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Your reserves may be best estimate, but are they valid?

Presented by members of the Towards the Optimal
Reserving process working party
30 November 2021

TORP Working Party

- Since 2016, I have chaired the Towards the Optimal Reserving Process working party. Working Party has existed since 2012
- This brings together actuaries to focus on the topic with a wide range of industry/consulting experience
- Title of the Working Party is attractive as it implies that there is a journey towards an optimal reserving process. Webpage is : <https://www.actuaries.org.uk/practice-areas/general-insurance/research-working-parties/towards-optimal-reserving-process>
- The objectives of Towards the Optimal Reserving Process Working Party are to:
 - investigate common practice within the reserving process and disseminate such information as required, ensuring practitioners are aware of such practices
 - describe common issues relating to the reserving process and provide ideas around how to address these within the 'typical' reserving process
 - consider emerging trends in reserving process requirements and identify potential ways to address these
 - assist in making new reserving methods accessible to the wider Profession by providing practical steps to integrate them within existing reserving processes
- Current membership: 16 members across personal/commercial lines; Lloyds / non-Lloyds and with International representation. Presented at each of the 2017 – 2020 GIROs plus produced this Sessional Paper
- Introduction of presenters: William Diffey; Ed Harrison/Laura Hobern; Arun Vijay; Al Lauder



Introduction & Overview

- Paper on IoA website is culmination of 2 years effort
- Paper focuses on:
 - Current state and techniques for reserving validation
 - Reserving validation frameworks and roles of key governance stakeholders
 - Impact of covid-19
 - Looks at key topics such as IFRS 17
 - Includes Machine Learning study
 - And Data framework as a key enabler
- Builds on GIRO 2020 foundation ‘Can you trust your reserving - Reserving validation under Covid-19’ & TORP presentations from GIRO 2017-2019
 - Reserving in the Pressure Cooker
 - IFRS 17: Are Reserving processes and systems heading for the Rocks
 - Are transformations driving reserving towards a cliff edge
- Conscious that section 3 could become exam core-reading! As could section 6

Section 2: Reserving validation in use

Core reserving analysis

- Identify assumptions that are no longer valid
- Detect emerging trends and risks that may need to be allowed for
- Identify material assumptions and their sensitivity
- Selection of best fit models
- Highlight areas of concern requiring additional attention
- Provide an overview of areas of key uncertainty in the review

Sign-off of reserves

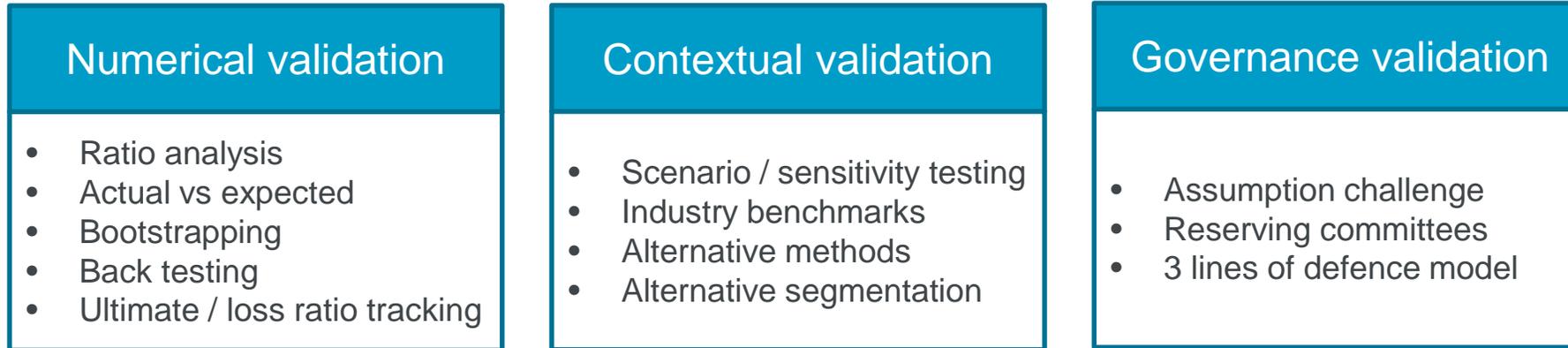
- Enable more effective challenge
- Identify key assumptions that impact the results
- Demonstrate that key assumptions have been challenged and plausible alternatives considered
- Give clarity around point estimates and uncertainty
- Provide evidence of good governance and appropriate challenge

Out of cycle

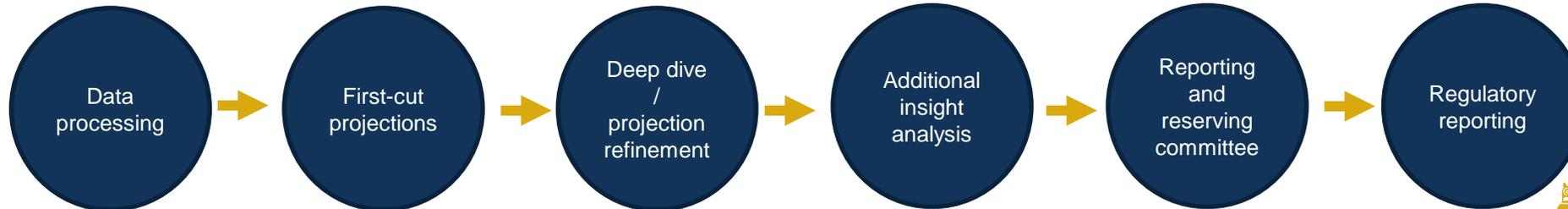
- Provide ongoing monitoring of experience to ensure assumptions remain appropriate
- Provide evidence to respond to regulatory queries (e.g. Dear Chief Actuary/CRO/CEO letters)
- Support/feed into other processes
- Provide meaningful comparisons to market
- Police/check new “black box methods”



Section 2: Possible Validation Framework



Stages of the core reserving process



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Section 3: Current approaches to validation

- This section presents a current critique of currently commonly used validation tools.
- The techniques aren't new, but are considered in the context of an overall framework.
- Also provide suggestions for best practice implementation.

Numerical validation

- Ratio analysis
- Actual vs expected
- Bootstrapping
- Back testing
- Ultimate / loss ratio tracking

Contextual validation

- Scenario / sensitivity testing
- Industry benchmarks
- Alternative methods
- Alternative segmentation

Governance validation

- Assumption challenge
- Reserving committees
- 3 lines of defence model



Section 3: Current approaches to validation

Themes from our review of existing validation techniques

Use of Automation

Diagnostics and dashboards

Joined-up approach across
business

Projection vs validation
granularity

Timing of validation activity

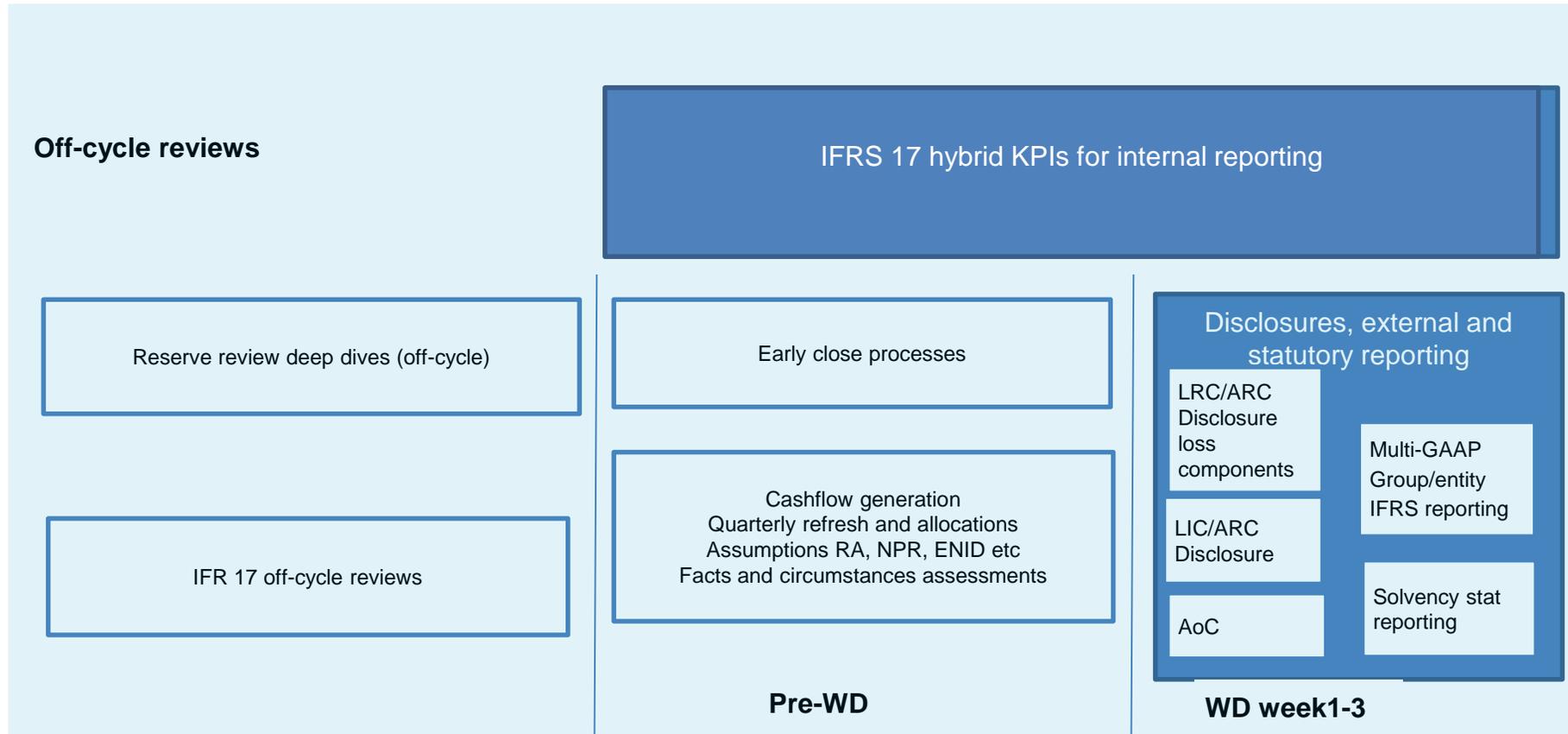
Understand the limitations of
your process



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From section 5: Impact of IFRS 17 on validation

IFRS 17 example reserving workflow



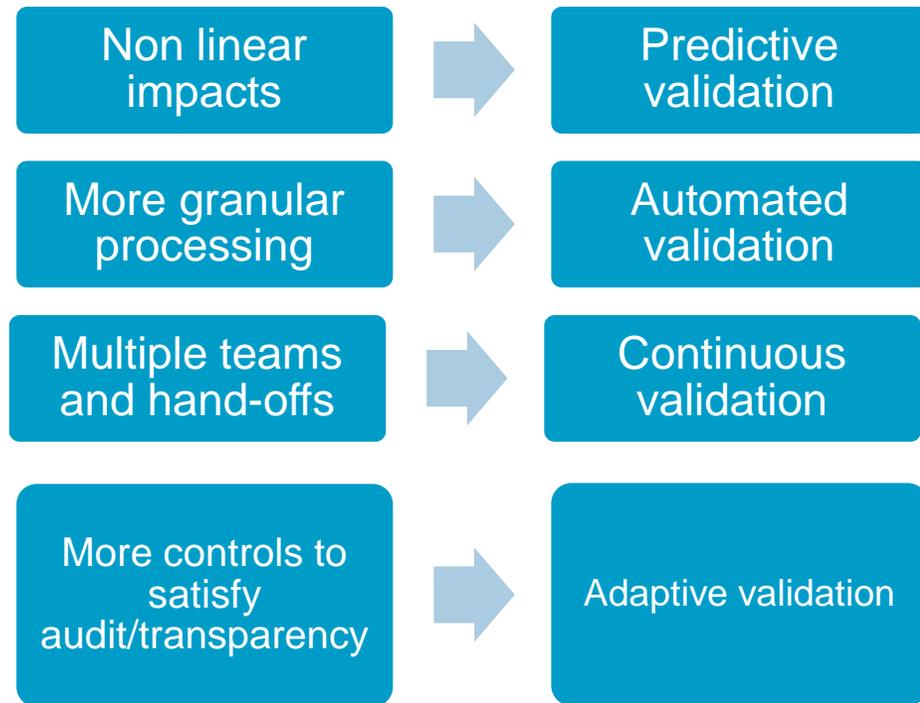
Features

- Non linear impacts
- Multiple teams/hand-offs
- Time pressure
- More granular processing
- Demand for transparency
- Expanded audit scope



From section 5: Impact of IFRS 17 on validation

IFRS 17 example reserving workflow



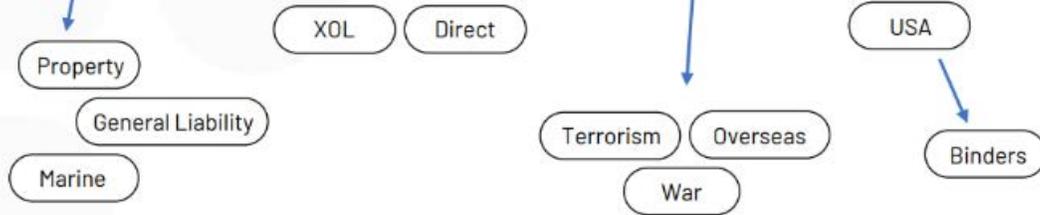
What does this mean?

- More tests of stress, scenarios, sensitivity
- More RPA, automated validation and controls
- Machine learning support (?)
- Risk targeting rather than general validation
- Robust documentation of processes and methodologies
- Strong teams + robust processes than reliance on key person
- Forward looking metrics rather than ex-post-facto methods
- Hybrid KPIs

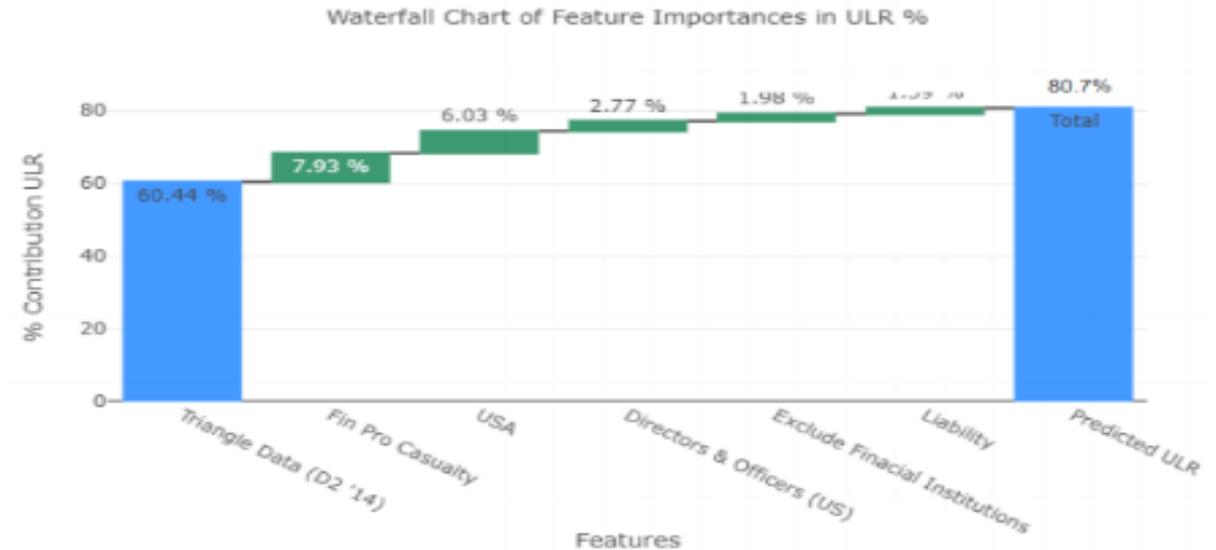


From section 6: Simple ML test case

RiskCode	High Level Class of Business	Type of Placement	Risk Code Description	Risk Code Description - Expanded	OECD Class Mapping
1E	Other Specialty	Direct	OVERSEAS LEG TERRORISM ENERGY OFFSHORE PROPERTY	Terrorism subject to overseas legislation - offshore energy - property	SHIPS DMGE & LIABILITY
1F	Other Specialty	Direct	OVERSEAS LEG TERRORISM ACCIDENT AND HEALTH	Terrorism subject to overseas legislation - accident and health	ACCIDENT AND HEALTH
2E	Other Specialty	Direct	OVERSEAS LEG TERRORISM ENERGY OFFSHORE LIABILITY	Terrorism subject to overseas legislation - offshore energy - liability	SHIPS DMGE & LIABILITY
2F	Other Specialty	Direct	OVERSEAS LEG TERRORISM AVIATION	Terrorism subject to overseas legislation - aviation	AIRCRAFT DMGE & LIAB
3E	Other Specialty	Direct	OVERSEAS LEG TERRORISM ENERGY ONSHORE PROPERTY	Terrorism subject to overseas legislation - onshore energy - property	SHIPS DMGE & LIABILITY
3F	Other Specialty	Direct	OVERSEAS LEG TERRORISM MARINE	Terrorism subject to overseas legislation - marine	SHIPS DMGE & LIABILITY
4E	Other Specialty	Direct	OVERSEAS LEG TERRORISM ENERGY ONSHORE LIABILITY	Terrorism subject to overseas legislation - onshore energy - liability	SHIPS DMGE & LIABILITY
4F	Other Specialty	Direct	OVERSEAS LEG TERRORISM MISC AND PECUNIARY LOSS	Terrorism subject to overseas legislation - pecuniary loss and other miscellaneous classes	PECUNIARY LOSS
5F	Other Specialty	Direct	OVERSEAS LEG TERRORISM MOTOR	Terrorism subject to overseas legislation - motor	MTR VEHICLE DMGE & LIAB
6F	Other Specialty	Direct	OVERSEAS LEG TERRORISM PROPERTY	Terrorism subject to overseas legislation - property	PROPERTY DAMAGE
7F	Other Specialty	Direct	OVERSEAS LEG TERRORISM THIRD PARTY LIABILITY	Terrorism subject to overseas legislation - third party liability	MTR VEHICLE DMGE & LIAB
8F	Other Specialty	Direct	OVERSEAS LEG TERRORISM TRANSPORT	Terrorism subject to overseas legislation - transport	MTR VEHICLE DMGE & LIAB
AG	Property Treaty	Excess of Loss Treaty, including stop-loss	AGRICULTURAL CROP AND FORESTRY XOL TREATY INCL STOP LOSS	Agriculture crop and forestry excess of loss treaty including stop loss	PROPERTY DAMAGE
AO	Aviation	Direct, Facultative Proportional, Facultative Excess Loss, Proportional Treaty	AVIATION PREMISES LEGAL LIABILITY NO PRODUCTS	Aviation premises and other airport legal liabilities excluding products liability	AIRCRAFT DMGE & LIAB
AP	Aviation	Direct, Facultative Proportional, Facultative Excess Loss, Proportional Treaty	AVIATION OR AEROSPACE PRODUCTS LEGAL LIABILITY	Aviation and aerospace products manufacturers' liability	AIRCRAFT DMGE & LIAB
AW	Aviation	Direct, Facultative Proportional, Facultative Excess Loss, Proportional Treaty	HULLS OF AIRCRAFT WAR OR CONFISCATION NO ACV	Aircraft hull war and confiscation excluding air cushioned vehicles	AIRCRAFT DMGE & LIAB
B	Marine	Direct, Facultative Proportional, Facultative Excess Loss, Proportional Treaty	VSSLS SHIPBLDG ACV LOH AND CONTAINERS TLO EXCL WRD	Total loss only in respect of vessels, shipbuilding, air cushioned vehicles, loss of tow and containers excluding war risks only	SHIPS DMGE & LIABILITY
B2	Property (D&F)	Direct, Facultative Proportional, Facultative Excess Loss	PHYS DAMAGE BINDER FOR PRIVATE PPTY IN USA	Physical damage binders for private property in USA	PROPERTY DAMAGE



The ML model translates new features into ULR contributions. Losses can be pivoted and grouped around these features, and flexible loss analysis performed.



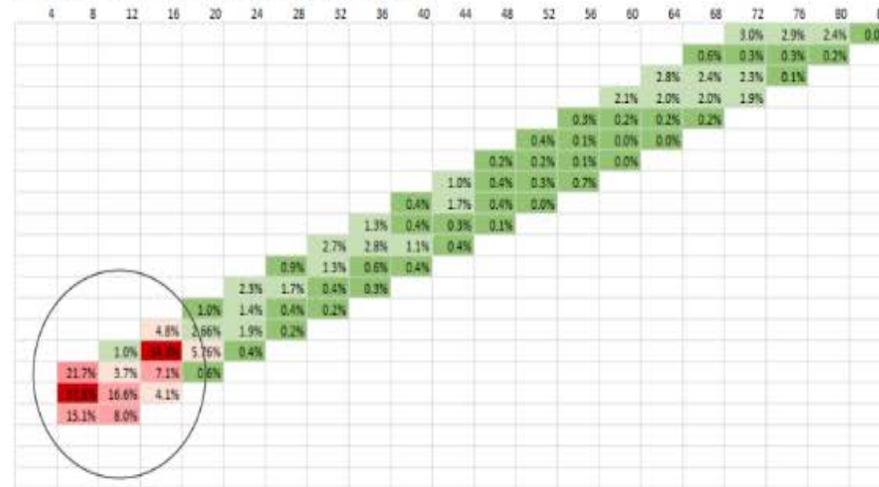
As good as an actuary

Chasing known ultimates

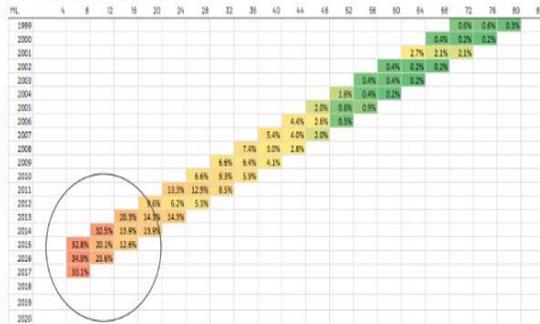
ML average errors; all classes



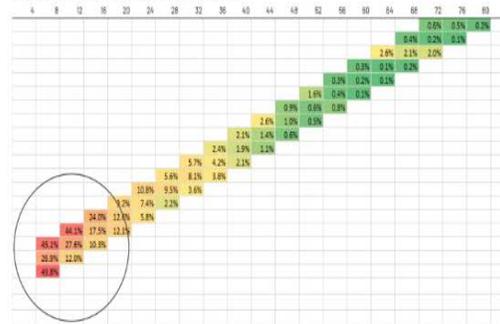
Actuarial selected average errors; all classes



ML average errors; all classes



Actuarial selected average errors; all classes



Our pain will be over *(example shows OCR lifting data from document)*

The image shows a side-by-side comparison of a document and its data extraction. On the left is a document viewer showing a 'MUTUAL Non-Disclosure AGREEMENT' between 'Cinegy Technology Ltd' and 'Deft Inc'. The document text includes clauses about confidentiality, representation, and the agreement's term. On the right is a 'CONTRACT DATA' form where the information from the document has been automatically populated into fields. The extracted data includes: Contract name: MUTUAL NON-DISCLOSURE AGREEMENT; Supplier: Deft Inc; Entity: Cinegy Technology Ltd; Status: Pipeline; Approval: Awaiting Approval; Team: (empty); Internal reference: (empty); Contract type: Mutual NDA; Category: (empty). Each field has a 'TEACH ME' button.

CONTRACT DATA

- Contract name: MUTUAL NON-DISCLOSURE AGREEMENT [TEACH ME]
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- Category: [Empty]



Section 7: Conclusion

- “On the plus side actuaries have more sophisticated and powerful tools in data analysis and machine learning to help meet at least some of [these] challenges. In particular machine learning should bring a step change in the analysis of data and trends far greater than would have been possible by human processing power. If these new tools are applied well, they should help actuaries meet the changes.
- But knowing how and when to use the tools may be the real challenge. As many found out in 2020, algorithms and other automated predictions can have their limitations. What is clear however is that a tight reserve validation framework is not an optional extra or an after the event thought or construct.
- It needs to be a clear embedded and structured part of a modern company's reserving framework. Otherwise, boards, regulators and practitioners alike lose confidence in the validation of reserves regardless of whether they are subsequently proven right by development.
- This leads to our conclusion (which is also the title of this paper) which is that reserves may well be right but may not be valid (as a best estimate).”

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Questions

Comments

Expressions of individual views by members of the Institute and Faculty of Actuaries and its staff are encouraged.

The views expressed in this presentation are those of the presenters.



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