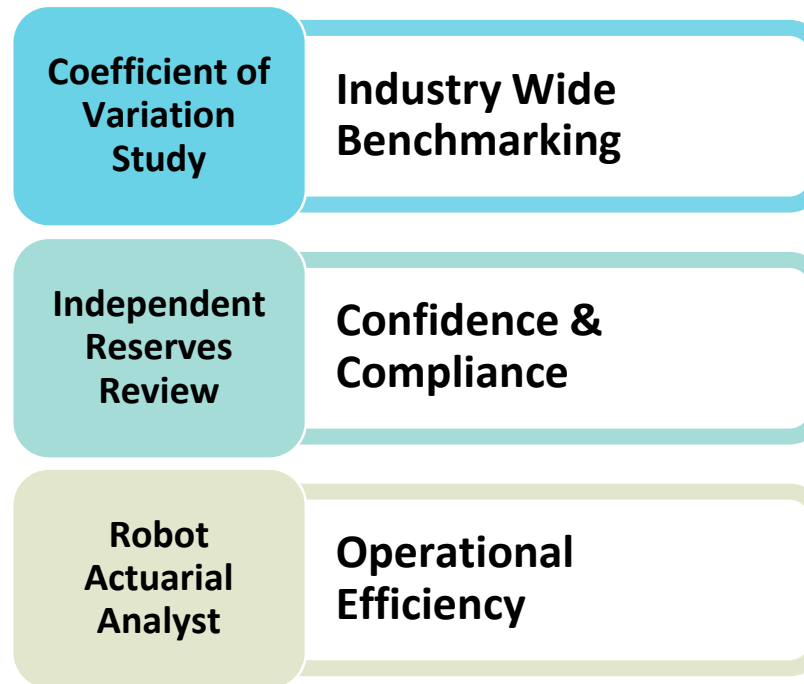
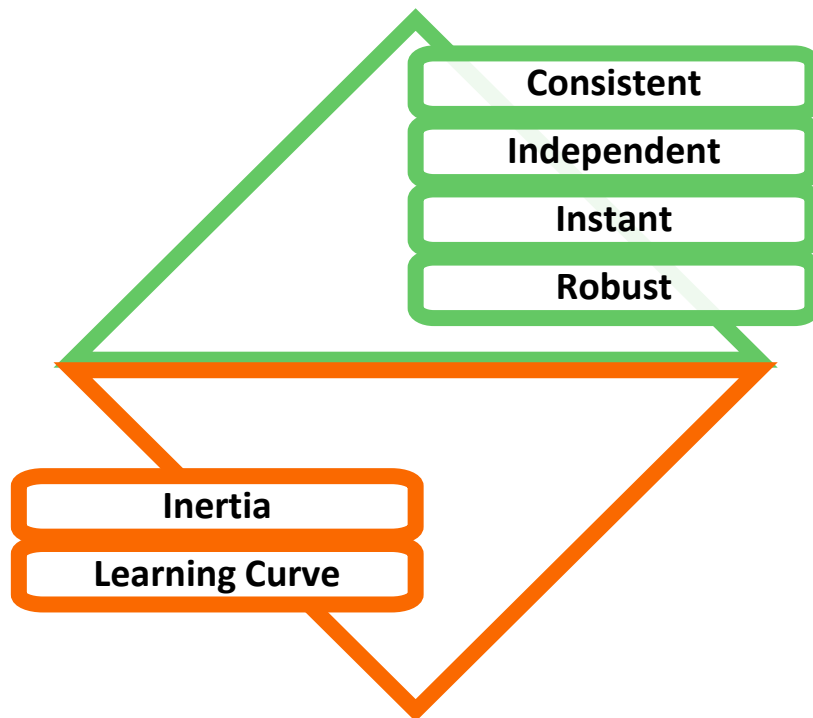
8. Repeat Step 4 Across Business Classes

Objective: Optimise Aggregate Ultimate Loss Estimate



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Strengths & Challenges



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Annexure

Stepwise Explanation

Step	Data – Paid & Incurred Claims, Earned Premiums	Paid & Incurred Link Ratio	Paid & Incurred BF	Individual Class Reserves	Aggregate Reserves
1	Data Acceptance Replacement Test				
2	Input	Development Factors Runs Test			
3		Decay Factors Runs Test			
4		Inter-Method Correlation Significance Test			
5		Calendar Year Correlation Significance Test			
6		Seed Loss Ratios Generation			
7	Input	Repeat Steps 4 & 5 with BF Method	Apply Method of Lagrange Multiplier		
8		Input		Repeat Step 4 Across Classes	

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Thank you!

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