Best Estimate(s): who will get the best one ?
Cognitive biases and expert judgement applied to P&C reserving

Simon ROBERT,

Deloitte Conseil (France)

May 11th – May 15th 2020

About the speaker

Simon ROBERT

- Senior Consultant at Deloitte Conseil (France)
- Support in IFRS 17 projects for large insurance and reinsurance group
- Support for the Solvency 2 actuarial function of a large medical insurer

Deloitte Conseil – Actuariat

- One of the leading French consulting companies regarding IFRS 17 projects, Solvency 2…

SECTIONS VIRTUAL COLLOQUIUM 2020

Expert judgment under the pressure of biases

Aware of the unconscious

« Systematic errors are known as biases, and they recur predictably in particular circumstances »
D. Kahneman, Thinking, fast and slow (2011)

Objectives

- Increase awareness to cognitive biases
- Show, with simplified cases how they may influence actuaries' decision
- Get a first measure of their impact

Expert judgment

- Influence of biases in Best Estimate calculation can be categorized as follows[1] :

  - A priori insights of the actuary due to familiarity with data and models
  - Mistakes related to how probabilities are perceived
  - Management and company culture influence in the decision making process

1: Source : Stein R. et Stein M. (1998). Sources of bias and inaccuracy in the development of a best estimate. *The casualty actuarial society forum*

Expert judgment under study
Actuary vs cognitive biases

Approach

- Statistical behavorial study of actuaries facing cognitive biases
  - Cases built for and through the biases
  - Practical reserving cases using Chain Ladder et Bornhuetter-Ferguson methods
  - Respondents unaware of the true purpose of the study
  - Claims and their development built in triangles through simulation
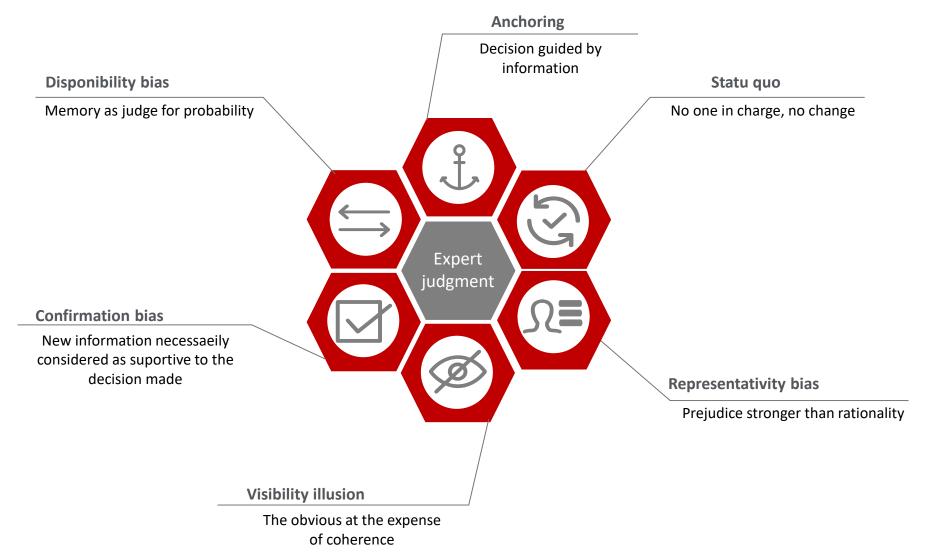
Study process

- Implementation of a simplified Excel reserving tool
  - Respondents perimeter of action limited to expert judgment decisions
    - **Chain Ladder claims development factors selection**
    - **A priori ultimate loss ratio for BF method**
- Biases' influence hidden into the cases instructions or structure
  - Instructions/Cases in 2 versions randomly given to the respondents
  - Identical claims triangles (in terms of development) used in several cases

Respondent view

Investigator view

Expert judgment surrounded by biases

Overview of biases covered by the study

Anchoring
Decision guided by information

Disponibility bias
Memory as judge for probability

Statu quo
No one in charge, no change

Confirmation bias
New information necessaeily considered as suportive to the decision made

Expert judgment

Representativity bias
Prejudice stronger than rationality

Visibility illusion
The obvious at the expense of coherence

Expert judgment surrounded by biases

Anchoring : Indications to the decision
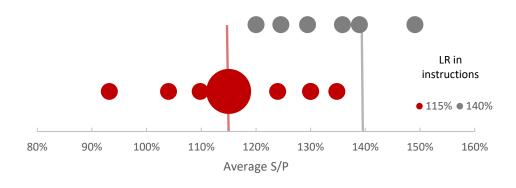
Anchoring

Principle

- When a figure is given to a person before making a decision, this figure tends to work as an « anchor » to the decision

Mechanism

- Benchmarked average LR given in the instructions (115% or 140%)

Results

- Average anwers to the ULR for BF method : 118% vs 133%
  - Important anchoring effect
- Comparison to control case : LR chosen by the respondents in a following case with the same development pattern different for 2/3 of them

LR in instructions

• 115% • 140%

Average S/P

Expert judgment

Expert judgment surrounded by biases

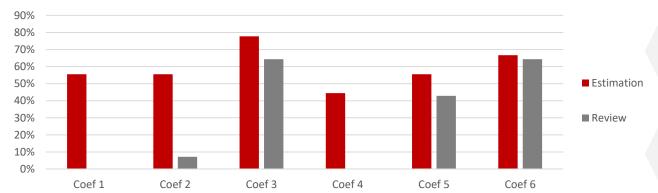Status quo : accept or reject first opinion ?

Status quo

Principle

- Once a decision has been taken by someone, people will have a tendency not to take responsability to go against this decision, even if it an incoherent one

Mechanism

- Selection of coefficient for the CL method already performed
- 2 possible instructions : performing an estimation of reserves or a review of the estimate

Results

- 50% of respondents with « estimation » as instruction did not any coefficient of the selection
- All the respondents with « review » as instruction changed at least the coefficient « illogically » excluded
    - Key role of respondents' commitment to the answer

Expert judgment

Expert judgment surrounded by biases

Illusion of visibility : obvious over coherent

Illusion of visibility

Principle

- Unability to see an abnormal element due to familiarity or overconfidence in one's judgment

Mechanism

- A development factor extremely high (>18) and one quite high (2,27) for the same development year

- A second use the same development factor with the exception of the very large one

Results

- Around 2/3 of respondents excluded the quite high coefficient in the second but not in the first

- Illusion of visibility effective : 78% of them did not excluded it during 1st selection

Expert judgment

Selection case 1/ case 6	Proportion
Kept/Kept	39%
Kept/Excluded	48%
Excluded/Excluded	13%

Expert judgment surrounded by biases

Heuristic of availability : memory as probability

Heuristic of availability

Principle

- The probability associated to an event is higher when this event relates to a recent memory

Mechanism

- Estimation of level of claims for a certain type of insured events : terrorist attacks or industrial catastrophes

- Allegedly the claims associated to either of these events cost in average 16 millions per year

Results

- Significative effect of the emotion associated to terrorist attacks (in the time of the study)

- Due to recent industrial catastrophes, the effect could diminish or even turn the other way around

- Estimated claims around the historical mean for respondents with industrial catastrophes and by far higher than the historical average for more than 75% of respondents with terrorist attacks

Expert judgment

Claims	Industrial	Terrorist
<10	0%	13%
10-15	13%	0%
15-18	75%	20%
18-20	0%	20%
20-25	13%	20%
>25	0%	27%

To an unbiased expert judgment ?

Ideas to limit cognitive bias effect

- By definition, even aware of the bias, an individual is not protected from it

- To reduce their effect, set up processes to avoid their specific circumstances to appear in the first place
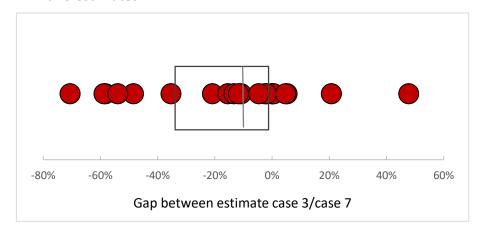
Expert judgment facing heteronomy

Variability of reserving in its own

Individual judgment coherence

- Incoherence in the performance of two CL by the same person using the same data

- Gap of more than 40% between the two estimates for more than 25% of respondents

- On average the same person haven 4 coefficients between its two estimates

Gap between estimate case 3/case 7

Different actuaries, different judgments, different Best Estimates

- High coefficient of variation => variability of expert judgments and estimates using the same data

- Variability goes even higher when judgment is not conditionned

	Case 1	Case 2	Case 3	Case 6	Case 7
Coefficient of variation	38%	63%	43%	18%	45%

Limited study of the expert judgment

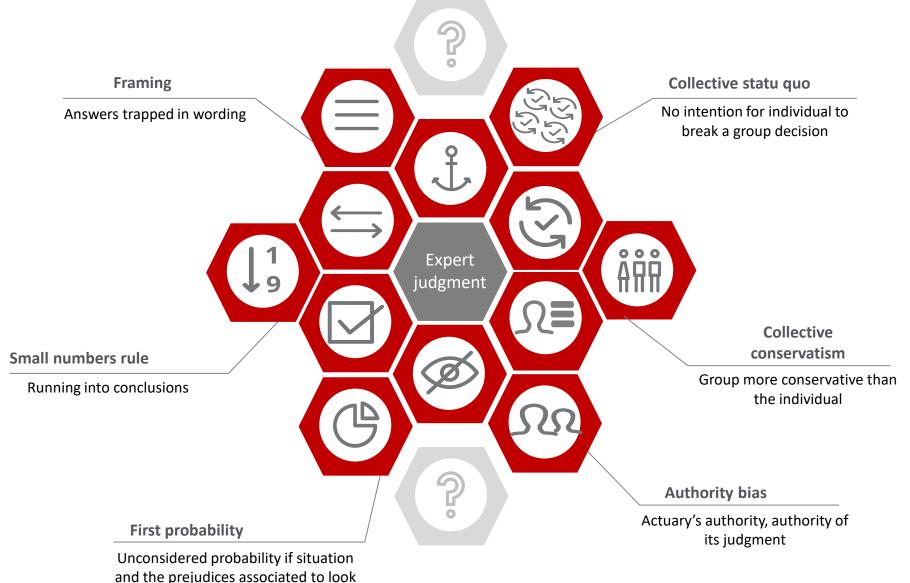A study with its own biases

Panel representativity

Case relevance

Measure relevance

Expert judgment overwhelmed by biases ?

Room for unstudied and undiscovered biases

Framing

Answers trapped in wording

Collective statu quo

No intention for individual to break a group decision

Small numbers rule

Running into conclusions

Collective conservatism

Group more conservative than the individual

First probability

Unconsidered probability if situation and the prejudices associated to look incoherent

Authority bias

Actuary's authority, authority of its judgment

Expert judgment

Academic papers on cognitive biases

- Tversky A. et Kahneman D. (1974*). Judgement under uncertainty : heuristics and biases*, Science, 185(4157), p. 1124-1131

- Kahneman D. (2011). *Thinking Fast and Slow*, Farrar, Straus and Giroux

Non-life reserving papers

- Habib I. et Riban S. (2012). Quelle méthode de provisionnement pour des engagements non-vie dans Solvabilité 2 ?, *Mémoire présenté devant l'Institut des Actuaires*

- Pierre M. et al. (2016). Non_life reserving practives. *ASTIN Working Party on Non-Life Rerserving*

Mixing non-life reserving and cognitives biases

- Gibson L. (2008). Defence against the dark arts, a practical handbook for reserving actuaries. *General Insurance convention of the Institute of Actuaries and Faculty of Actuaries*

- Valentu J., Edwards B. et Haggith H. (2012). The limitations of being a human : A study of cognitive bias impacts on actuarial decisions making. *General Insurance Seminar of the Institute of Actuaries of Australia.*

Thank you for your attention

Contact details :

Deloitte Conseil

Tour Majunga – 6 place de la pyramide
92902 Paris-La Défense
FRANCE

srobert@deloitte.fr

https://www.actuarialcolloquium2020.com/

Disclaimer:

The views or opinions expressed in this presentation are those of the authors and do not necessarily reflect official policies or positions of the Institut des Actuaires (IA), the International Actuarial Association (IAA) and its Sections.

While every effort has been made to ensure the accuracy and completeness of the material, the IA, IAA and authors give no warranty in that regard and reject any responsibility or liability for any loss or damage incurred through the use of, or reliance upon, the information contained therein. Reproduction and translations are permitted with mention of the source.

Permission is granted to make brief excerpts of the presentation for a published review. Permission is also granted to make limited numbers of copies of items in this presentation for personal, internal, classroom or other instructional use, on condition that the foregoing copyright notice is used so as to give reasonable notice of the author, the IA and the IAA's copyrights. This consent for free limited copying without prior consent of the author, IA or the IAA does not extend to making copies for general distribution, for advertising or promotional purposes, for inclusion in new collective works or for resale.