

Cognitive Bias: Should we be thinking about it?

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US P&C Primary Other and Products Liability – Schedule P Errors in 12 Months Estimates

Accident Year	Gross Earned Premium	Estimated Ult Loss	Estimated Ult LR	Original 12 Month Loss Ratio	% Error in 12 Month Estimate
1996	19.2	16.3	85.2%	78.0%	-8%
1997	19.6	18.6	94.9%	78.0%	-18%
1998	20.8	22.6	108.5%	82.0%	-24%
1999	21.9	27.2	124.2%	84.0%	-32%
2000	22.6	28.4	125.9%	84.0%	-33%
2001	27.8	30.2	108.8%	78.0%	-28%
2002	33.0	27.0	81.7%	71.0%	-13%
2003	40.3	25.8	63.9%	67.0%	5%
2004	43.3	21.7	50.0%	67.1%	34%
2005	44.7	22.3	49.9%	64.1%	28%
2006	47.6	24.2	50.8%	63.7%	25%
2007	46.9	27.1	57.7%	65.8%	14%
2008	44.8	28.2	62.9%	68.5%	9%
2009	41.9	27.5	65.5%	69.3%	6%
2010	40.2	26.6	66.1%	69.0%	4%
2011	40.1	27.1	67.6%	68.3%	1%
2012	41.6	26.5	63.7%	66.3%	4%

What causes good
actuaries to produce
bad loss ratio
estimates?

Agenda

- Introduction
 - Reinsurance Reserving 101
 - Treaty Reinsurance Placement Overview
- Cognitive Biases in Treaty Reinsurance Pricing
 - Overconfidence and the Planning Fallacy
 - Anchoring
 - Present and Familiarity Bias
- What can we do about this?

Introduction

Reinsurance Reserving 101

- Write contracts that cover large losses
 - quota shares on excess business
 - excess of loss on primary business
 - Aggregate loss ratios for all contracts
 - Group contracts into reasonably homogeneous buckets
 - Use Benktander or Bornheutter Ferguson for a long time to smooth chain ladder volatility
- ➔➔➔ Accuracy of pricing loss ratios is critical

Introduction

Reinsurance Treaties - Process and People



- Brokers
- Broker Actuaries
- Primary Reinsurance Buyers
- Primary Underwriters
- Primary Actuaries
- Reinsurance Marketers
- Reinsurance Underwriter
- Reinsurance Actuaries

Cognitive Bias

Cognitive Biases

- **Cognitive bias** describes the inherent thinking errors that humans make in processing information.
- **Field Pioneers - Kahneman and Tversky**
 - Kahneman: Thinking Fast and Slow
- **Cognitive biases potentially affecting the insurance cycle**
 - Overconfidence and the Planning Fallacy
 - Anchoring and Adjustment
 - "Present-Bias" and "Familiarity Bias"

Overconfidence Bias and the Planning Fallacy

- It is fully human to be optimistic
 - My kid is smarter than average, and a good athlete too.
 - I drive better than most people
 - I'm going to live a long and healthy life
- The Planning Fallacy – Tversky and Kahnemann
 - Plans that are unrealistically close to best case scenarios
 - Could be improved by consulting statistics of similar cases

The Planning Fallacy - Example

- Kahneman: "People who have information about an individual case rarely feel the need to know the statistics of the class to which the case belongs"
- Example – Start Up Martial Arts Studio
 - The Inside View (Overconfidence Bias – Best Case)
 - Teacher with talent and a following
 - Extrapolate a reasonable growth in students per month
 - Projected Revenue minus Expenses
 - Put it in the spreadsheet - You have the Plan!
 - The Outside View (Reference Class Forecasting)
 - What is the failure rate of Martial Arts Studios?
 - How long does it take to get new students on average, best case, worst case
 - How does our studio differ from the typical base case? Are we really that much better?

Optimism (Overconfidence) in Insurance

- Leaders are very confident, optimistic people
- Underwriting Managers - Personal Observations
 - Particularly confident, convincing
 - Excellent reputations
 - Results over the cycle are rarely seen
- Plan Loss Ratios are generally within a relatively tight range.
 - Usually reflect the Inside View
 - Often a strong analytical/actuarial component
 - Usually reflect a "reasonable amount" of profit regardless of competitive environment

Anchoring and Adjustment

- Anchor – An initial value chosen as a reference point.
- How does an anchor bias estimates?
 - People start with the anchor and "adjust" until they reach an acceptable answer
 - Overwhelming experimental evidence shows that adjustments tend to be insufficient

Anchoring and Adjustment in Insurance

- Anchors in Insurance/Reinsurance
 - Plan Loss Ratios
 - Client or Broker Analyses
 - Last Year's loss ratio estimate
 - Last Year's reserve estimate
 - The Breakeven Loss Ratio
- Are actuarial estimates biased because we so commonly anchor on another estimate and adjust?

Present-Bias and Familiarity

- "Present-Bias"

- Psychological tendency to be more responsive to immediate consequences than delayed ones

- Familiarity

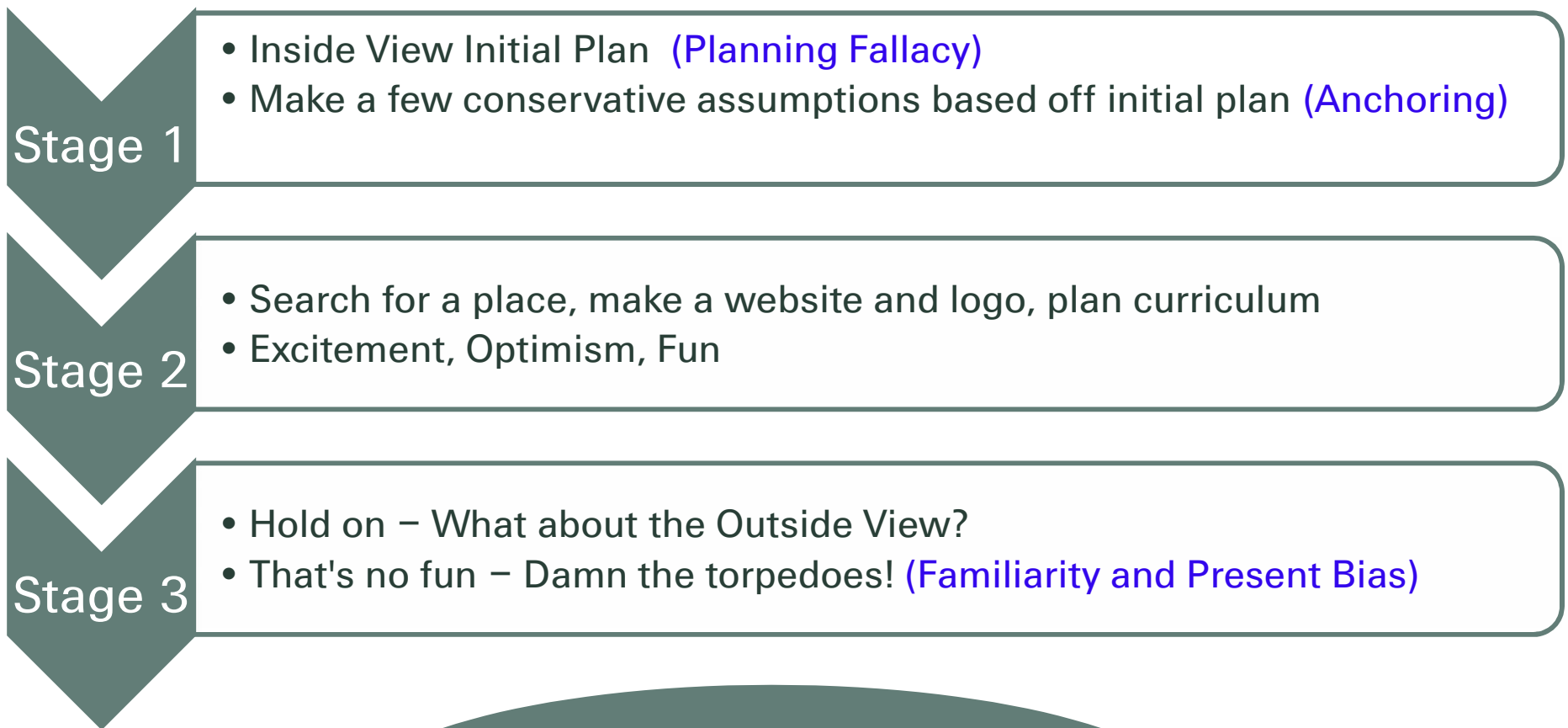
- People are more willing to harm strangers than individuals they know

Present-Bias and Familiarity in Insurance

- Familiarity
 - We know (and generally like) our colleagues and clients
- Present-Bias
 - Buying in to safe assumptions is easier than delivering bad news, even if bad news now is more helpful in the long run.
- Do we (unconsciously) take safe positions because we are hardwired to focus on the immediate consequences of our actions?

How Biases Work Together

Martial Arts Studio – Real Life Example



The Outside View – Stage 1
or not at all!

Cognitive Bias in Reinsurance



- The Planning Fallacy
 - ✓ Inside Views
- Anchors
 - ✓ Well Vetted
 - ✓ Rational
 - ✓ Profitable
- Many friendly relationships
- Doing the deal is a lot of fun
- Cognitive Bias thrives in Reinsurance
 - ✓ More Uncertainty
 - ✓ More People
 - ✓ Large Contracts with Strong Anchors
 - ✓ Interrelated Plans

What can we do about this?

Reducing Cognitive Bias

- Don't forget about Chain Ladder
 - Compare mechanical averages and methods with actuarial selections
 - Simply tracking of mechanical averages to selections – share with management
- Reduce Anchoring Effects
 - Move assignments around
 - Force "blind" studies (forget the booked number)
- The Outside View: Pre-determined, formulaic adjustments to apriori loss ratios?
 - React quickly to adverse development over multiple quarters
 - Cycle adjustment explicitly tied to pre-agreed external indicators and industry results

Questions to Think About

- How might cognitive biases be impacting your work?
- Would actuaries benefit from formal cognitive bias training?
- Can companies that take cognitive bias seriously manage the cycle more effectively?

Sources and Further Reading

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Thank you