



Reserving Excellence

Extracting the 'value' from Actuarial Valuations

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Win-Li Toh

October 2009



Contents

- Background
- Survey Results
- Features of a superior valuation process
- Reserving Control Cycle
- The Valuation Process
- Summary



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Background

- General Environment in Australia
 - APRA implemented reforms in February 2006
 - GPS 310 Audit and Actuarial Reporting and Valuation
 - Insurance Liability Valuation Report (ILVR)
 - Financial Condition Report (FCR)
 - External Peer Review (EPR)
 - Various approaches adopted across the industry
 - In-house/external Appointed Actuaries
 - In-house/external Valuation Actuaries



Background

- More recently...
 - General move from outsourced to in-house reserving solutions
 - Pressure on costs
 - Do in-house resources understand business better?
 - External Peer Reviews (EPRs)
 - Are they adding sufficient value? Too compliance focussed?
 - Valuations are important and necessary, but not adding the business value they should
 - Process inefficiencies are misdirecting effort



Background

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 - Valuations are important and necessary, but not adding the business value they should
 - Process inefficiencies are misdirecting effort
 - **Lessons can be learned that are applicable in New Zealand**



Background

- New Zealand – Regulatory Changes
 - Insurance (Prudential Supervision) Bill
 - RBNZ regulator and supervisor of insurance industry

 - Requirement for an Appointed Actuary
 - Audit of “specified” information
 - Actuarial information
 - Derived from or based on actuarial information
 - Including reserving (claims, premium liability), risk margins,...
 - Assess compliance with solvency standard
 - Financial Condition Report

 - **Strong parallels with the Australian framework**

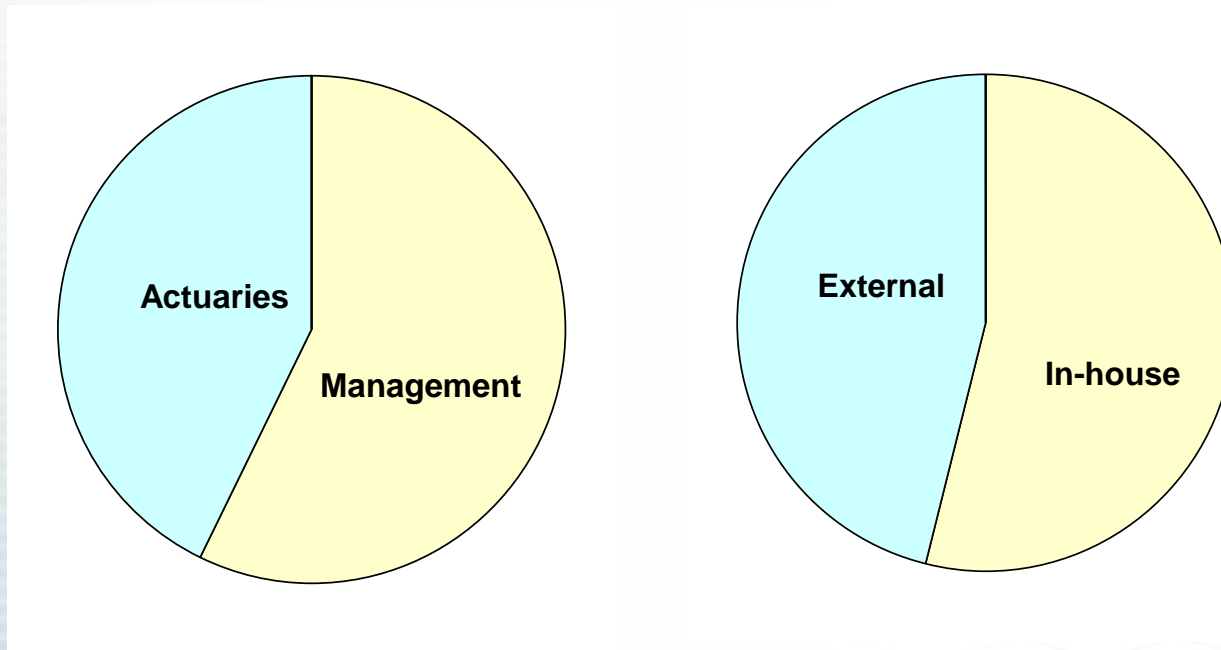


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Survey

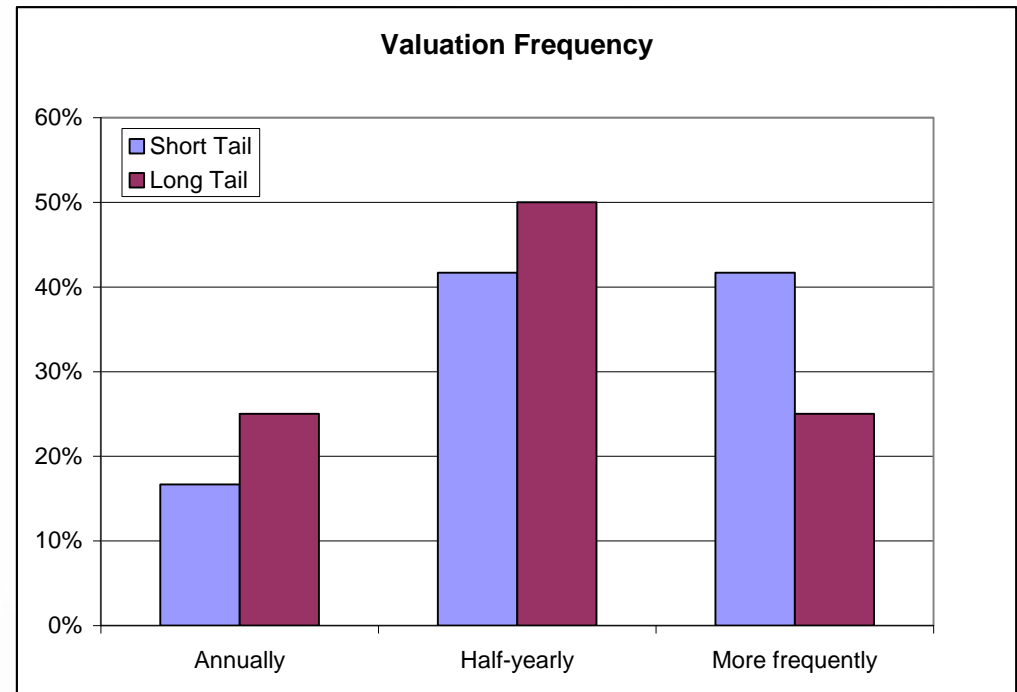
- Fifteen survey responses:





Valuation Approach

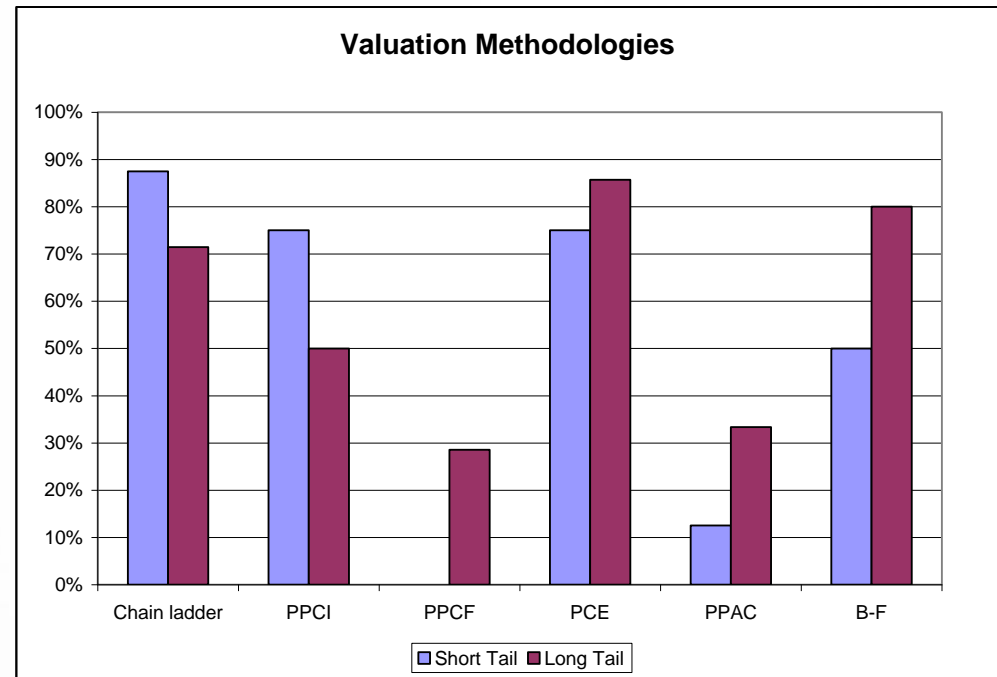
- Valuation Frequency?
 - Understandably, short tailed portfolios valued more frequently on average than long tailed
 - Half-yearly is most popular frequency for long-tailed
 - Short-tailed is half-yearly to quarterly





Valuation Approach

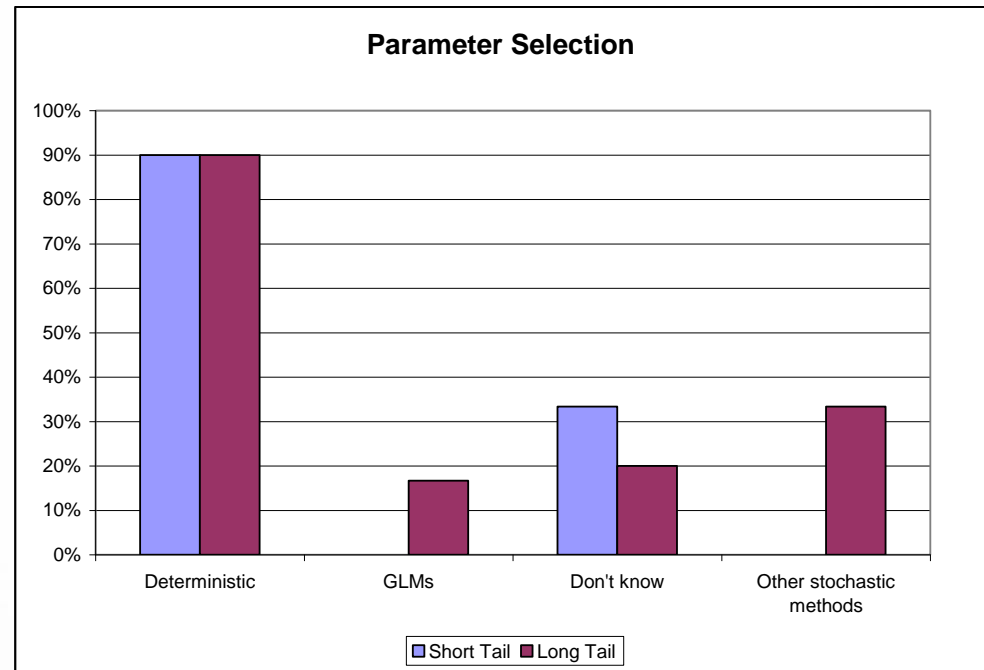
- Methodology?
 - Chain-ladder development widely used
 - Supplemented by PPCI, PCE and B-F
 - B-F more for longer tailed classes
 - PPCF and PPAC typically for the longer tailed classes only





Valuation Approach

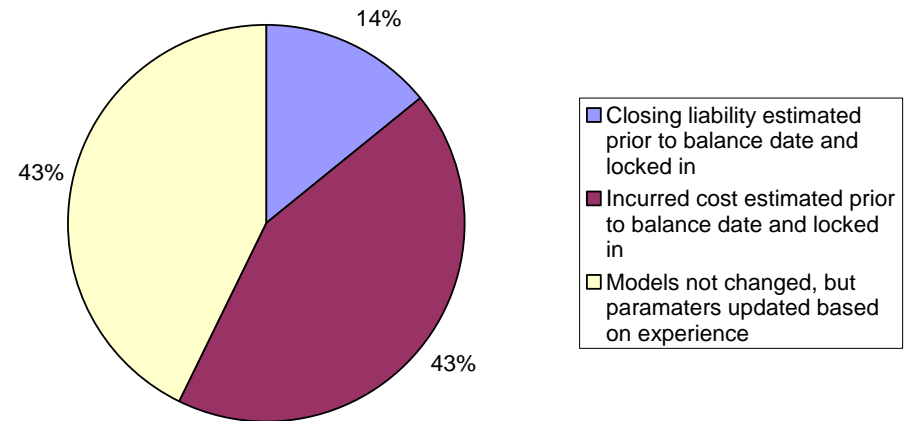
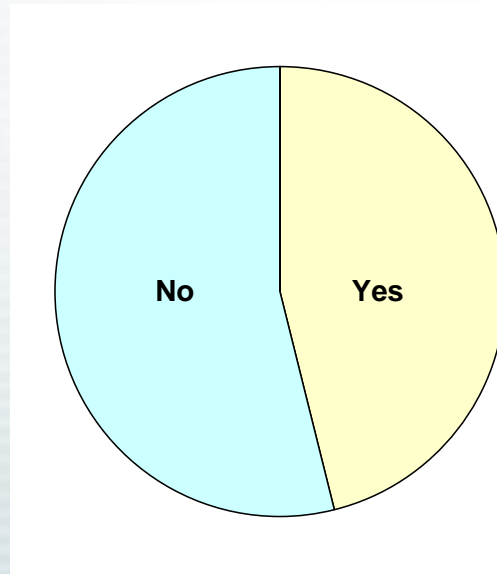
- Parameters?
 - Deterministic methods prevail
 - Some use of stochastic methods for long tailed classes





Valuation Approach

- Roll Forward?
 - Yes, in about half of instances
 - Fixed incurred, or fixed model most popular methods

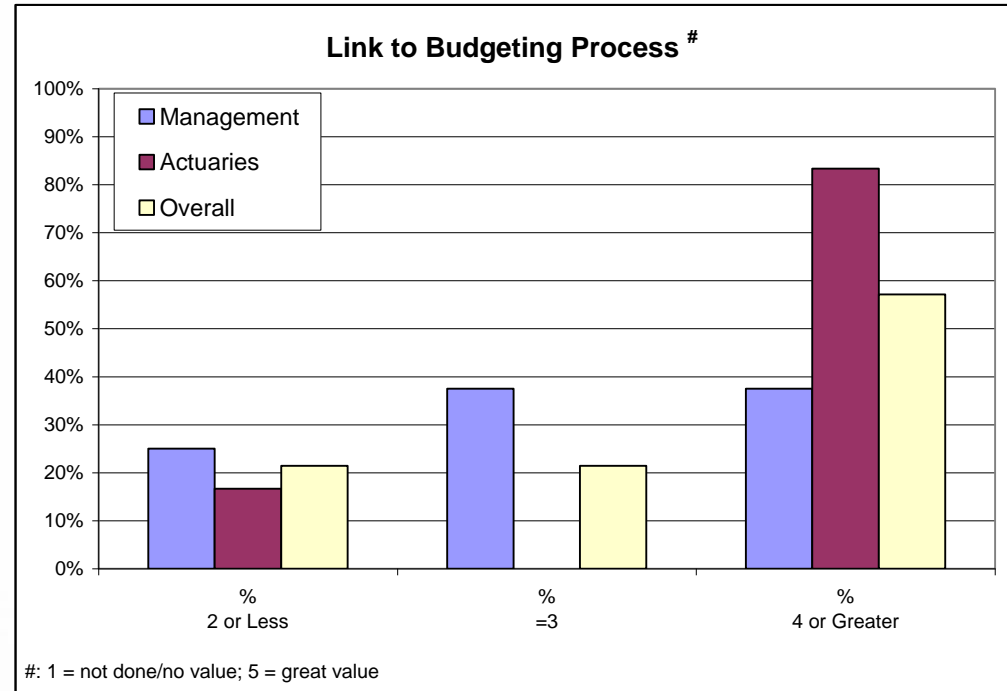


- Closing liability estimated prior to balance date and locked in
- Incurred cost estimated prior to balance date and locked in
- Models not changed, but parameters updated based on experience



Added Business Value

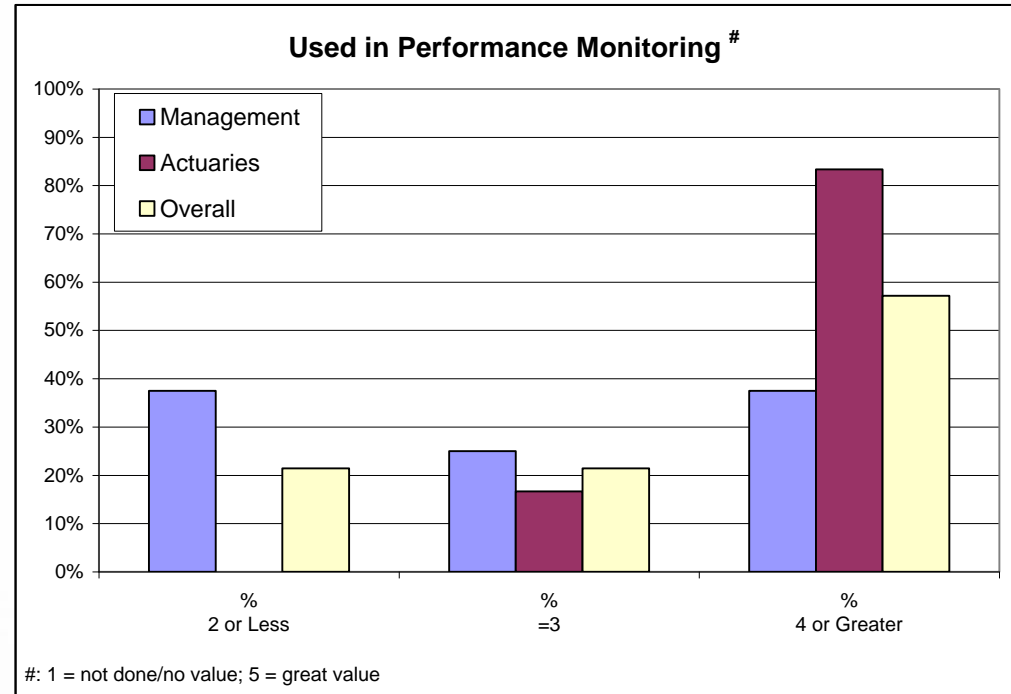
- Link to Budgeting Process?
 - Actuaries see greater value than management
 - Overall, there is perceived value for most





Added Business Value

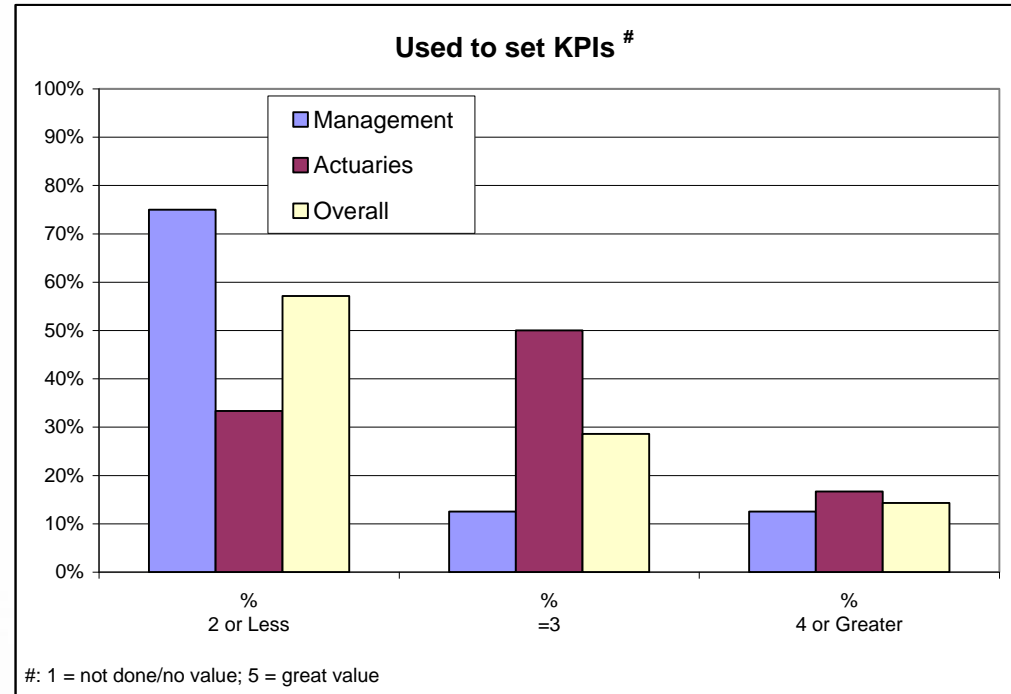
- Performance Monitoring?
 - Similar to previous
 - Actuaries see greater value than management
 - Overall, there is perceived value for most





Added Business Value

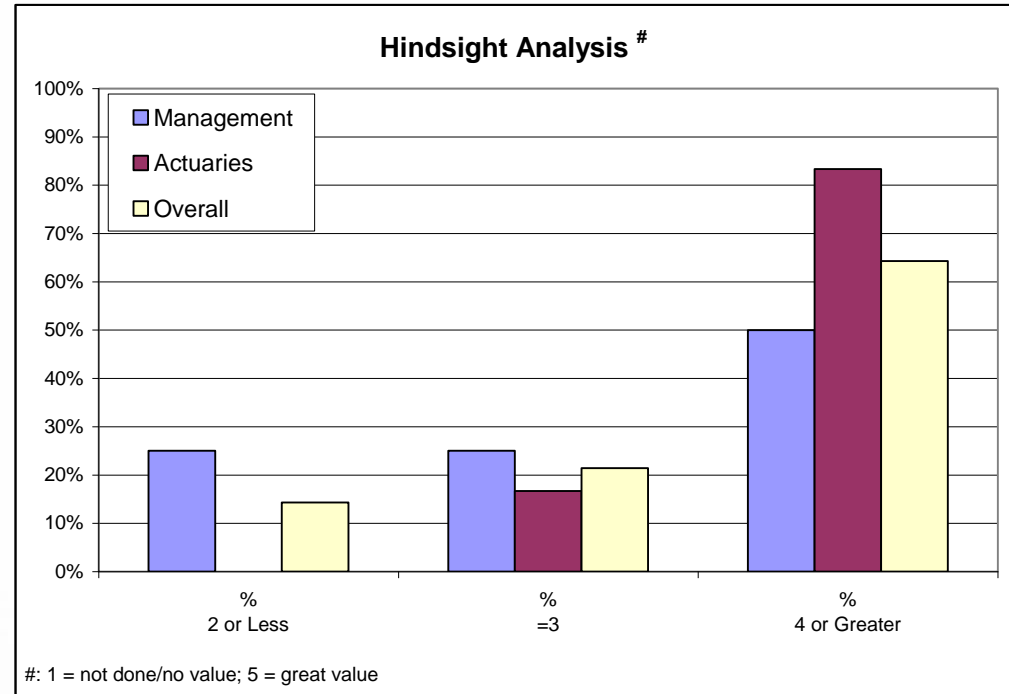
- Useful/Used for KPIs?
 - Mostly not done or little value seen
 - Actuaries see greater value than management





Added Business Value

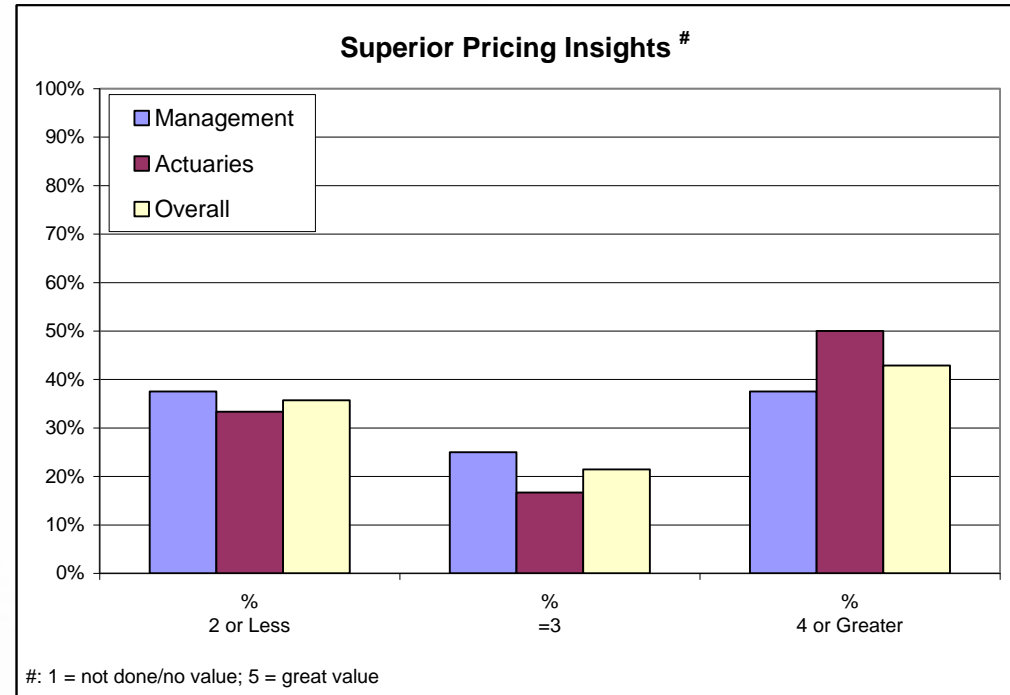
- Hindsight view on reserving?
 - Generally universal agreement that there is value in this





Added Business Value

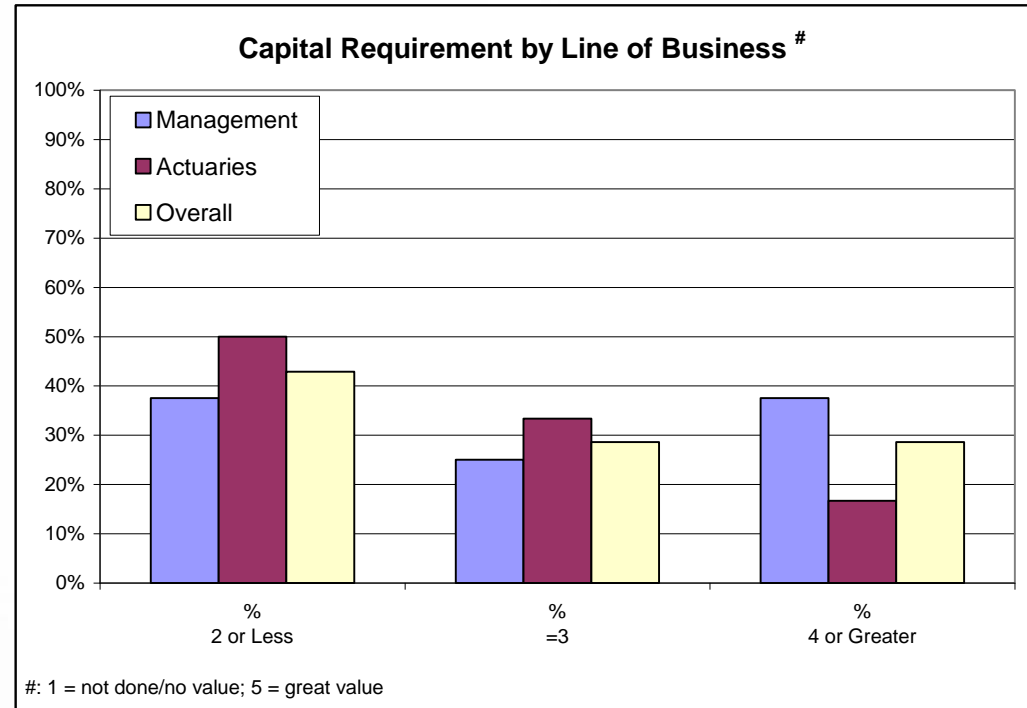
- Pricing Insights?
 - Distribution of Management views similar to Actuaries'
 - Evenly distributed across buckets





Added Business Value

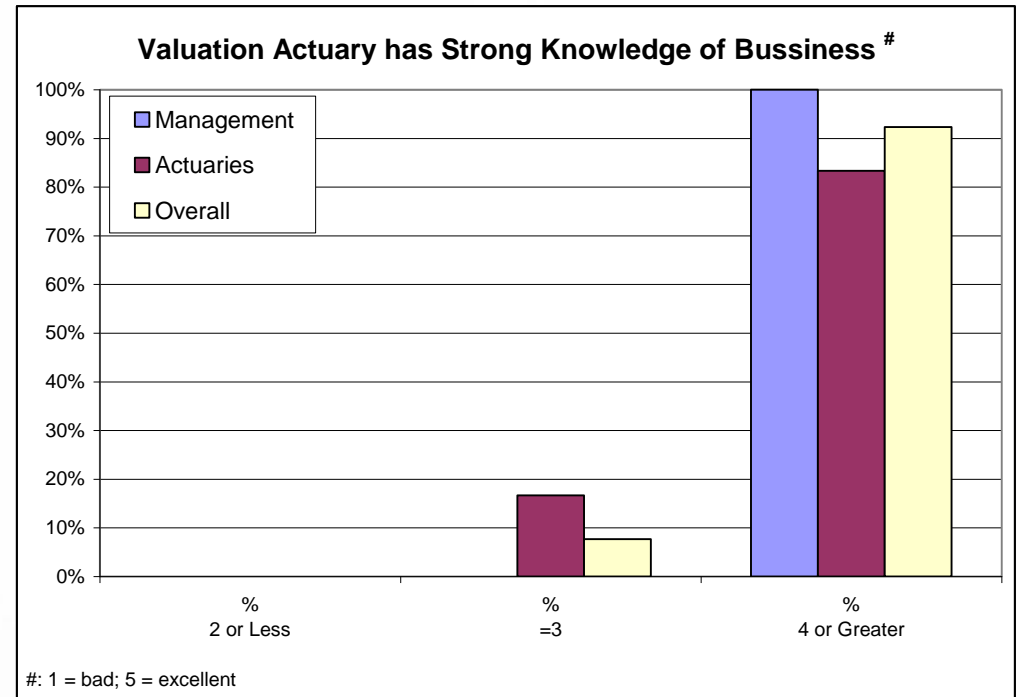
- Capital Requirements by LOB?
 - Large proportion not done or see little value
 - Similar distribution to pricing





Valuation Approach

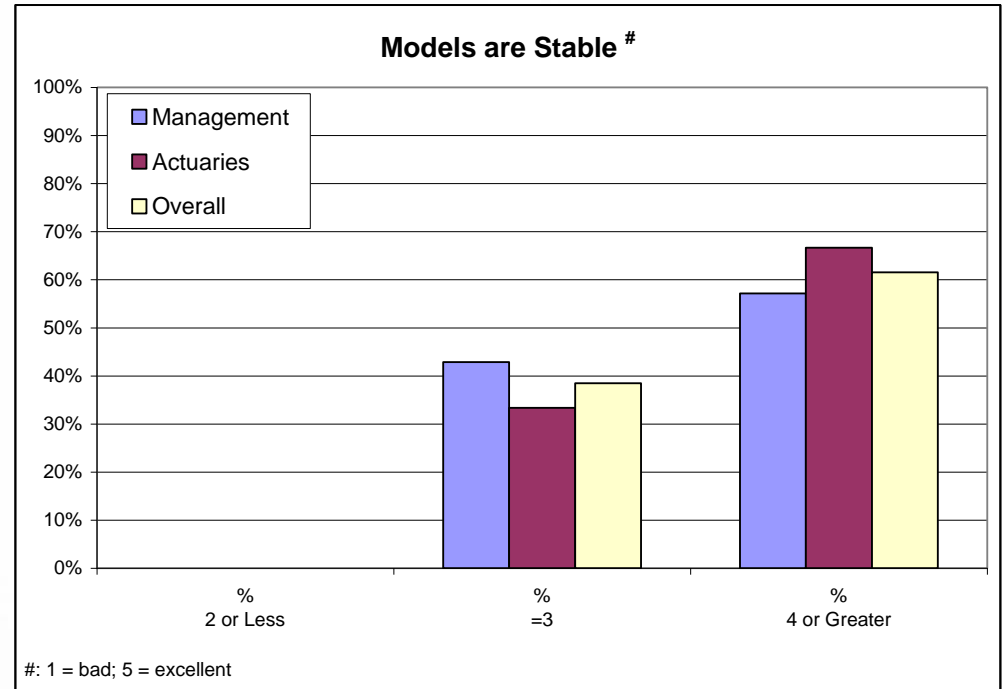
- Valuation Actuary has strong knowledge of business?
 - Of course we do!





Valuation Approach

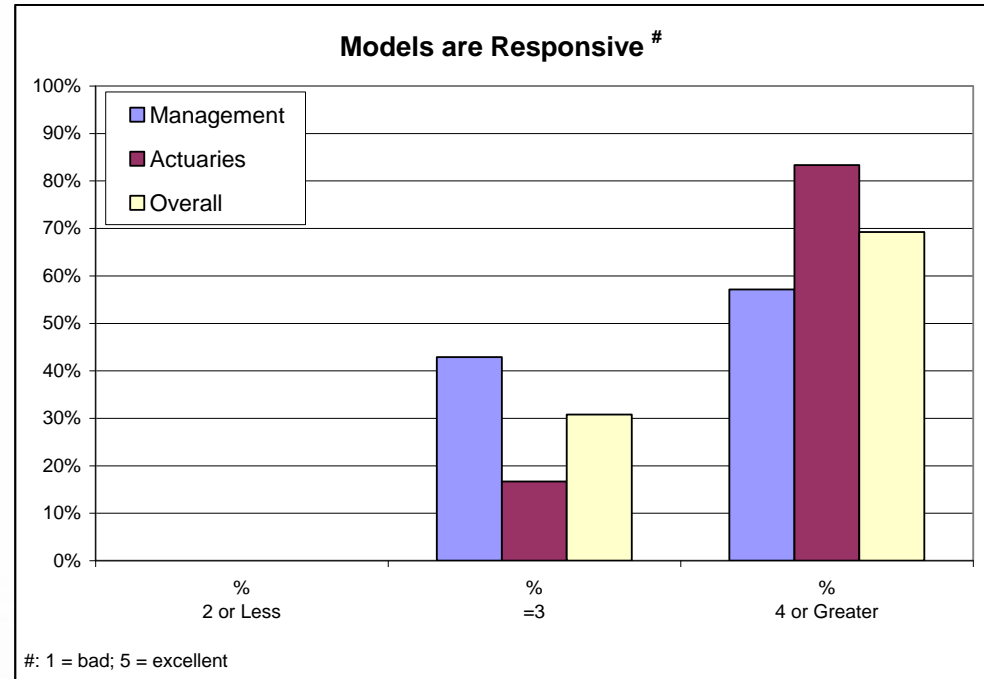
- Stable models?
 - Yes, generally speaking





Valuation Approach

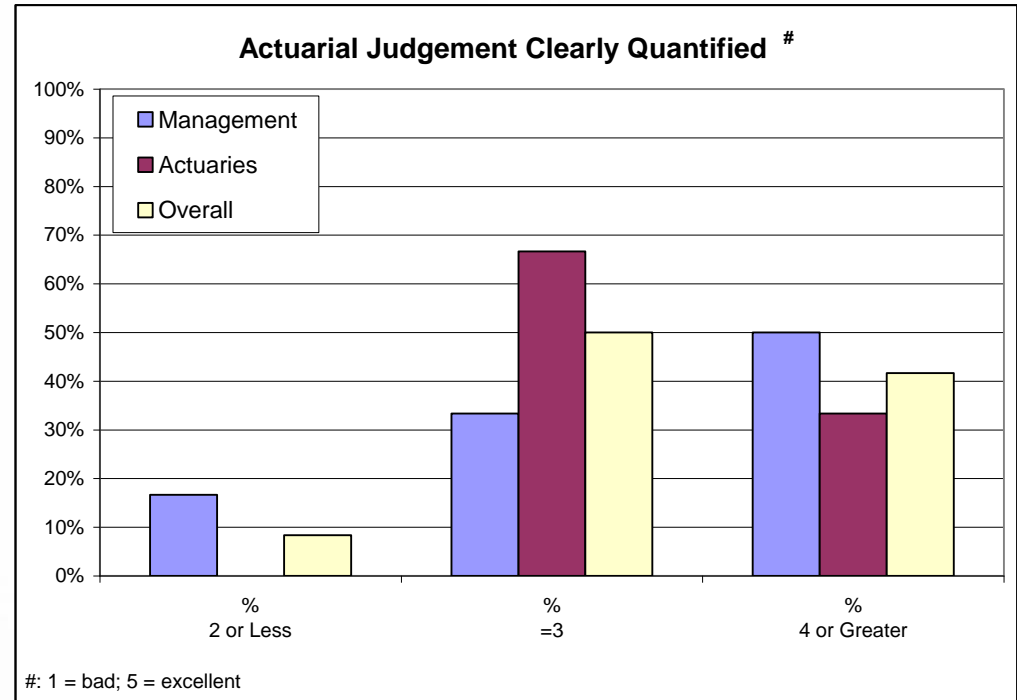
- Responsive models?
 - Yes, generally speaking





Valuation Approach

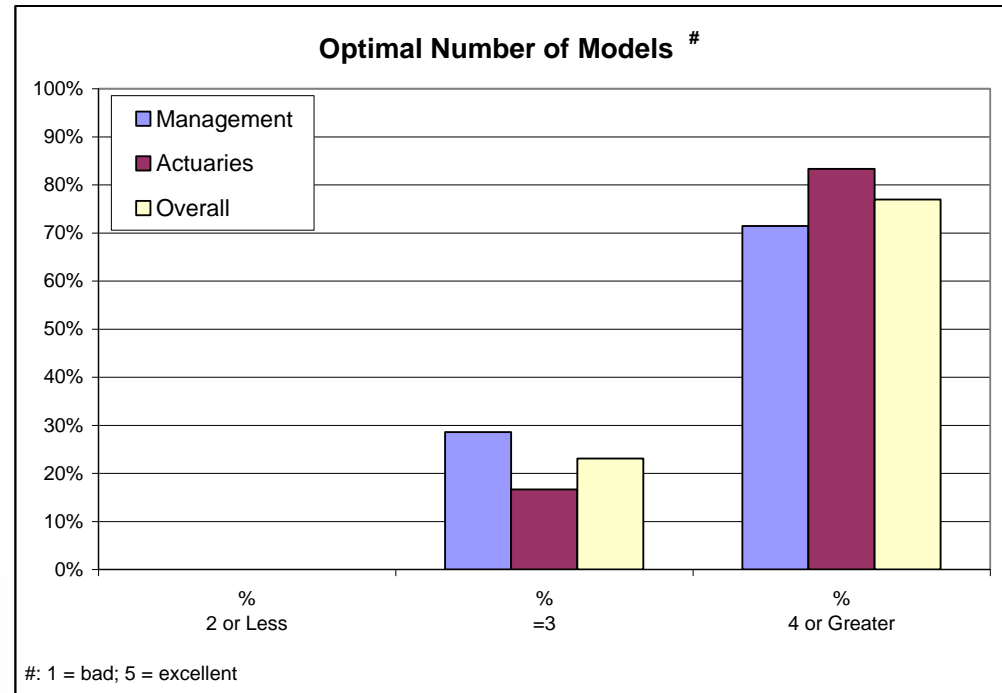
- Actuarial Judgement Identified?
 - Yes, generally speaking
 - Management view perhaps slightly less positive





Valuation Approach

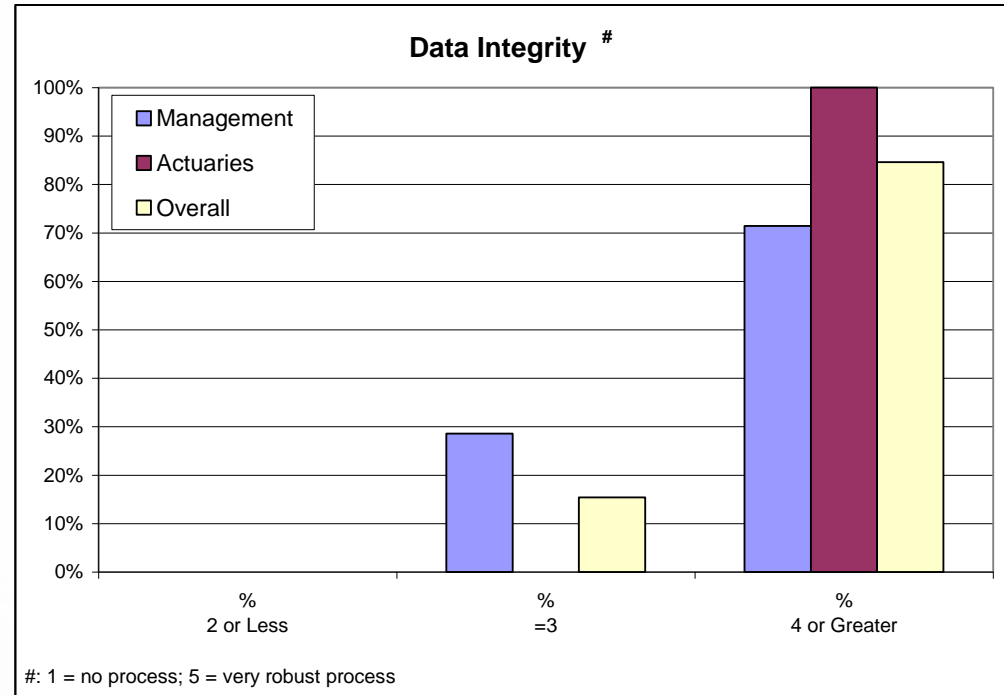
- Number of models?
 - General view is that it is about right





Valuation Approach

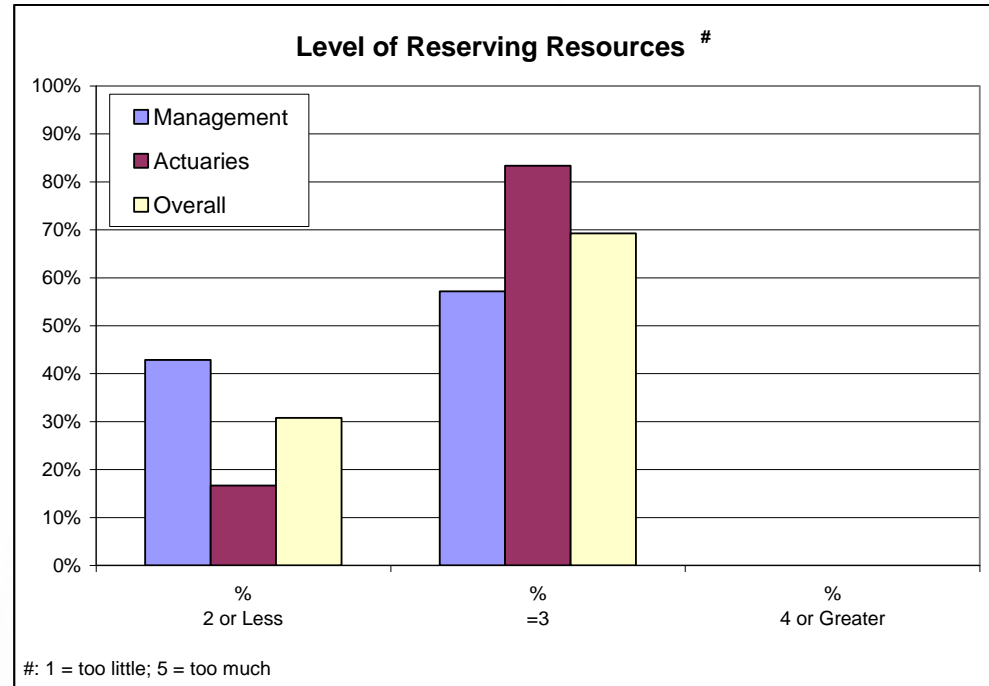
- Data Integrity?
 - Seen as important by all
 - Processes are generally working well





Valuation Approach

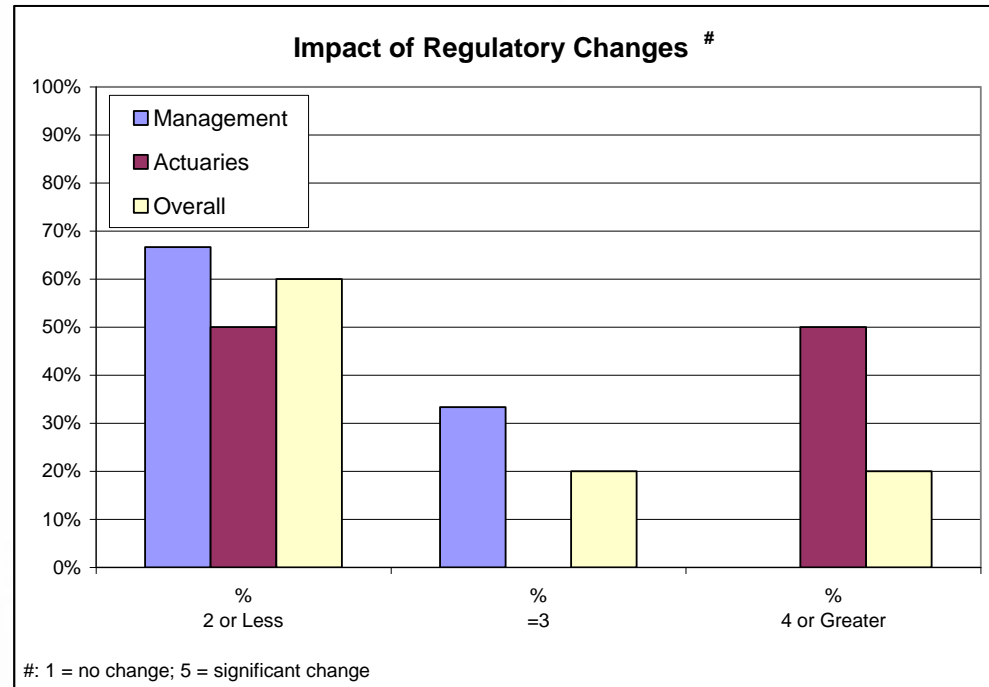
- Reserving resources?
 - Perhaps under-done?
 - Management seem to think so





The Future?

- Impact of Regulatory Changes?
 - Management see little change to current process
 - Actuaries maybe more in two minds





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Superior OS claims valuations

- Are planned, and
- Are designed to meet an identified need
 - Insurance Liabilities
 - Risk Margins?
 - Lead Indicator for management?
 - Claims management targets?
 - ...?



Superior OS claims valuations

- Effectiveness of Outputs
 - Readily understood
 - Fit for purpose
 - Integrated with Company systems, Revenue Accounts, Reporting framework,...
 - Link to Budgeting and Planning process
 - Provides useful information (claims experience, KPIs,...) leveraged across organisation
 - Clear communication
 - Easily audited
 - Drill down reconciliation
 - Issue/error identification
 - Process needs to be designed with this in mind
 - Hindsight analysis



Superior OS claims valuations

- Efficiency of Process
 - Use of inputs, resources, time, costs
 - Avoid duplication
 - Process streamlining and automation allows
 - Better use of finite resources
 - Automatic roll forwards
 - Highlighting of judgmental intervention
 - Concentration on important areas
 - More reliable and timely delivery
 - Improved engagement of staff



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Should be able to run a valuation at a new date on the same set of assumptions with minimal effort, to view standard diagnostics.

A first cut of updated assumptions should easily follow.



Superior OS claims valuations

- Clarity of Process
 - Role Clarity
 - Valuation Actuary, Management, AA, Board, Auditors, ...
 - Recommendation vs Decision
 - Process Clarity
 - Roll-forward approach (e.g. hard close?)
 - Triggers?
 - Key milestones identified
 - Input requirements (e.g data)
 - Key meetings (claims, management, audit, ...)
 - Key Deliverables identified
 - Stakeholders
 - Outputs
- Expectations are better managed



Superior OS claims valuations

- Data Integrity
 - Defined capture process
 - Automated reconciliations, error identification
 - Formalised accountability



Superior OS claims valuations

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“It’s not my job...”



Superior OS claims valuations

- Data Integrity
 - Defined capture process
 - Automated reconciliations, error identification
 - Formalised accountability



“It’s not my job...”



Superior OS claims valuations

- A formalised and automated Actuarial Data Integrity process
 - Establishes accountability
 - Enables sign-off on data integrity
 - Improves value of overall valuation process (time is spent not on data issues but on value-adding areas)
 - Supports the audit process
 - Reduces risk of error in the valuation process
 - Fewer nasty surprises



Superior OS claims valuations

- Sound models
 - Incorporate a strong business knowledge
 - Technically sound
 - Stable but reflective of recent trends
 - Appropriate assumptions
 - Clearly separate best fit from judgemental overlay
 - Parsimonious parameterisation
 - NOT too many models or assumptions!

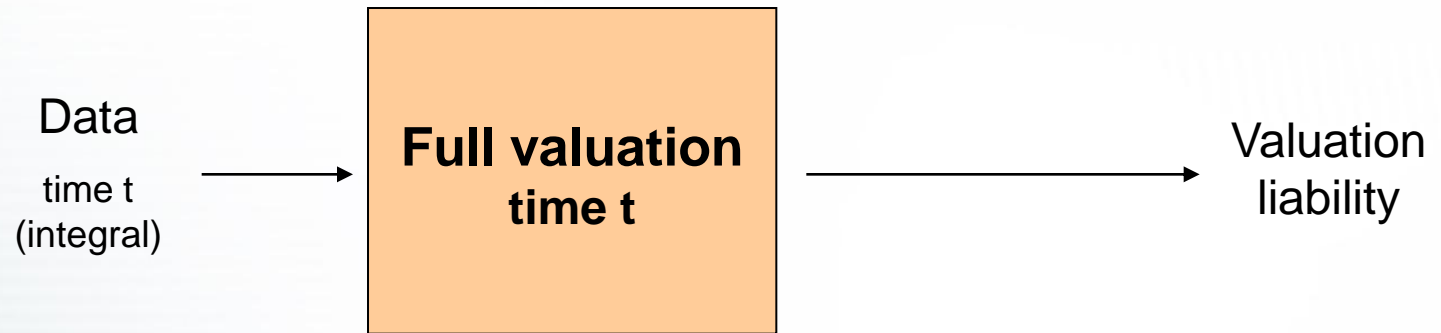


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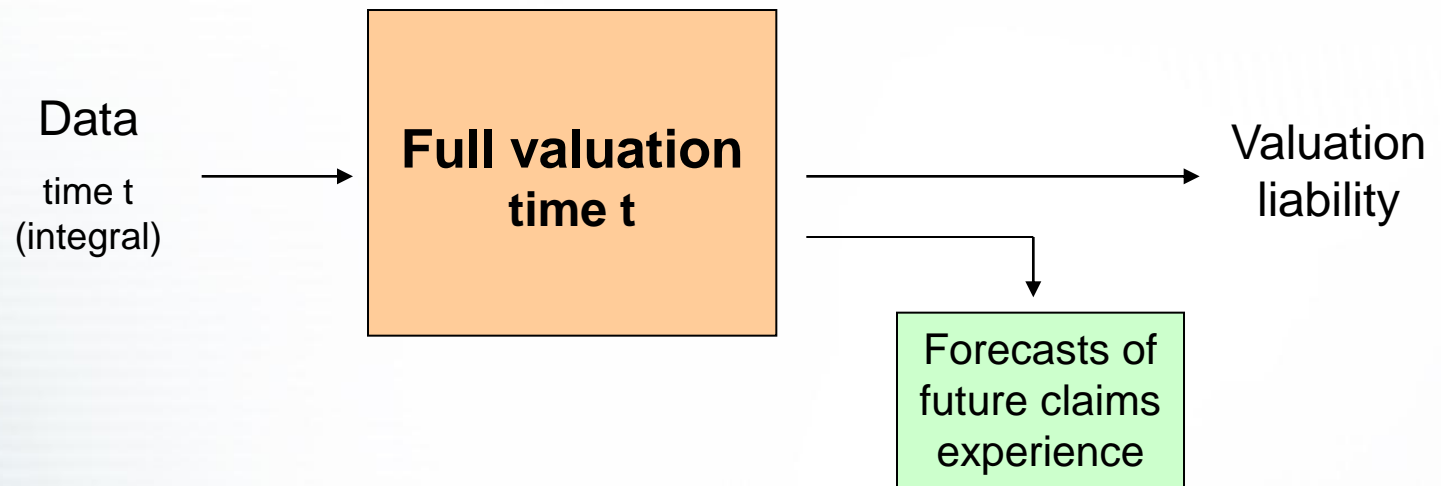


The valuation and control cycle



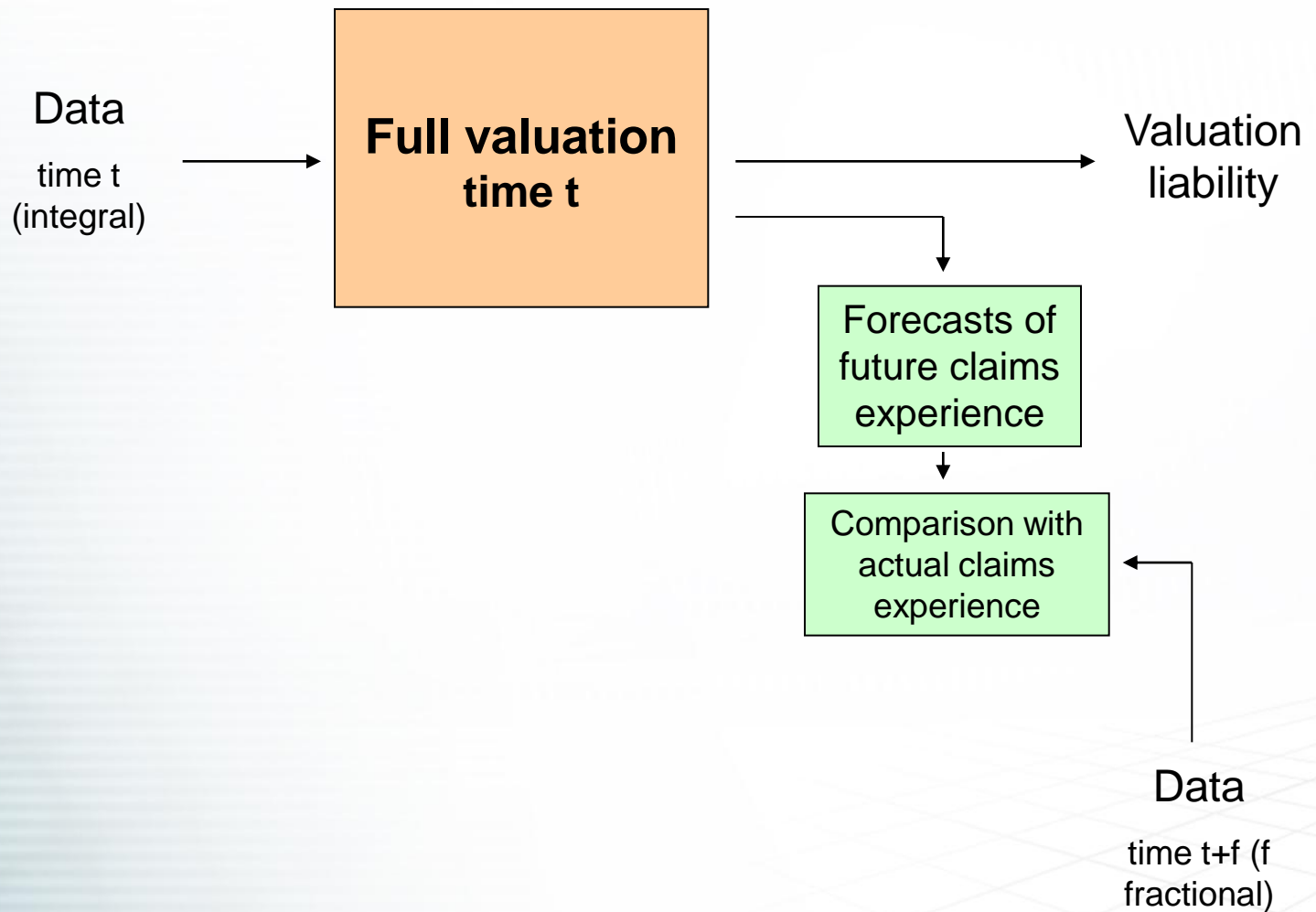


The valuation and control cycle



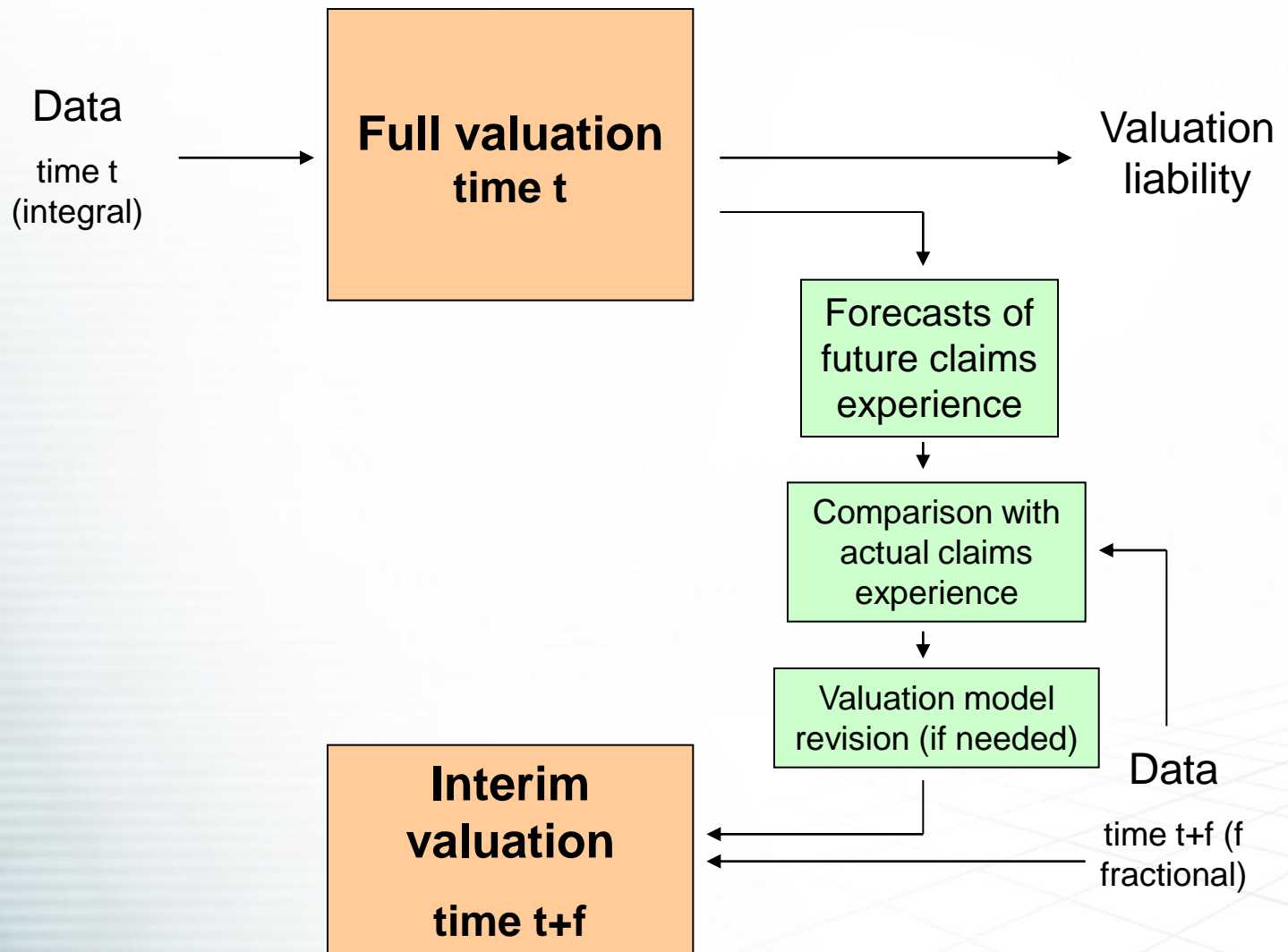


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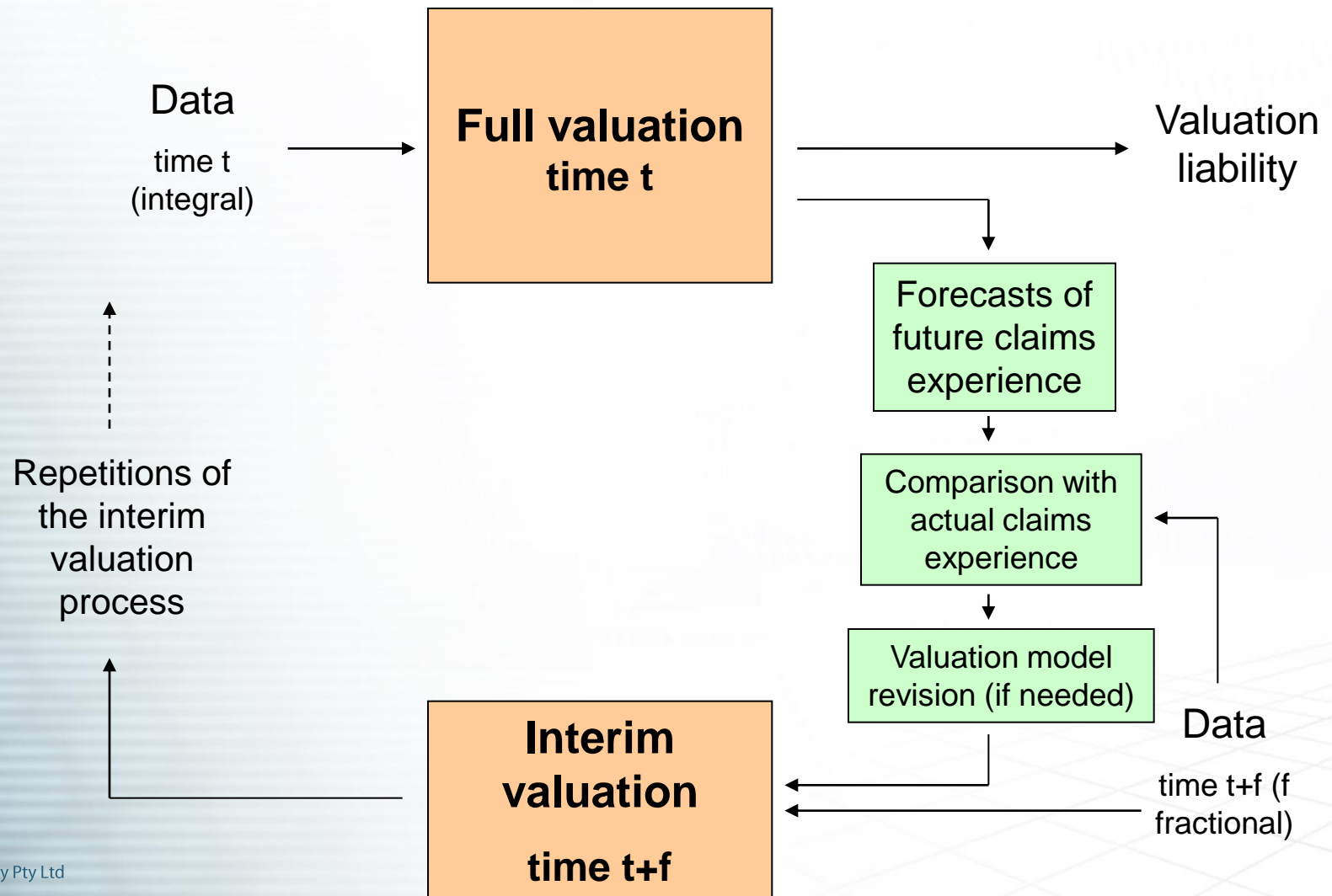


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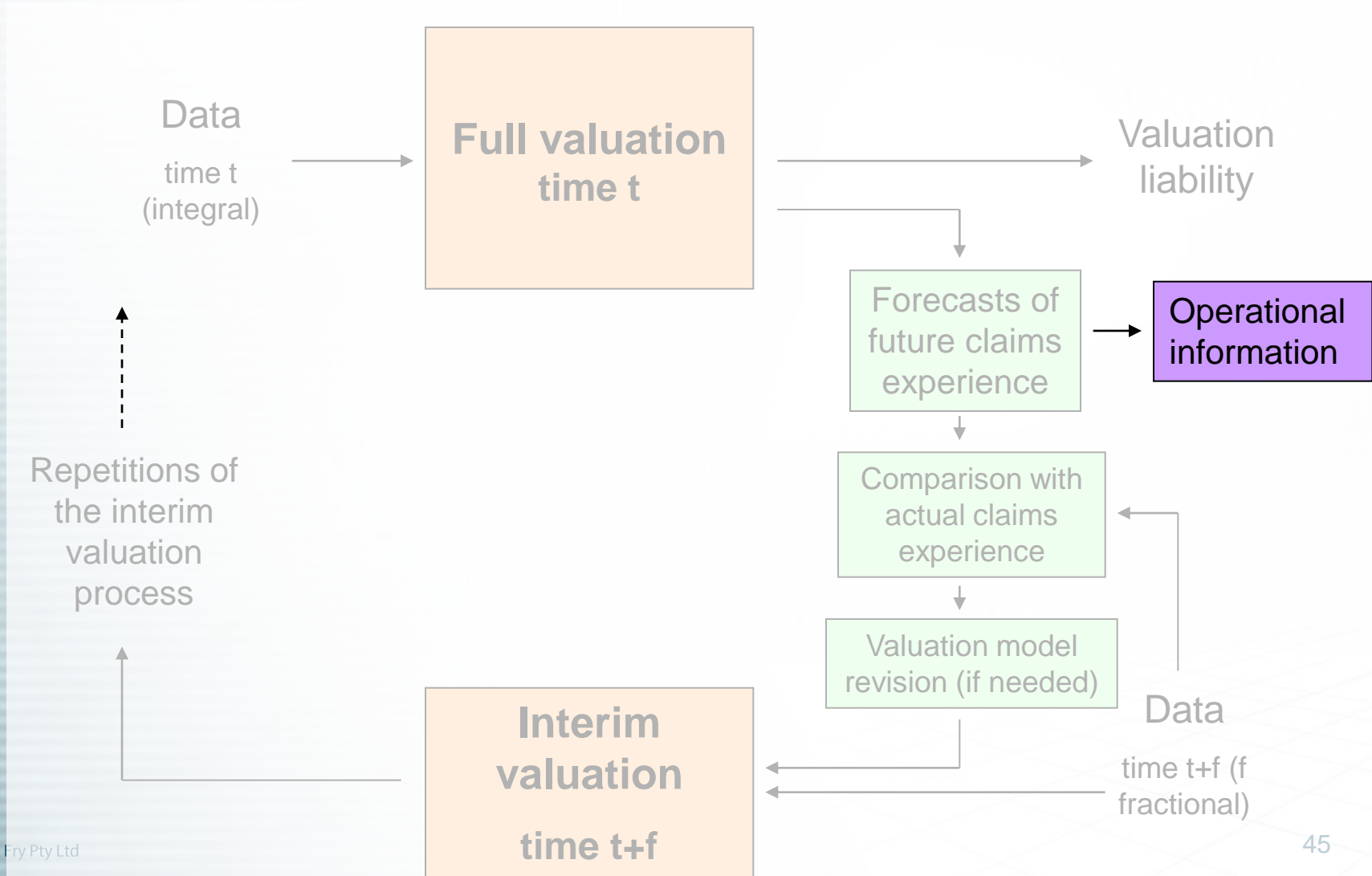


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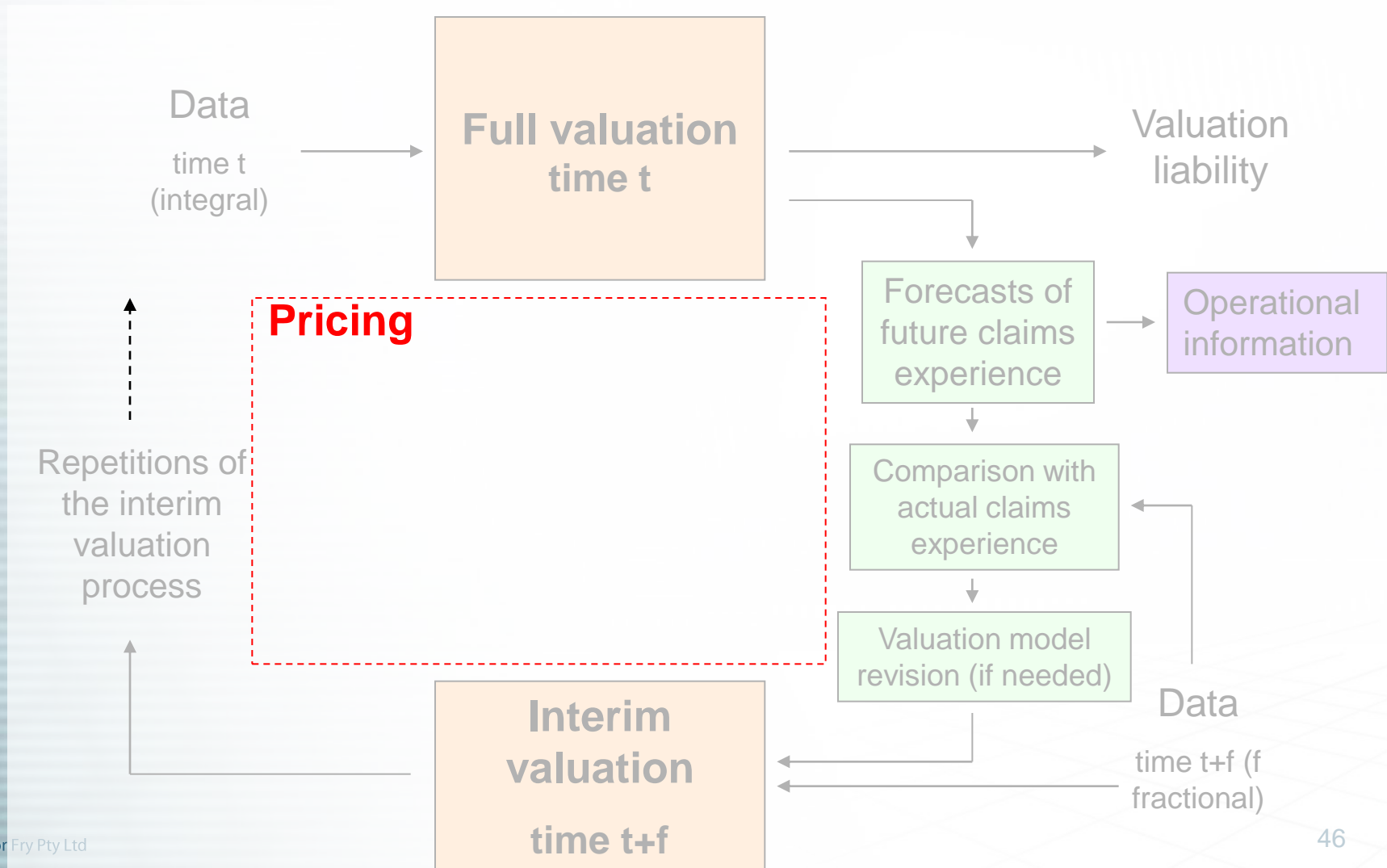


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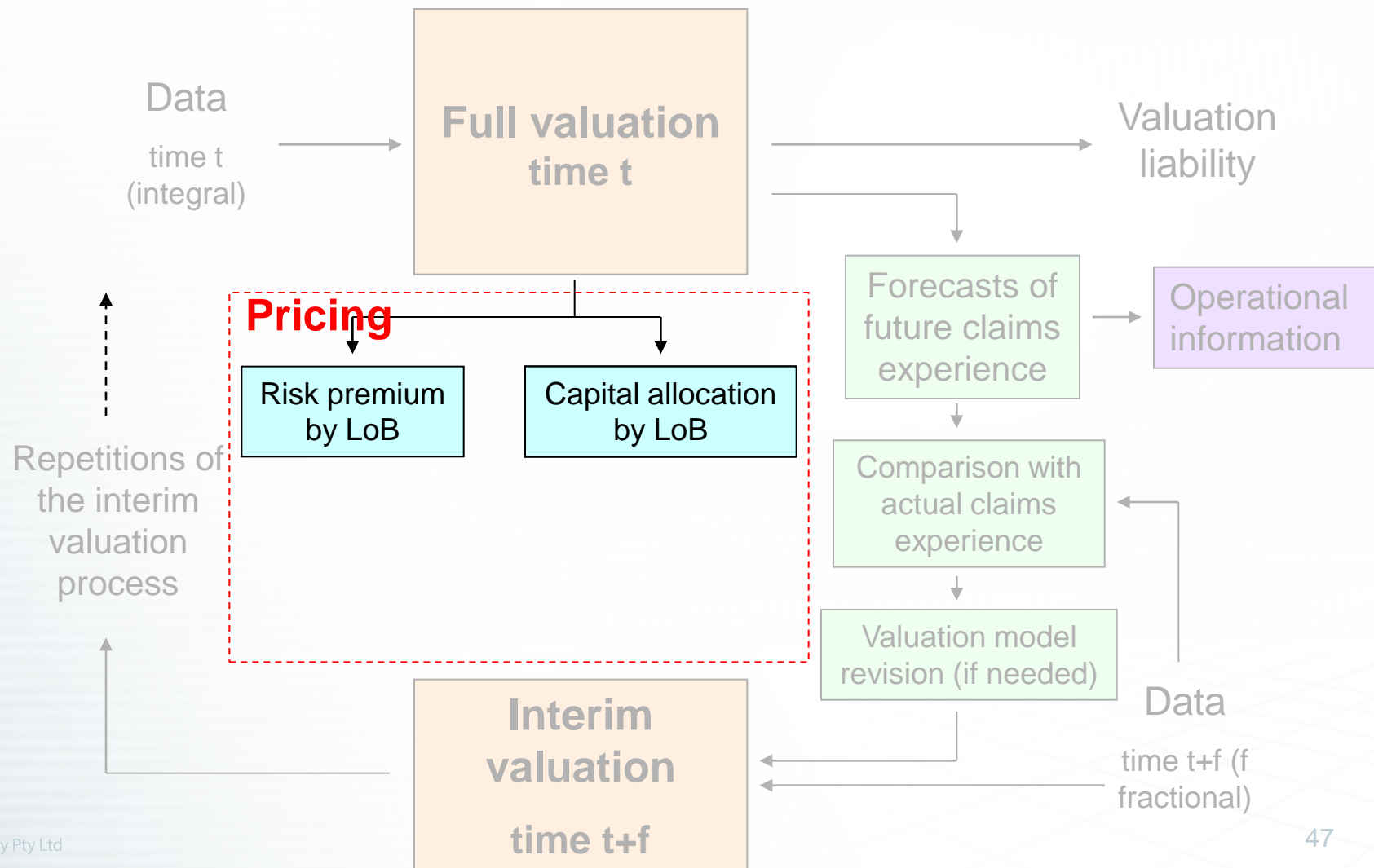


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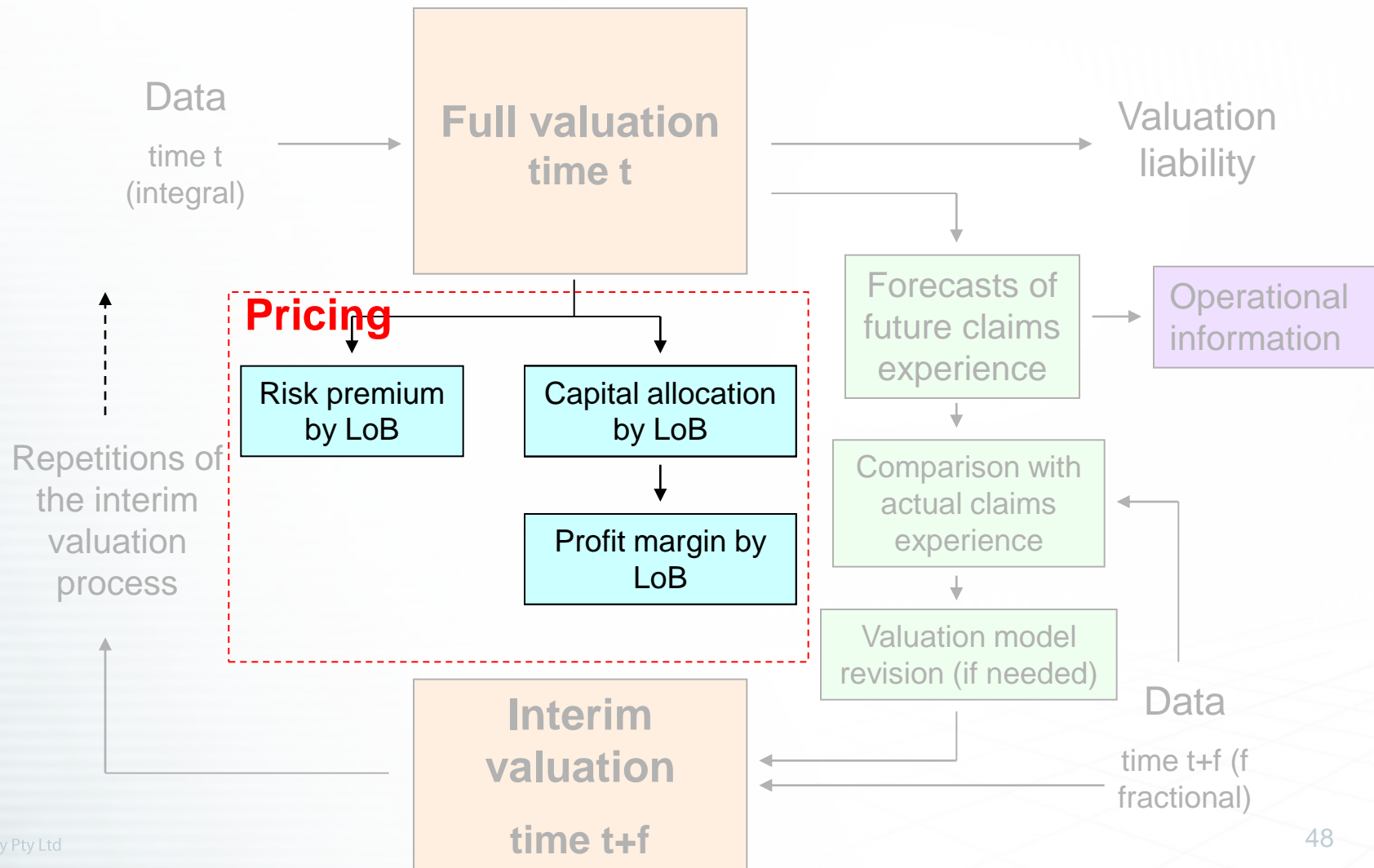


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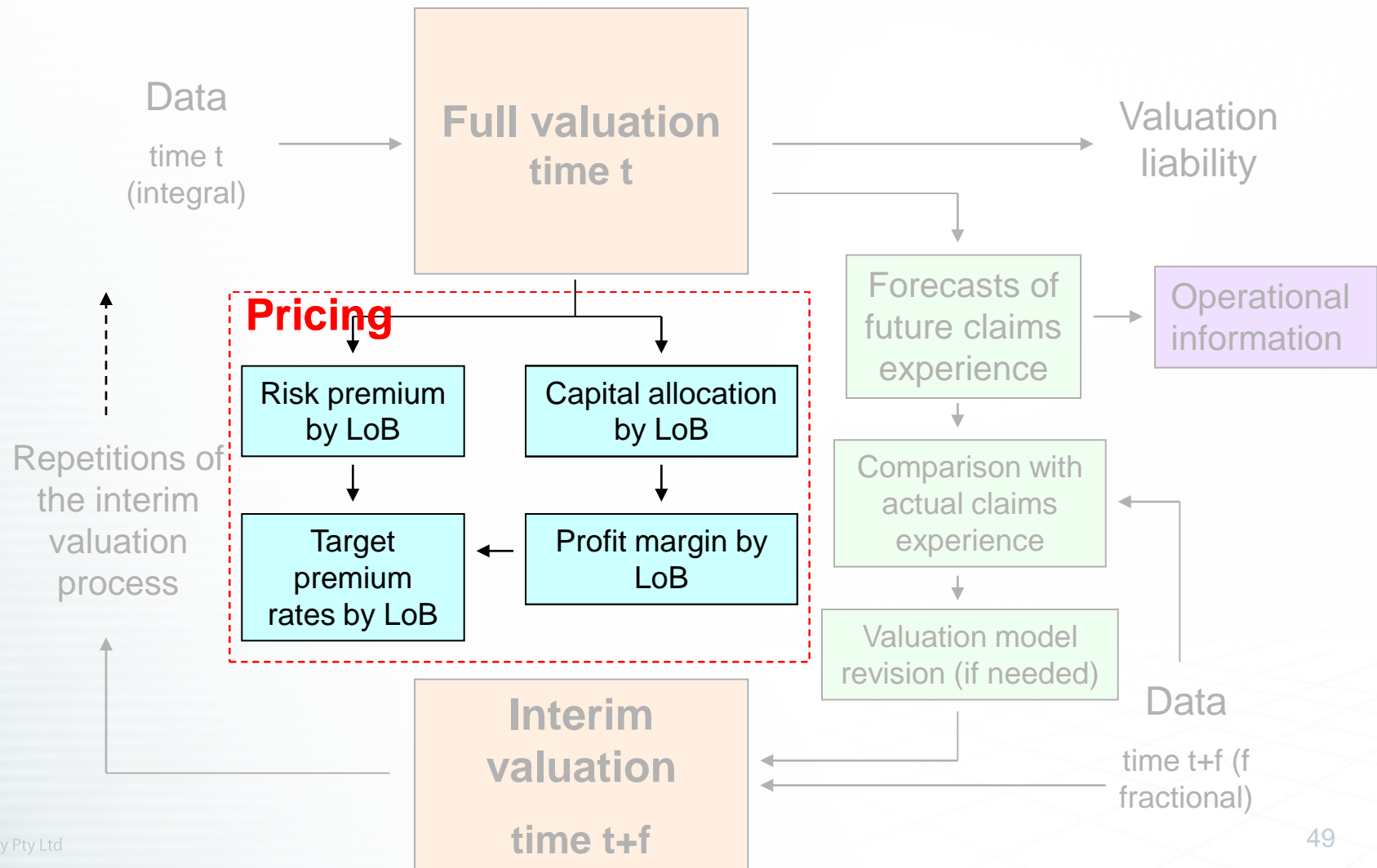


The valuation and control cycle





The valuation and control cycle





The valuation and control cycle

- The emphasis is on **business integration** of the valuation and control cycle
 - Valuation output informs business processes
 - Pricing (both risk and profit components) integrated with valuations

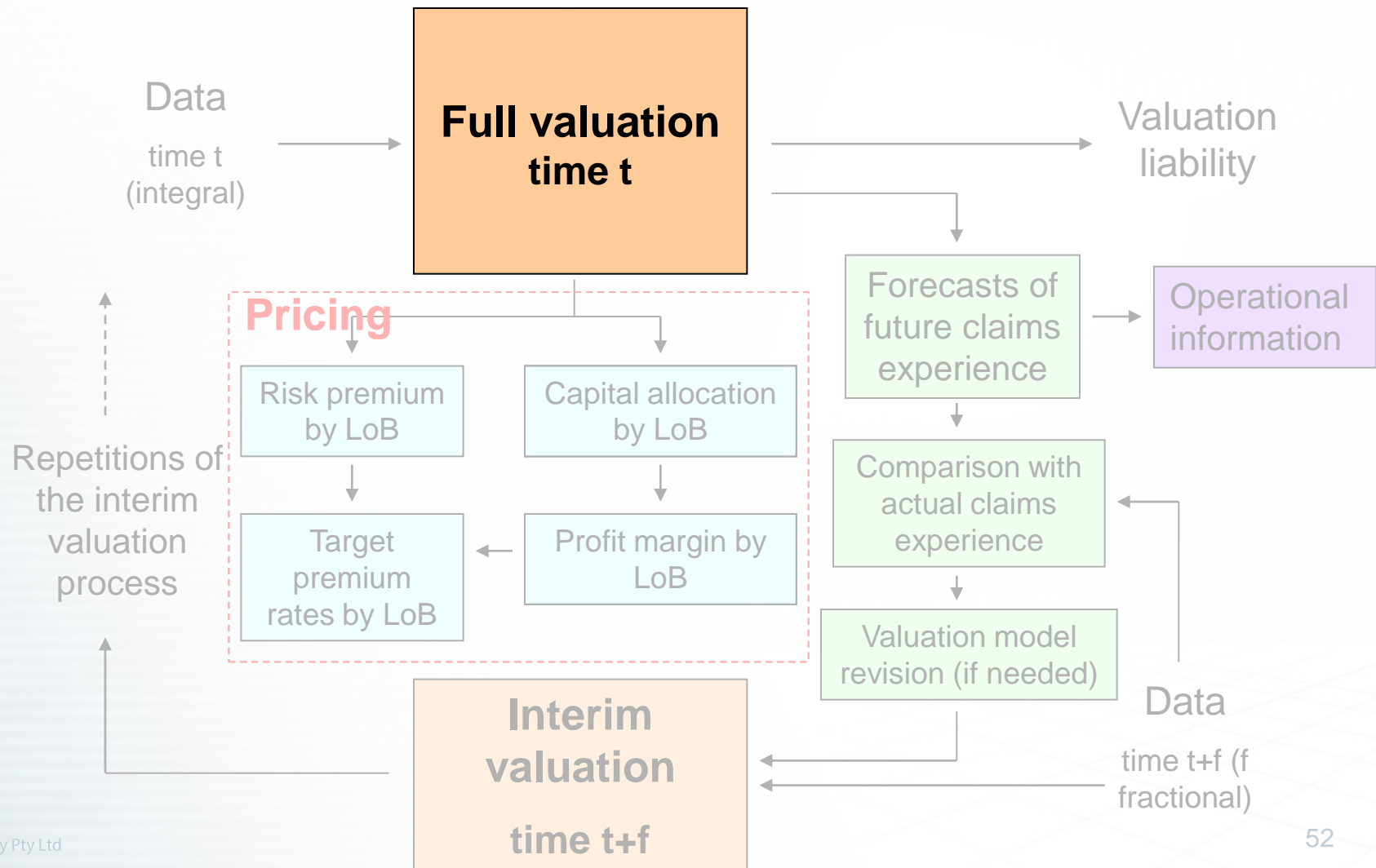


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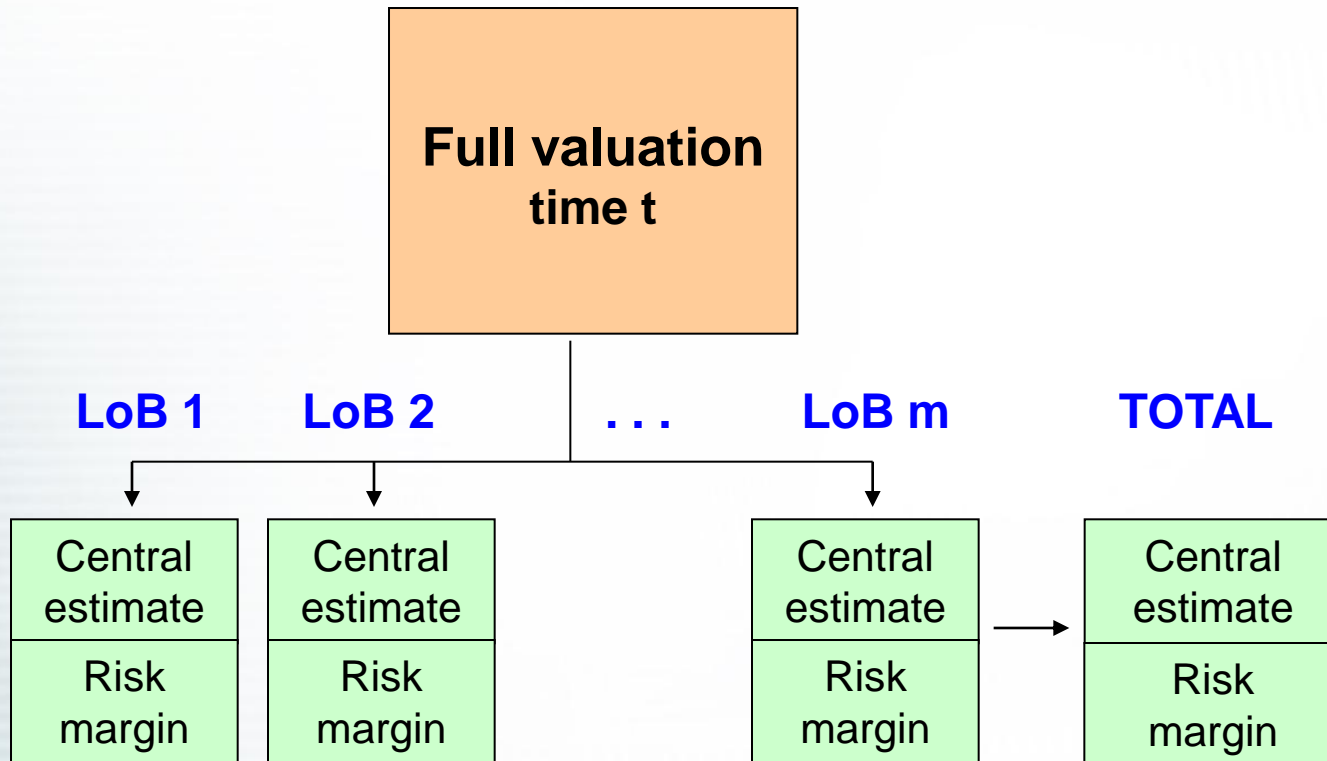


Full valuation process



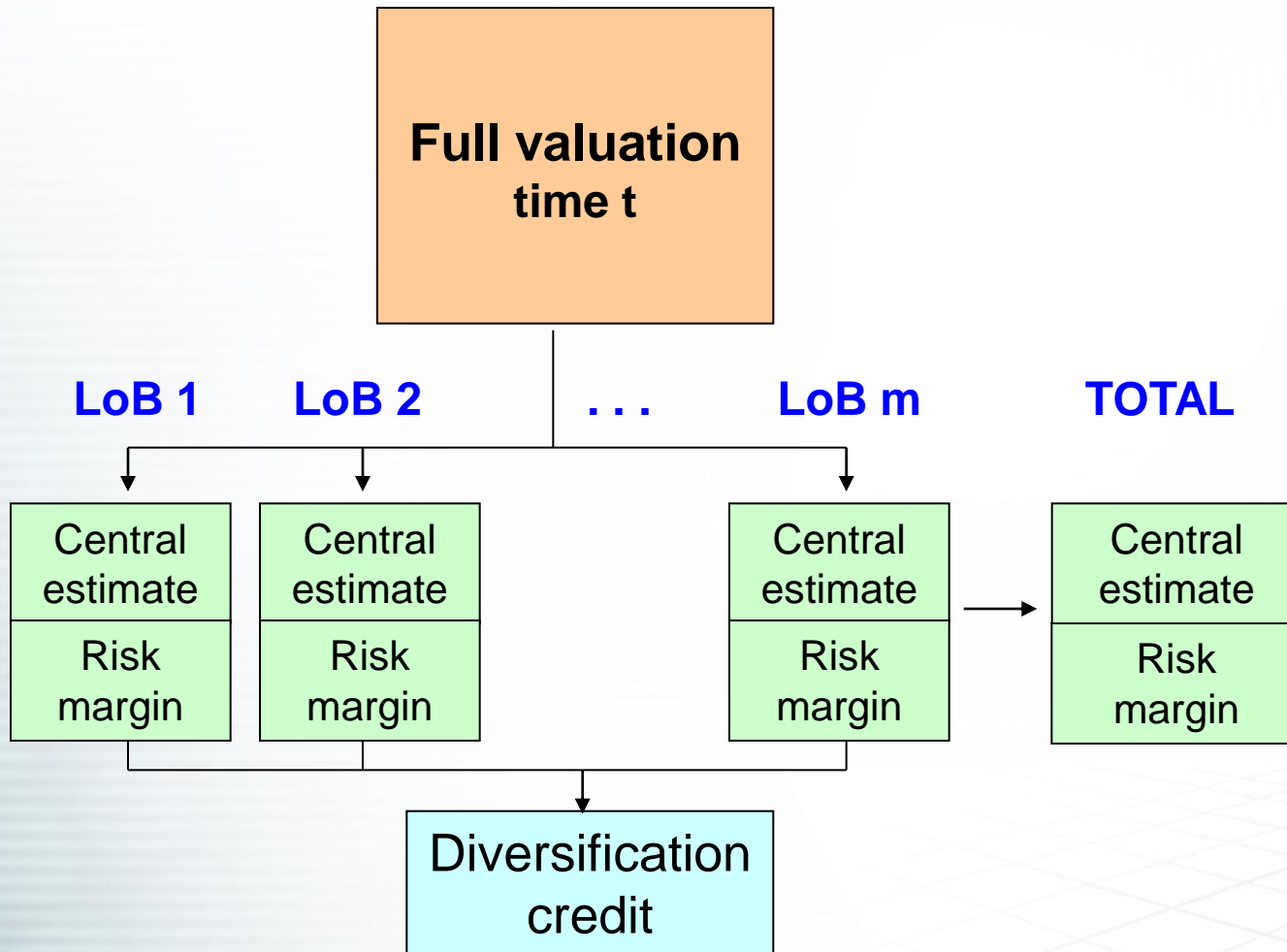


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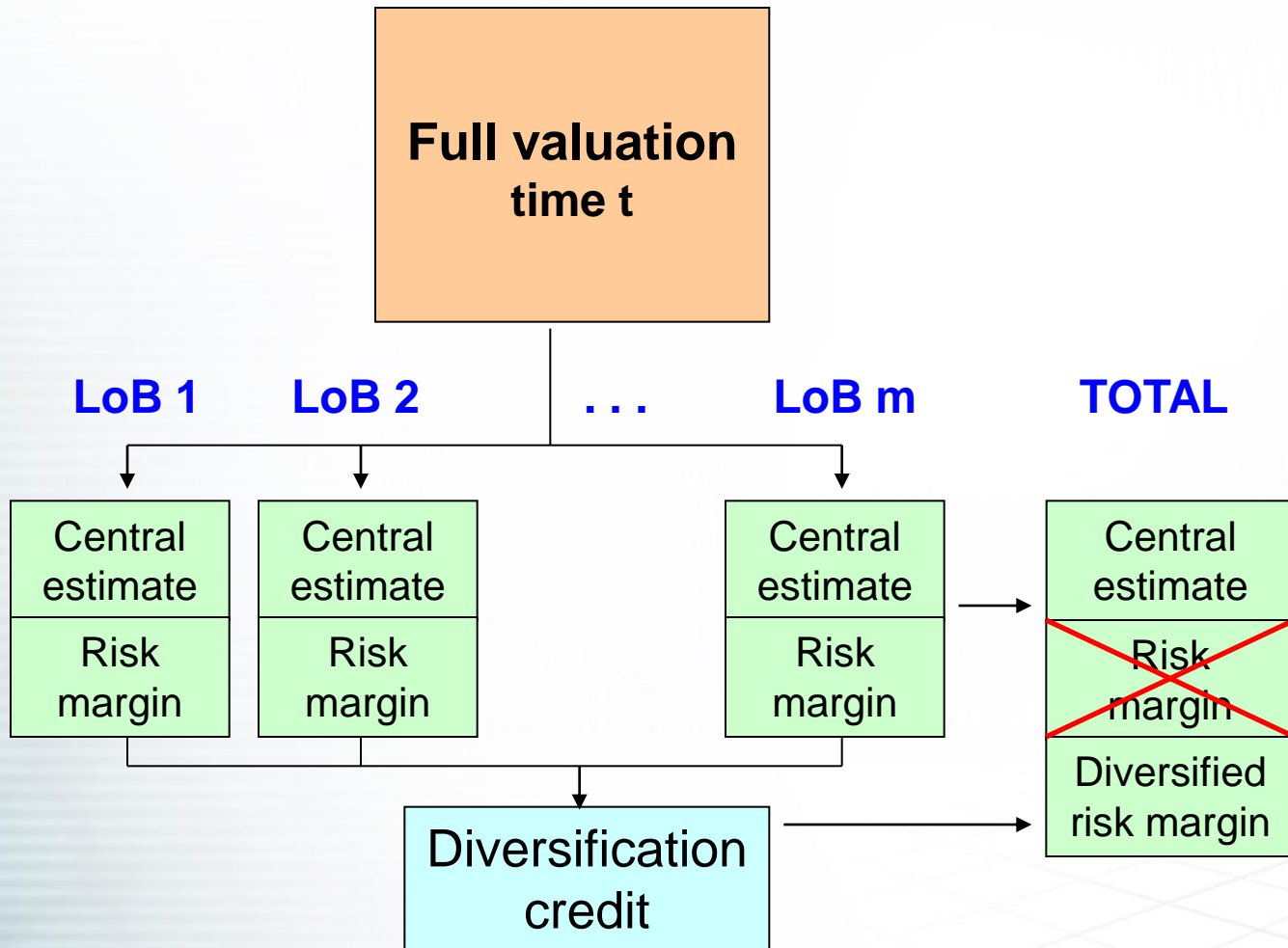


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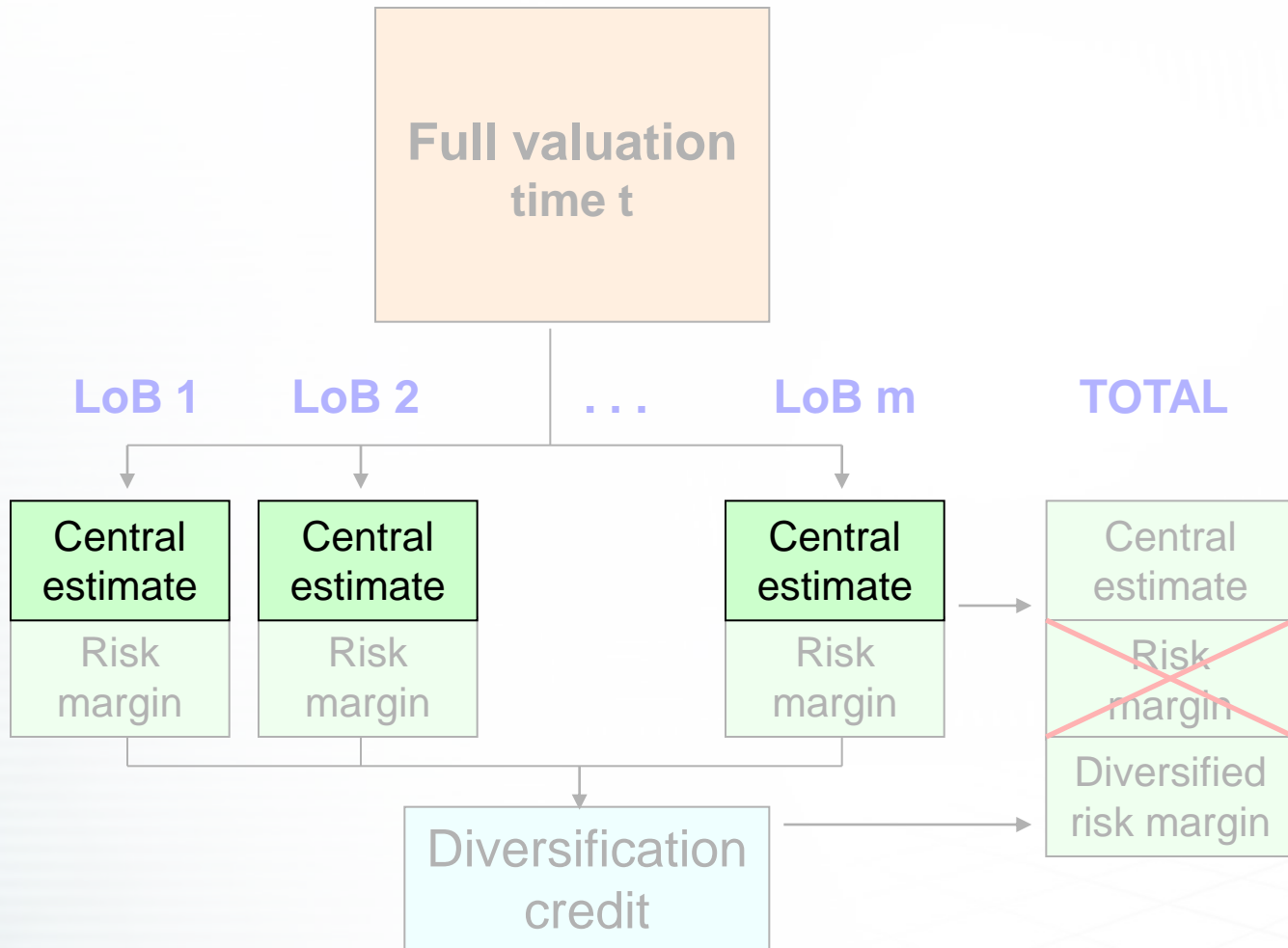


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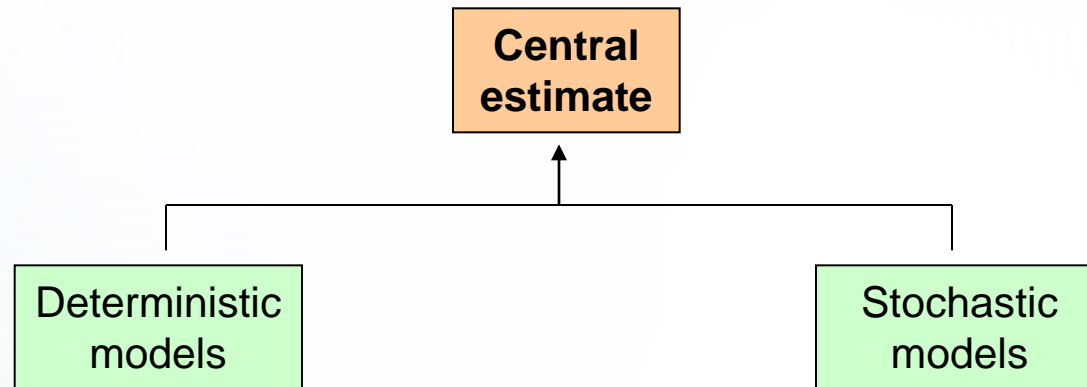


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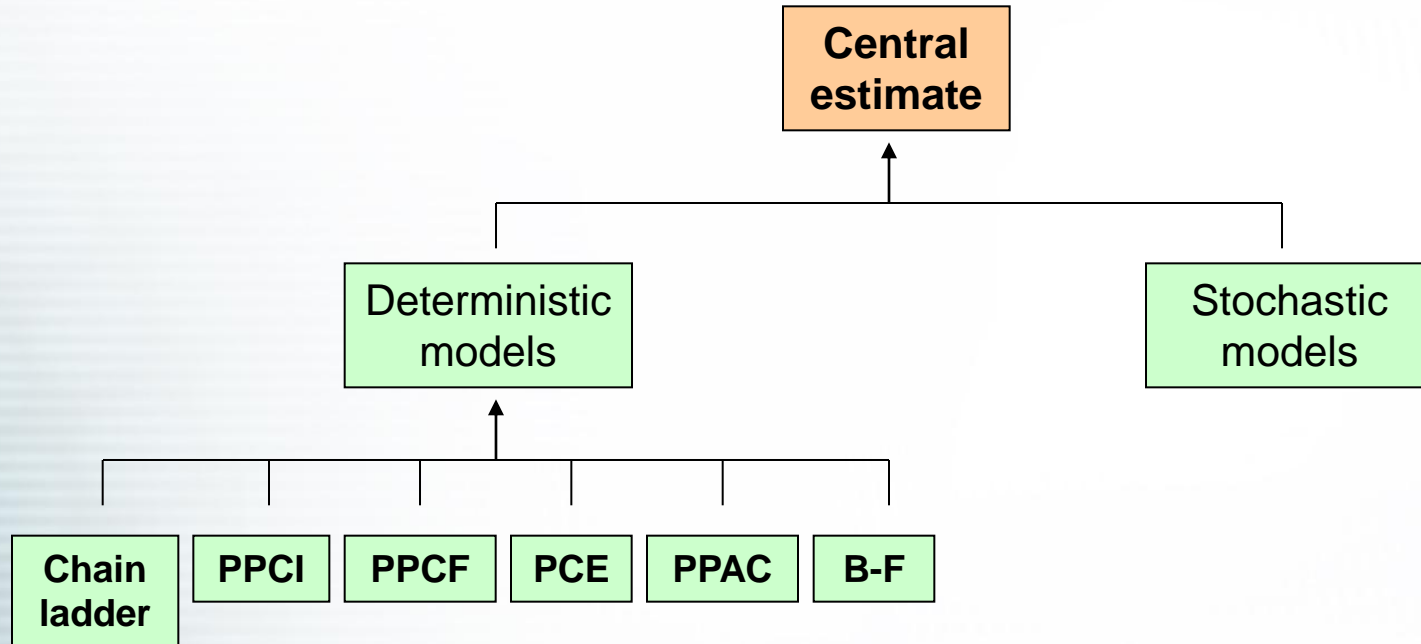


Central estimate for a single LoB





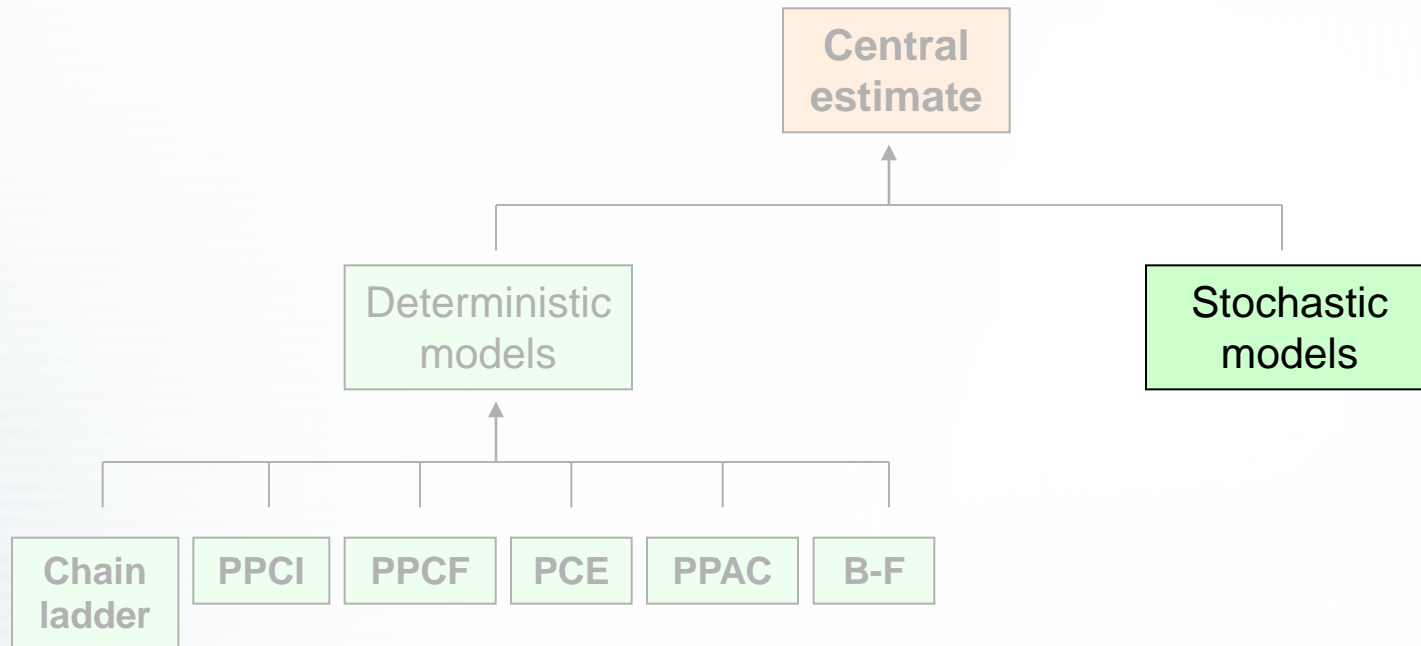
Central estimate for a single LoB



Mainstream



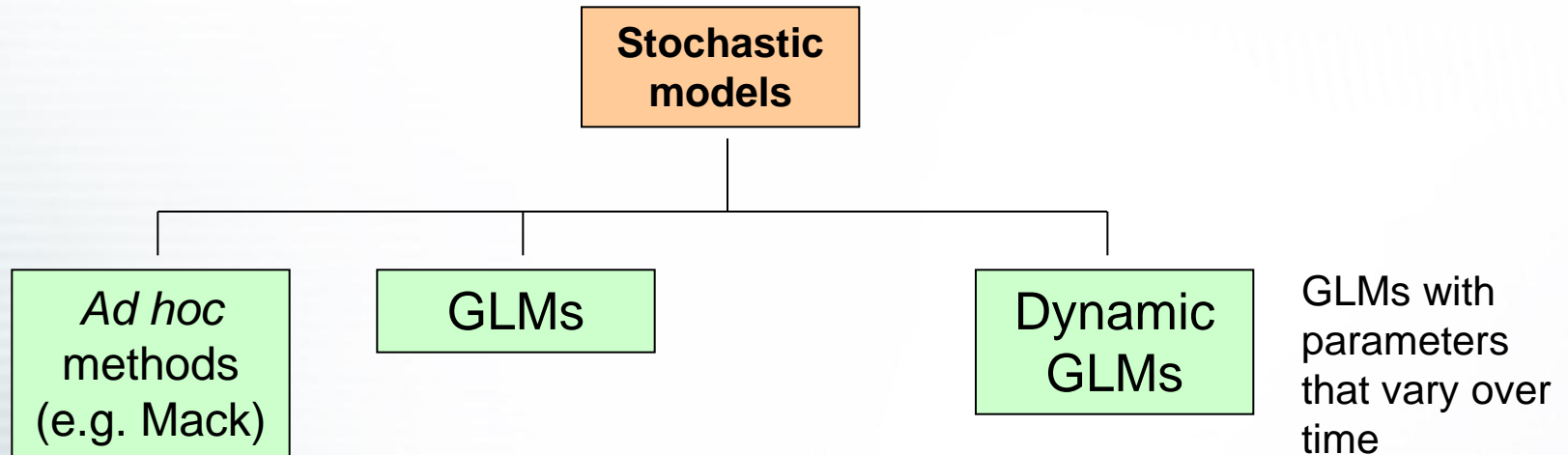
Central estimate for a single LoB



Mainstream

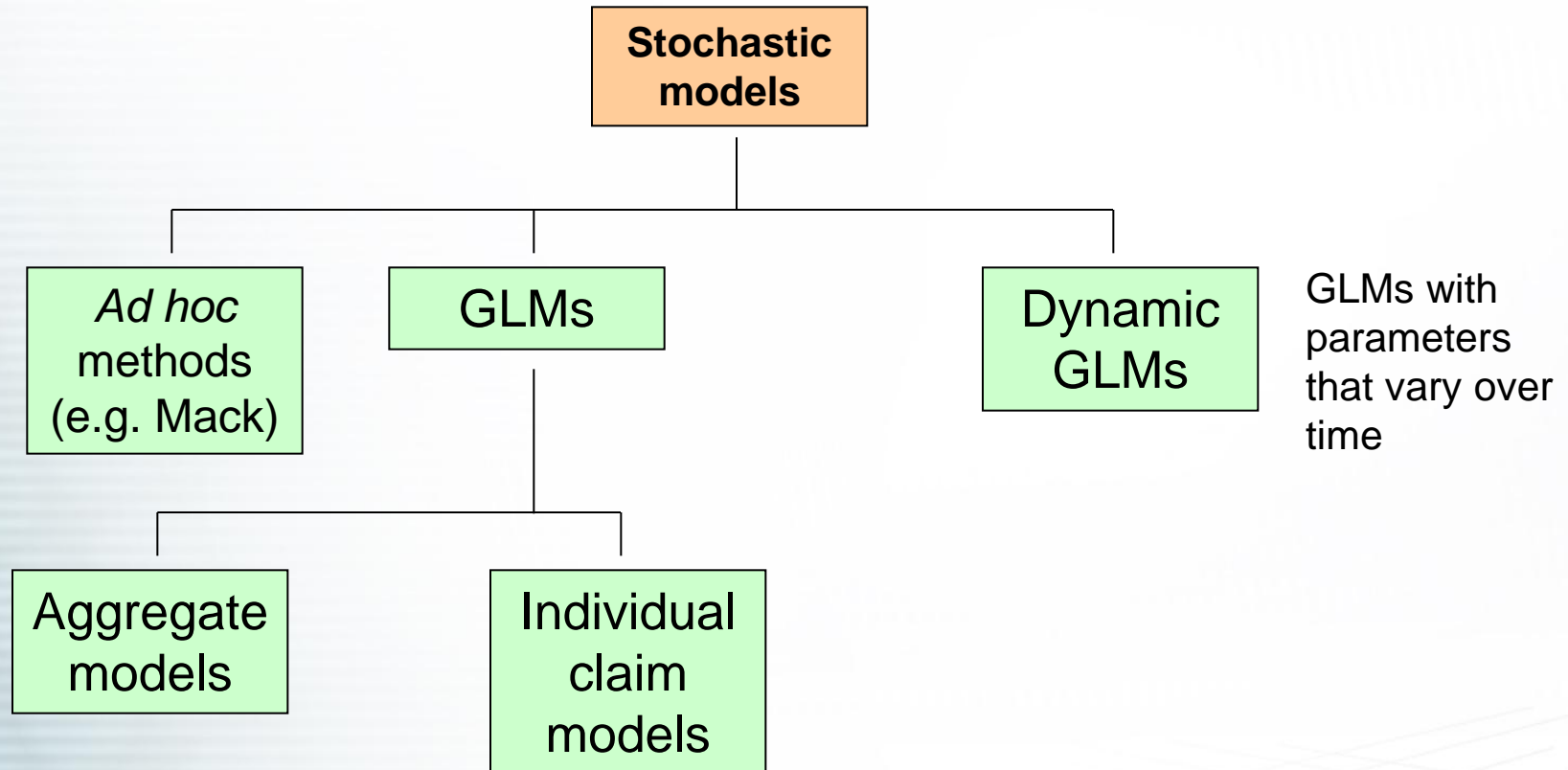


Stochastic loss reserving models



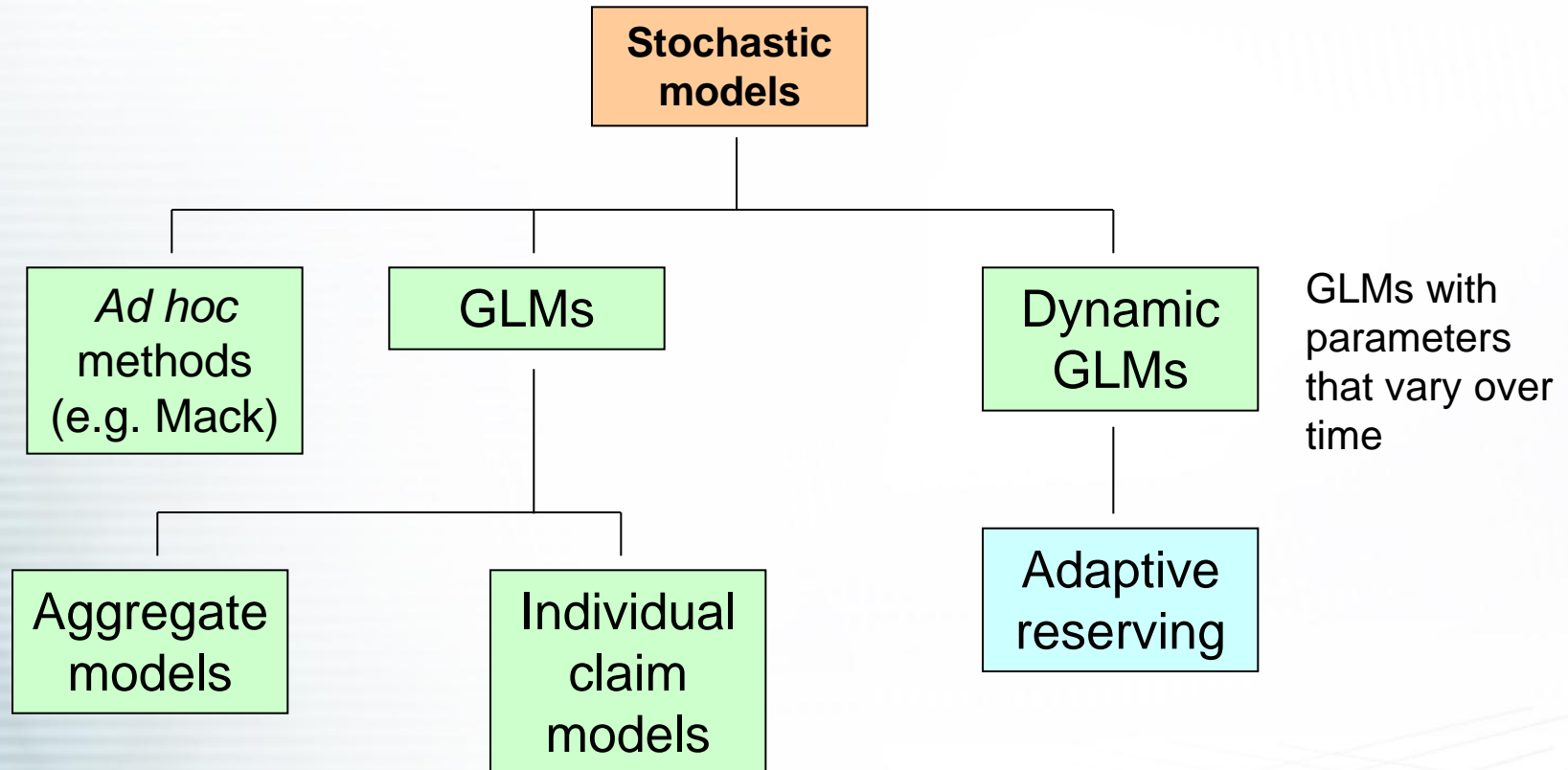


Stochastic loss reserving models



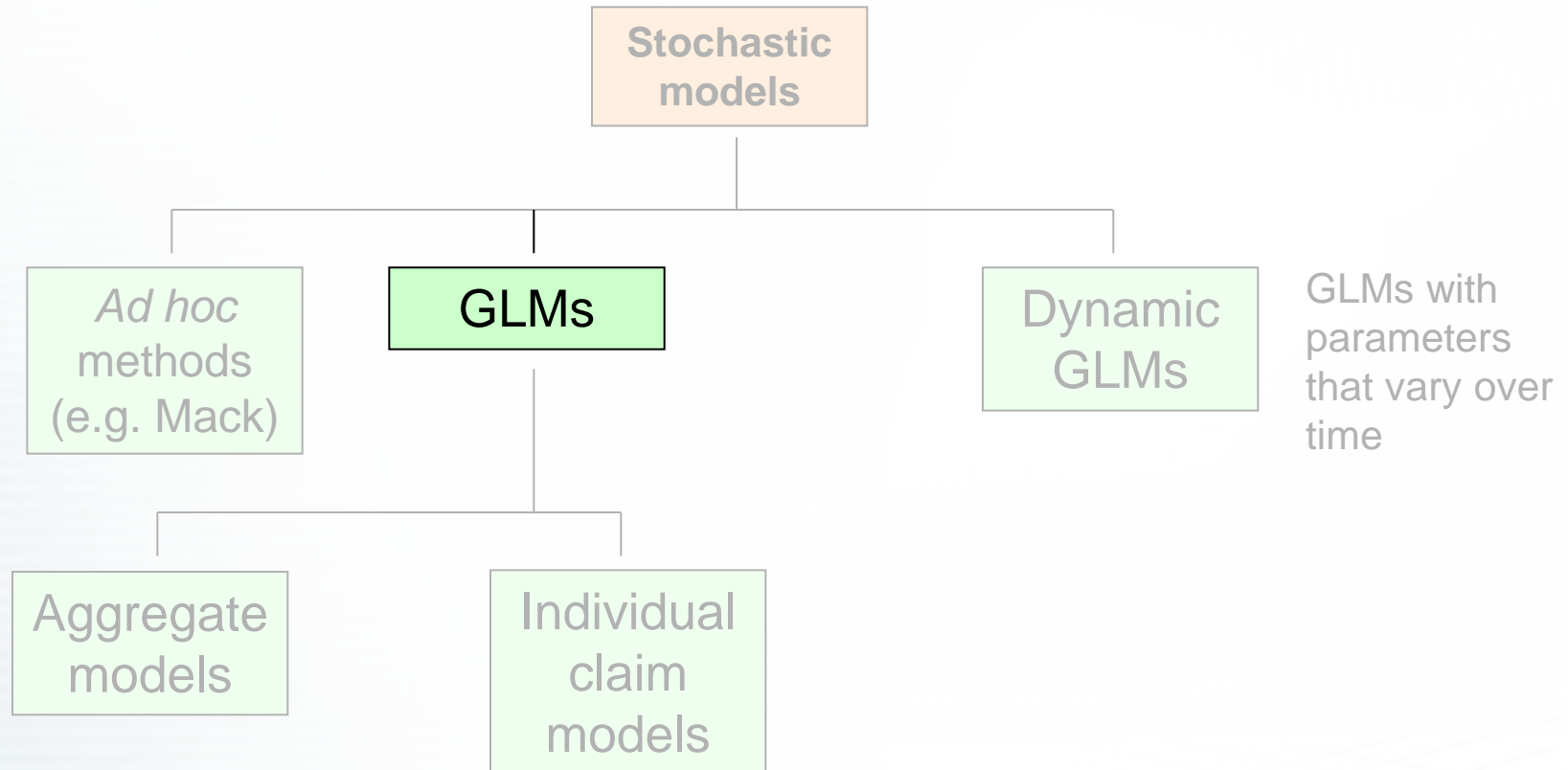


Stochastic loss reserving models





Stochastic loss reserving models





Deterministic vs Stochastic?

- Deterministic models appropriate in many circumstances
- Well understood, extensively utilised
- But cannot capture multivariate properties of the data

- GLMs can actually make life easier
 - They reduce the number of model parameters to be calibrated
 - This increases the model's predictive power
 - They capture multivariate properties of the data that are difficult to capture by more conventional means
 - e.g. superimposed inflation whose rate varies with age of claim at settlement



For example...

- Taylor Fry model of a long-tailed liability portfolio with a **single** GLM for size of claim settlements
- Individual (not aggregate) claim model with factors for:
 - Operational time at finalisation
 - Seasonality of finalisation
 - Injury severity (8 levels)
 - Legal representation (Y/N)
 - Legislative effects
 - Different for different severities
 - Different for different operational times
 - Superimposed inflation
 - Nil for lengthy periods but substantial for others
 - Different rates for different injury severities
 - Different rates for different operational times at finalisation

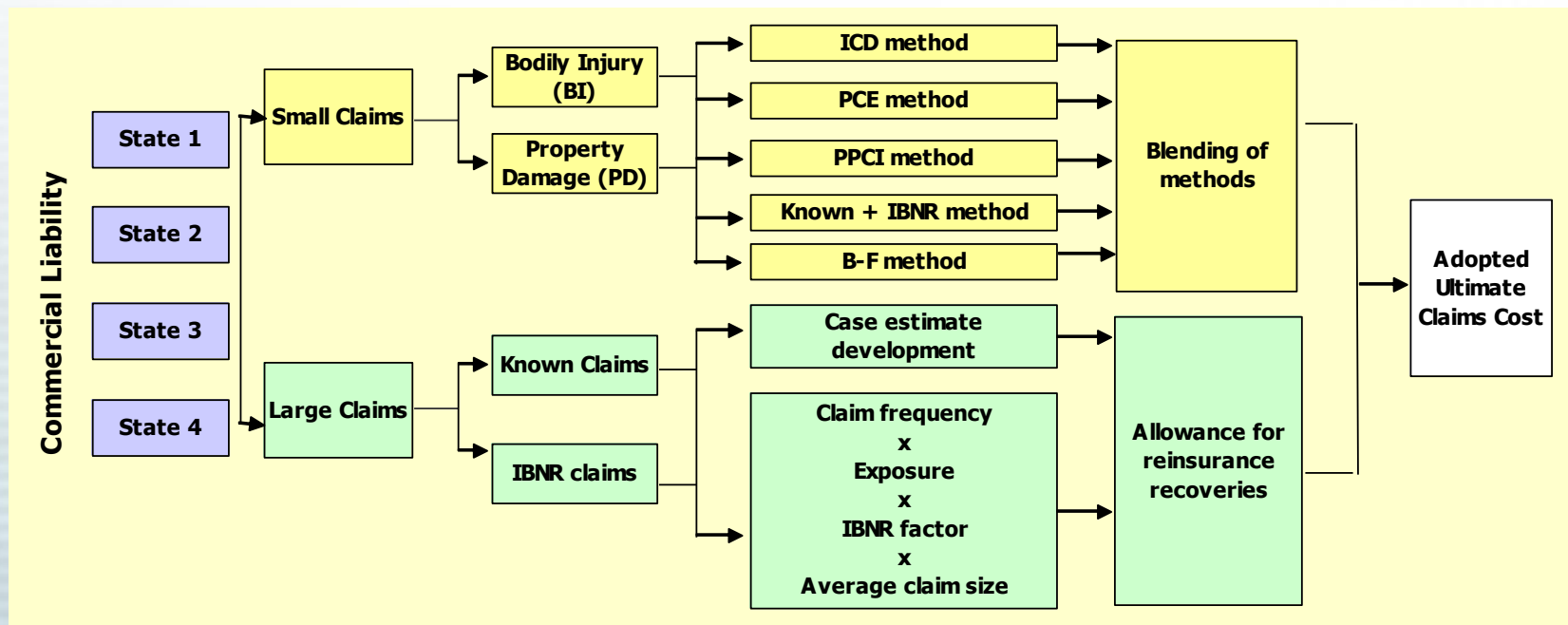


Segmentation of valuation

- For example – by state, by channel, by component, ...
- Often driven by operational reasons (eg profit sharing, reporting,...)
- Problem often addressed in one of two ways:
 - Single valuation dissected by state/channel/... on the basis of case estimates
 - Sometimes effective, but usually doubts about the most recent accident periods
 - Alternatively, separate valuation for each state/channel/...
 - Independent valuations are disconnected
 - The data from one segment has no influence on another – even if it should!
 - As well as generating dubious results in the smaller segments

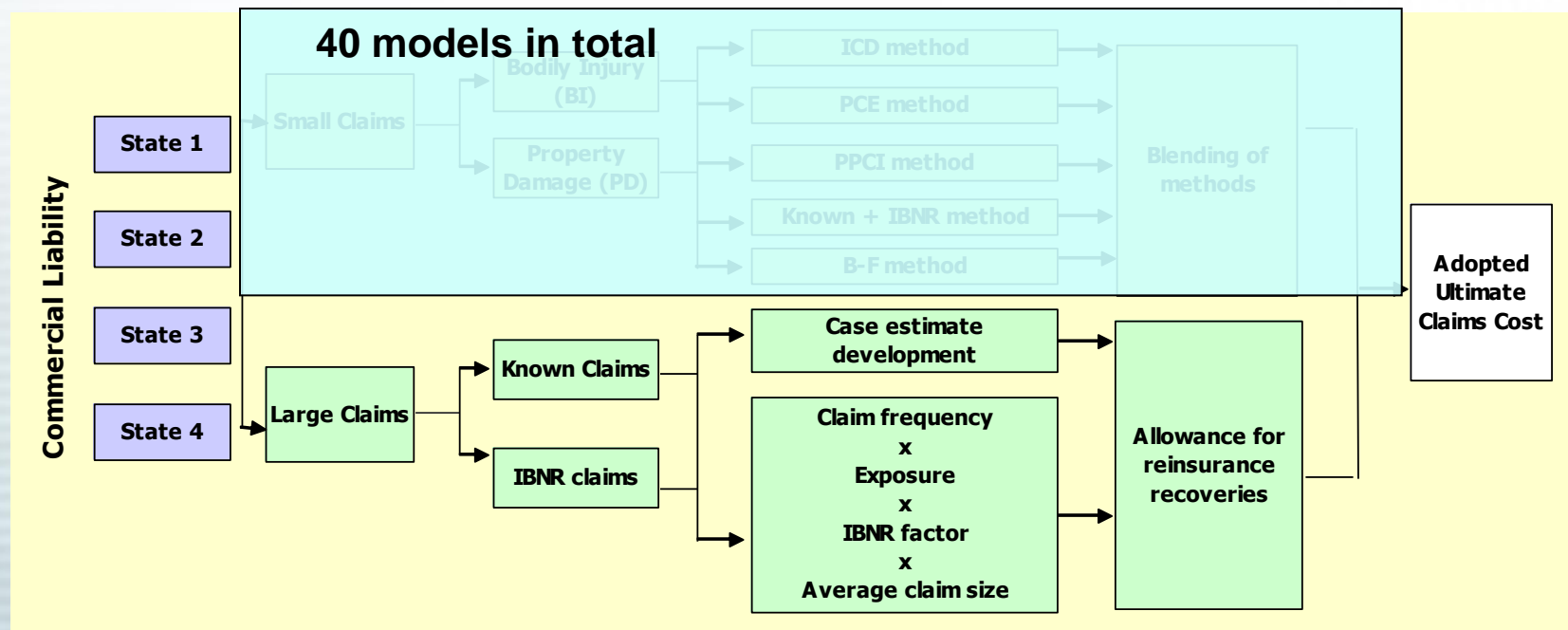


Segmentation – a case study



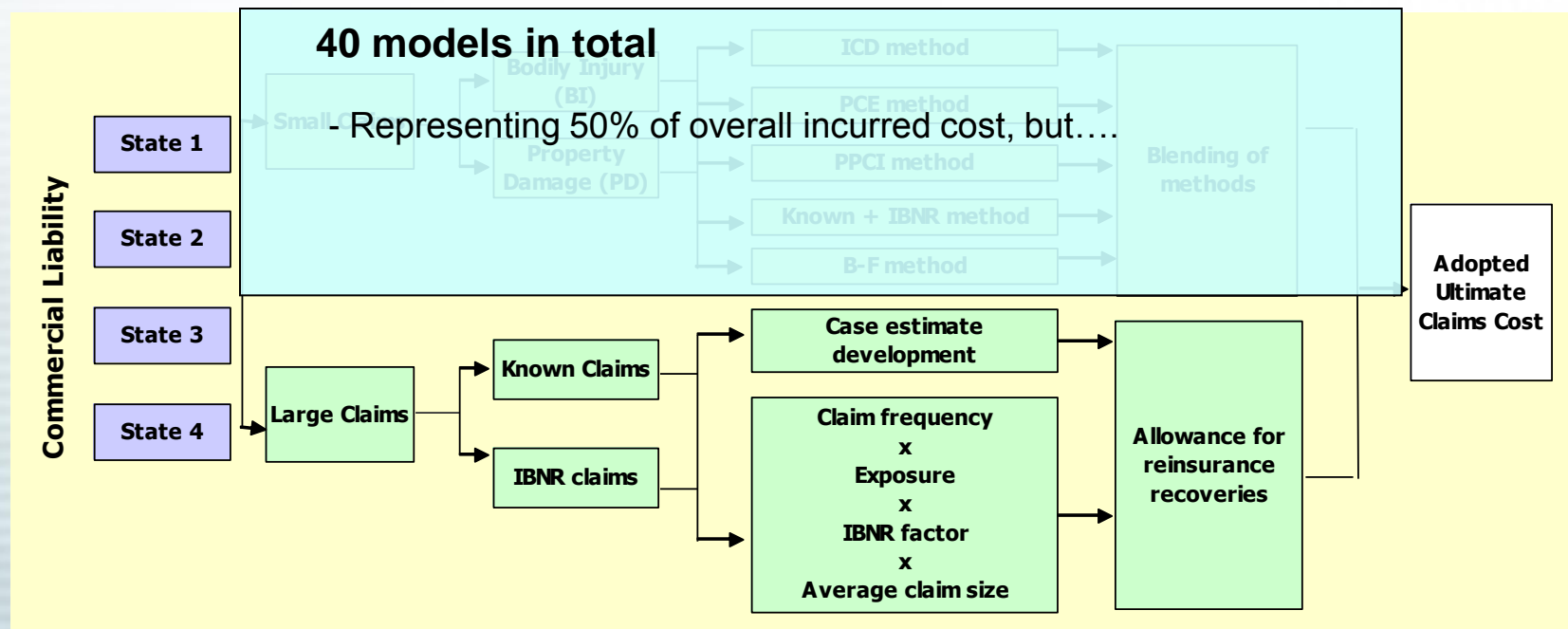


Segmentation – a case study



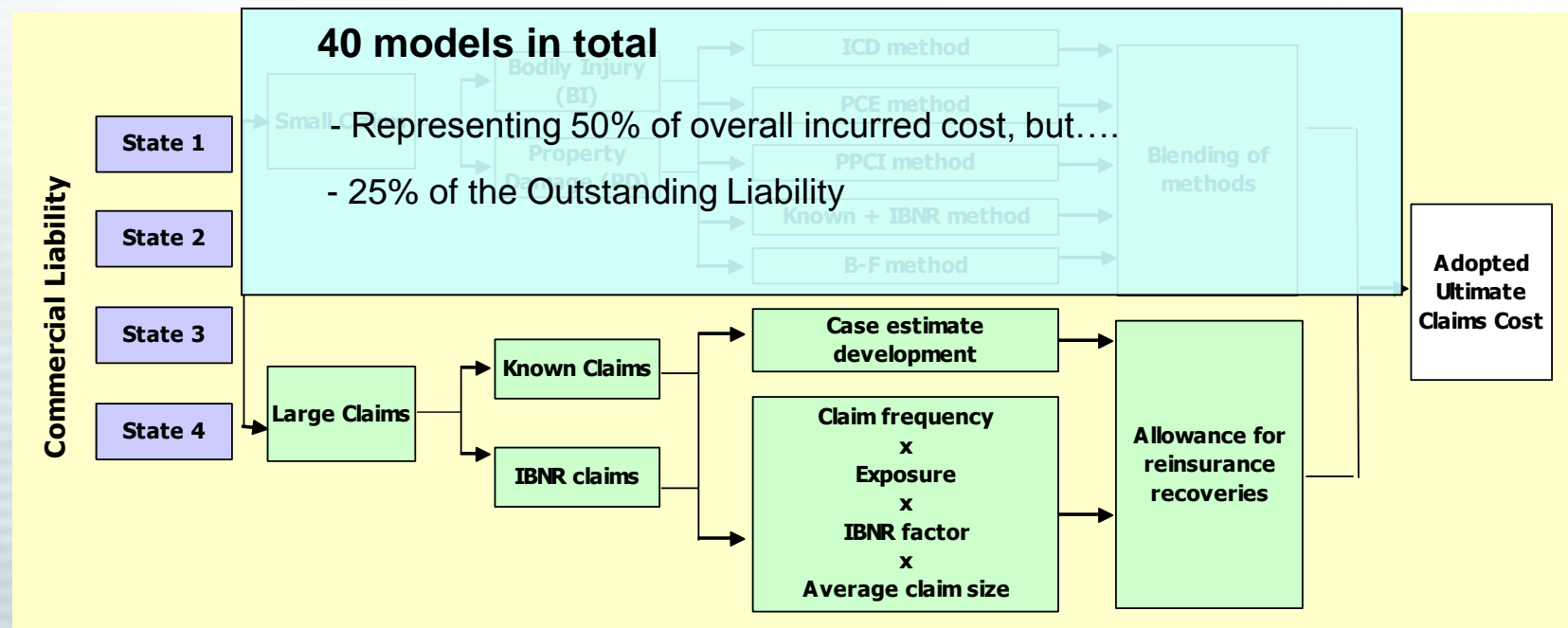


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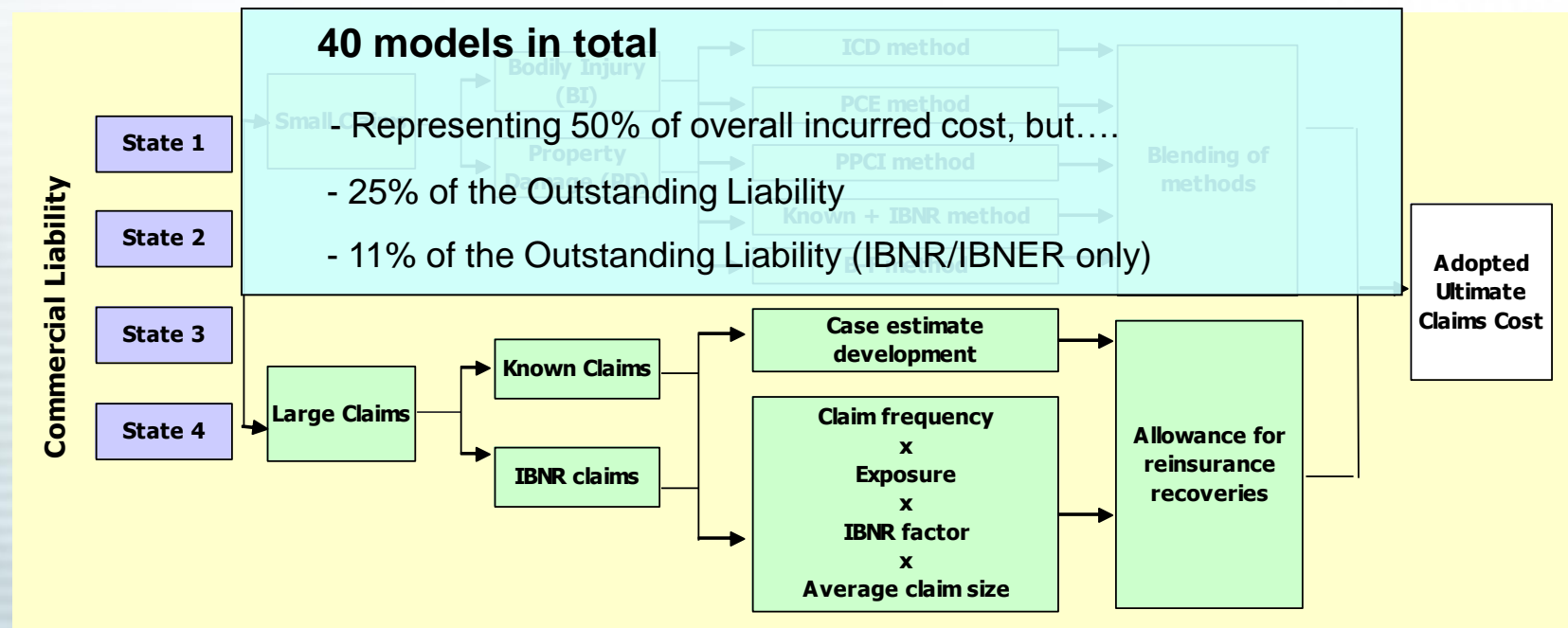


Segmentation – a case study





Segmentation – a case study





Is there an alternative?

- Consolidation
 - Across states?
 - Across claim size?
 - Across claim type?
- Reduce number of models
 - Are they all adding value?
- Alternative approach
 - Single GLM to integrate all valuations by means of a single model as far as possible
 - Model extended to test significance of variables (e.g. state)
 - This type of integration allows small segments to receive the benefit of (development year) information contained in all the other segments

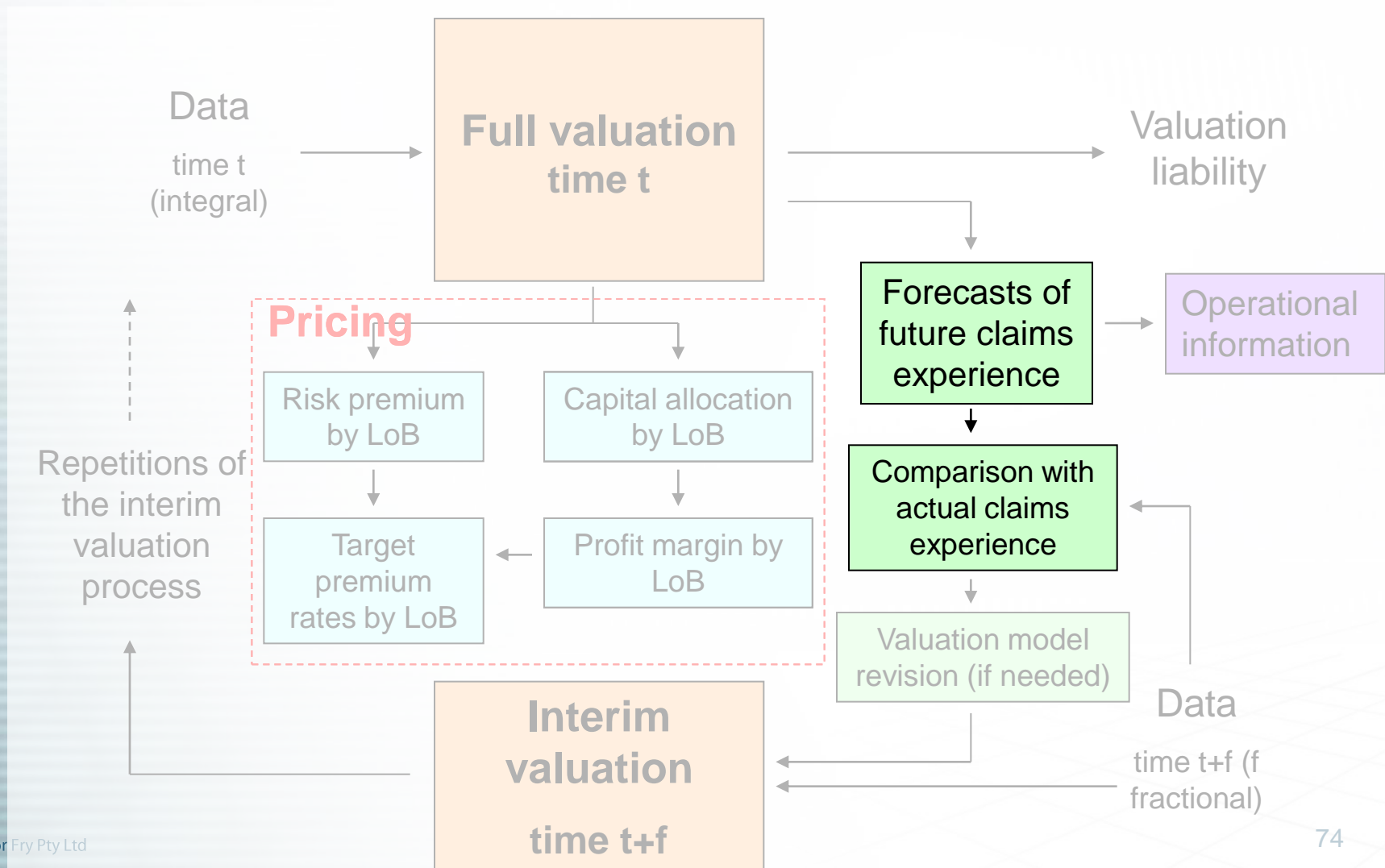


Getting the Balance Right

- Segmentation often driven by operational demands
- Require diagnostics/trends (e.g. frequency and claim size)
 - By portfolio
 - By state
 - By cost component
 - By....
- Need to explicitly consider the pros and cons of linking the Reserving to this detailed monitoring
 - Can lead to significant over-engineering of reserving process
 - Understand the cost/benefit



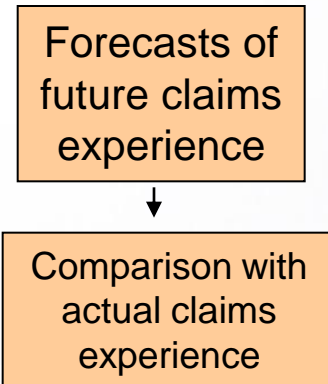
Full valuation process





Performance tracking

- Require continuous inter-valuation testing of last valuation model
- i.e. need to flag any significant deviations of claims experience from valuation forecasts

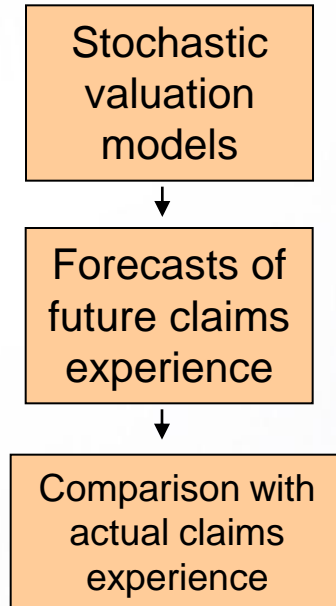




Performance tracking

- Require continuous inter-valuation testing of last valuation model
- i.e. need to flag any significant deviations of claims experience from valuation forecasts
- “Significant” means “statistically significant”
- So require stochastic properties of valuation forecasts

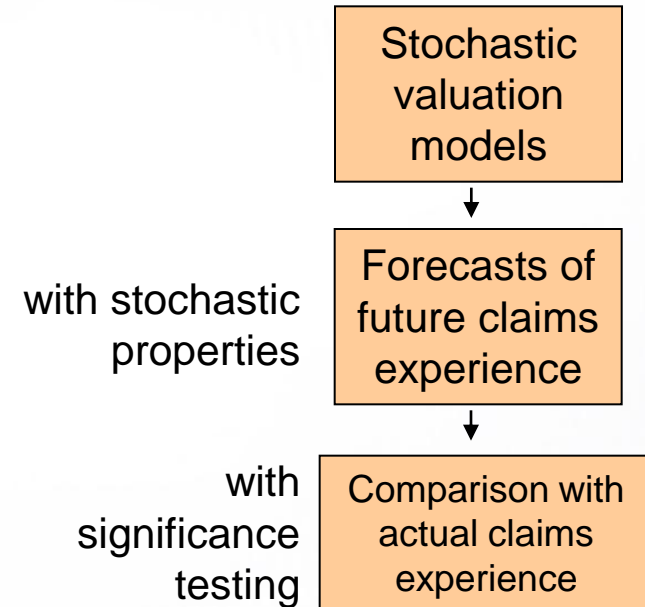
with stochastic properties





Performance tracking

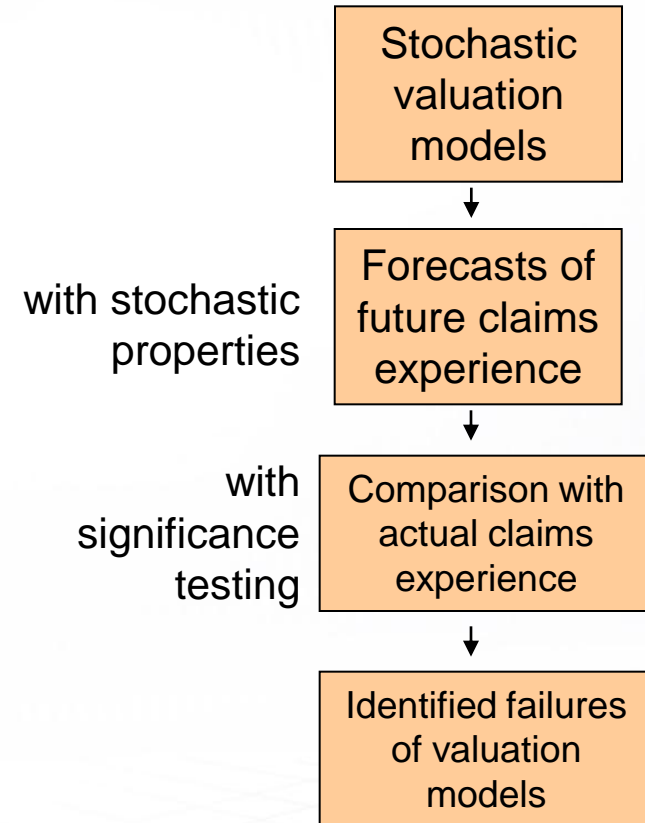
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- This enables identification of statistically significant failures of the valuation models





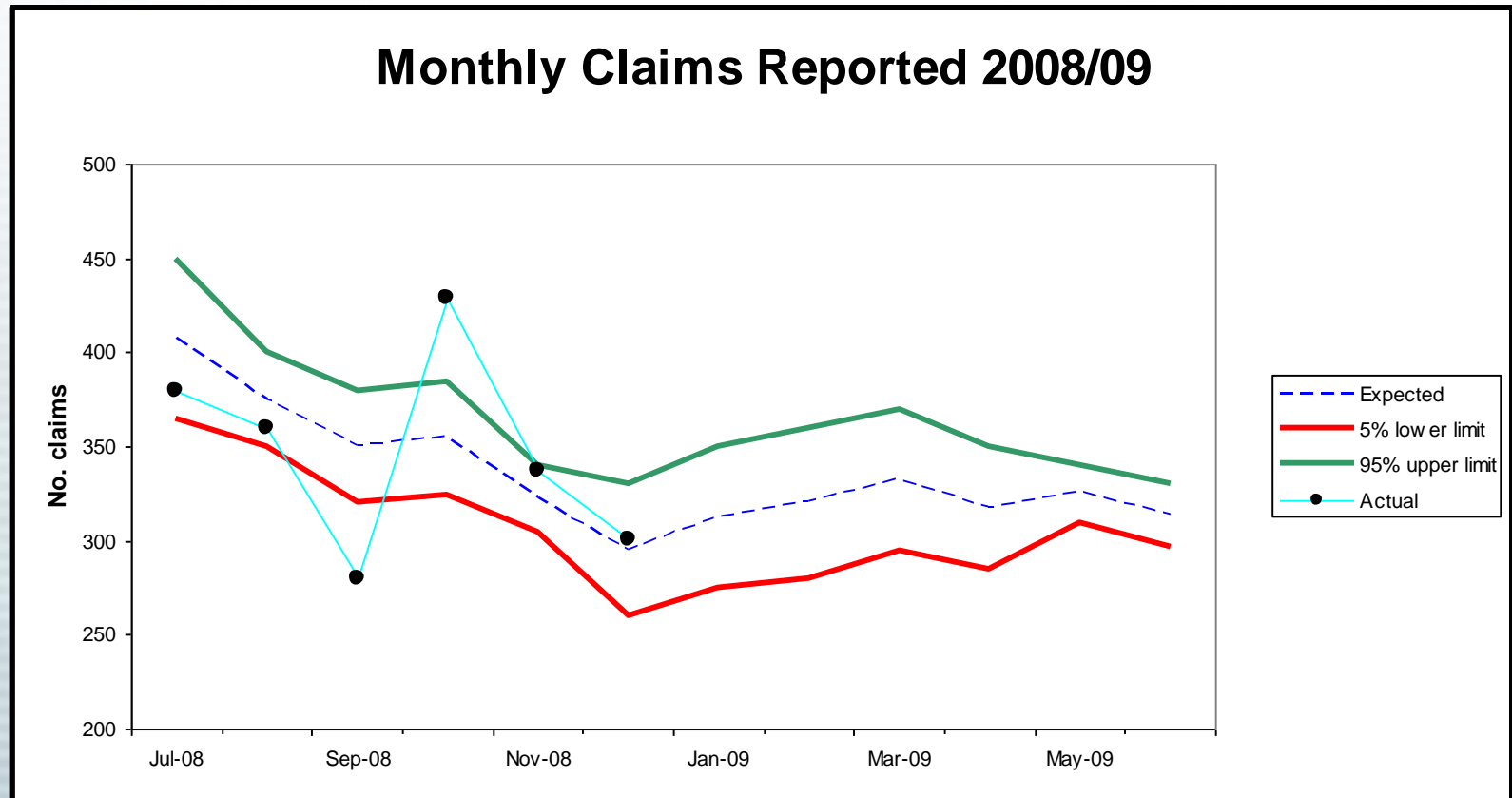
Performance tracking

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- i.e. need to flag any significant deviations of claims experience from valuation forecasts
- “Significant” means “statistically significant”
- So require stochastic properties of valuation forecasts
- This enables identification of statistically significant failures of the valuation models
- Indicating where those models require correction





Case Study – Performance Tracking





Case Study – Performance Tracking

December 2008 (Numbers)

Development Year	Actual Dec-08	Expected Dec-08	A / E	Flag
			%	
0	209	228	92	
1	61	49	124	!!!
2	5	9	56	
3	8	4	200	!!!
4	3	2	150	
5	0	1	0	
6	1	1	100	
7	0	0	0	
8	0	0	0	
9	0	0	0	
10	1	0	963	
11	0	0	0	
12	0	0	0	
13	0	0	0	
14 & later	0	0	0	
Total	288	294	98	

- Reported Numbers
- Overall within tolerance, but some significant deviation within development year
- “Flag” can highlight significance at any required level
- Monitor payments, finalisations, case estimates,...



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- Background
- Survey Results
- Features of a superior valuation process
- Reserving Control Cycle
- The Valuation Process
- Summary



Summary

- Think about what you want from your reserving process, and design it to deliver this
- Reserving is an opportunity to add value (not just something that you have to do!)
- Improving the valuation process can add tangible value to the business (it is not just an academic exercise)



Checklist

- Whether using in-house or external resources, consider:
 - Purpose
 - Process design
 - Data capture/data integrity process
 - Modelling approaches (eg Stochastic vs Non-stochastic)
 - Outputs and monitoring (KPIs, diagnostics)
 - Possible automation (eg Excel/SAS platforms)
 - Correlation and diversification analysis



Checklist

- If using in-house resources, consider:
 - Supplementing with external advice
 - Training
 - Knowledge transfer
 - Quality assurance
 - Establishing techniques, models, templates, ...
 - Continuous improvement
 - One-off assignments or periodic support
 - Could form part of AA brief (if external)



The Benefits of Getting it Right

- Improved efficiency
- Reduced risk
- Reduced costs

- Improved pricing
- Better operational information
- Greater business value extracted from a mandatory exercise

- Fewer nasty surprises



Thank you