



# Rate Filings and Ratemaking

Steve Fiete and Matt Goldrich – Aon

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Prepared by Aon Benfield

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## Steve Fiete

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Stephen Fiete, ACAS, is a Director at Aon Benfield Analytics running Aon Benfield's Predictive Modeling practice group. Predictive Modeling at Aon Benfield includes Aon Benfield's Catastrophe Scoring service, rating plan analyses, loss distribution analysis, and model miss studies. Mr. Fiete's actuarial work has focused on predictive modeling since 1996 with the advent of credit and automated underwriting in personal lines. In 2005 he was a winner the COTOR Round 3 Challenge – a predictive modeling contest sponsored by the CAS. He has worked in personal and commercial lines pricing for insurance companies beginning in 1992, and has been with Aon Benfield since February of 2006. Prior to joining Aon Benfield he worked for Allstate and CNA.

## Matt Goldrich

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Matt Goldrich is a Director of Aon Benfield Analytics' analytics team. Matt's responsibilities at Aon Benfield include advising clients on appropriate allocation and recovery of catastrophe costs, assisting client product pricing and development, and researching the current regulatory and competitive industry environment. Prior to rejoining Aon Benfield's Chicago office, he acquired ten years of experience in the insurance industry with positions in catastrophe modeling and personal lines product management.

# Agenda

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**Section 1** What Goes Into a Rate Filing?

**Section 2** OIR Rules and Regulations

**Section 3** Improvements to Ratemaking and Underwriting

**Section 4** Q&A



# What Goes Into a Rate Filing?



## What is a Rate Filing?

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- Actuarial justification for how to determine pricing for current and prospective risks
  - Must conform to state regulations (ex. rates not unfair or discriminatory)
  - Submitted to state regulator for approval
- Use the past to estimate the future
  - Filings are prospective; restate historical premiums and losses at current levels
  - Use models or other sources of data when the past isn't helpful
- Goal is to ensure company solvency



$$\text{Indicated Premium} = \frac{\text{Expected Losses} + \text{DCC} + \text{Reinsurance} + \text{Fixed Expenses}}{(1 - \text{Variable Expense Ratio} - \text{Profit Ratio})}$$

## Parts of a Rate Filing

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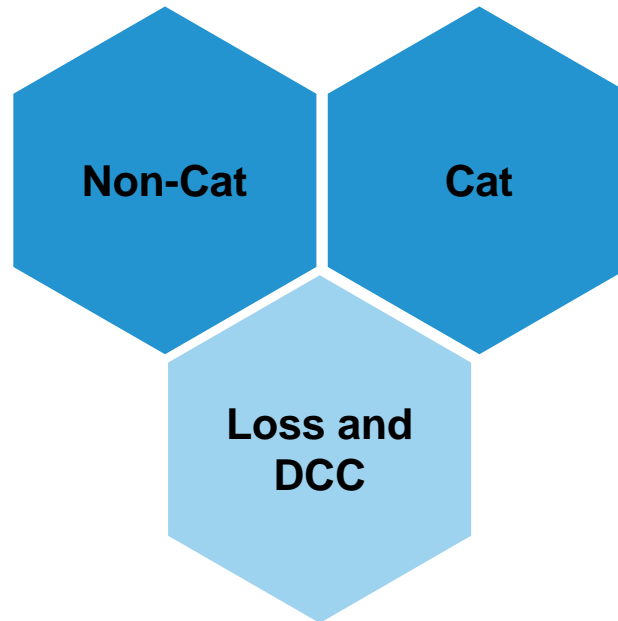
- Explanatory memorandum
  - Summarize what changes are being made to rates and rating factors
  - Effective dates of changes
- Rate indication
  - Are current rates adequate or inadequate?
- Actuarial support
- Other support
  - Model vendor documentation (ASOP 38)
  - Reinsurance contracts
- Changes
  - Revised rate manual pages
- Regulator objections and company responses

**Must certify rates each year.**

## Losses – Cat and Non-Cat

### Non-cat

- High frequency, low severity
- Company loss history generally credible
  - 3-5 years, weighted
- Adjustments
  - Trend
  - Loss development
  - Large-loss smoothing
  - Coverage changes



### Cat

- Low frequency, high severity
  - Hurricanes, earthquakes, etc.
  - Same occurrence affects numerous risks
- Loss history generally not credible
  - ~15 hurricanes in Florida since 1992
  - Cat models used to estimate loss potential
- Non-modeled cat
  - 10-30 years of loss history
  - Cat loss as % of non-cat loss

### Loss Adjustment Expenses (LAE)

- Costs associated with adjusting and settling claims.
  - Old (pre-1998): Allocated + Unallocated (ALAE vs. ULAE)
  - New (post-1998): Defense and Cost Containment + Adjusting and other (DCC + A&O)

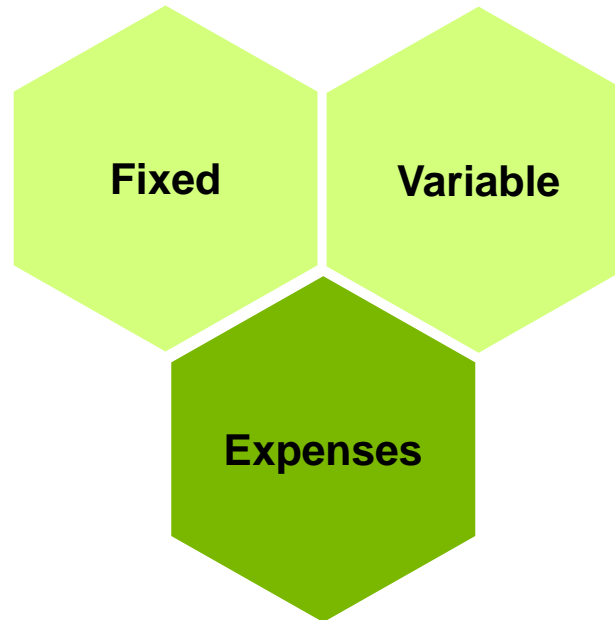
$$\text{Indicated Premium} = \frac{\text{Expected Losses} + \text{DCC} + \text{Reinsurance} + \text{Fixed Expenses}}{(1 - \text{Variable Expense Ratio} - \text{Profit Ratio})}$$



## Expenses – Fixed and Variable

- Fixed

- Does not scale with premium (general and other acquisition, A&O component of LAE, etc.)
- How to allocate?
  - Premium?
  - Flat expense fee?
- Don't over price!



- Variable

- Scales with premium (commissions, TLF, etc.)

Typically based on 1-3 years of experience, trended to current levels.

$$\text{Indicated Premium} = \frac{\text{Expected Losses} + \text{DCC} + \text{Reinsurance} + \text{Fixed Expenses}}{(1 - \text{Variable Expense Ratio} - \text{Profit Ratio})}$$

## Reinsurance

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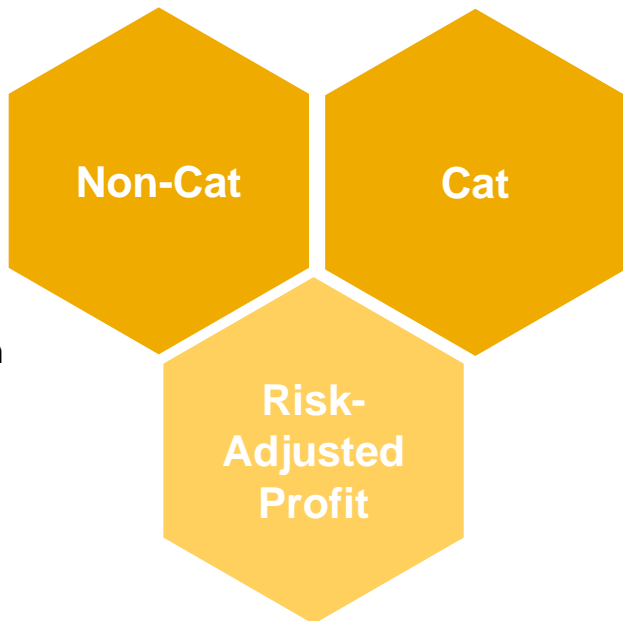
- Expected ceded loss
  - Long-term estimate of losses ceded to reinsurers
- Reinsurer margin
  - Profit ceded to reinsurers
- Allocate to risks based on contribution to modeled losses that cede to reinsurance layers



$$\text{Indicated Premium} = \frac{\text{Expected Losses} + \text{DCC} + \text{Reinsurance} + \text{Fixed Expenses}}{(1 - \text{Variable Expense Ratio} - \text{Profit Ratio})}$$

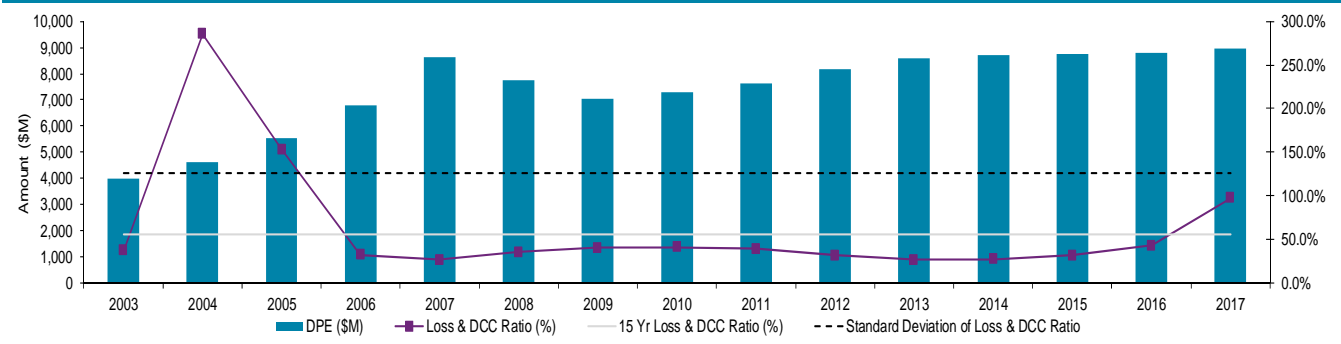
# Profit

- Traditionally 5% of homeowners premium
  - Was not adjusted for cat loss potential
  - FL promulgated profit provision currently 4.2% of premium
- Reinsurance pricing decreasing in past decade
- Risk-adjusted profit provision
  - Price for volatility
  - Cat > Non-cat



- Profit volatility
  - FL homeowners 15yr direct combined ratio ~90%
  - Current industry HO premium ~\$9B
  - 15yr profit at current rates ~\$13.5B
  - Est. industry Hurricane Andrew loss if happened today: \$40-50B
- Selected modeled HU loss return periods for FL
  - \$40B industry: 18-20yrs
  - \$50B industry: 23-26yrs
  - \$10B HO: 9-10yrs
  - \$15B HO: 13-14yr
- Modeled FL HU HO AAL: ~\$4.5B

Florida P&C Industry - Direct Earned Premiums and Loss & ALAE Ratio



$$\text{Indicated Premium} = \frac{\text{Expected Losses} + \text{DCC} + \text{Reinsurance} + \text{Fixed Expenses}}{(1 - \text{Variable Expense Ratio} - \text{Profit Ratio})}$$

## Rate Indication

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- Must adjust historical premiums as if they were priced today
  - Same historical time period as used for non-cat loss (3-5 years)
- Premium trend
  - Account for changes in home values and risk characteristics on premium
- Premium on-leveling
  - Adjust historical policy premiums for subsequent rate changes

$$\text{Rate Indication} = \frac{\text{Indicated Premium}}{\text{Trended and On-Levelled Premium}} - 1$$

## Rate Relativities and Endorsements

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- Adjust rates based on differing loss potential of risk characteristics through rating factors
- Identify adequacy of current rating factors and adjust as needed
  - Subsidies
  - Adverse selection
- Interaction of rating variables
  - Community of high-valued homes built in the same year
  - Homes near the coast have higher hurricane deductibles
  - Machine learning and predictive modeling
- Endorsement premiums
  - Ex. water backup, ID theft, etc.
  - Are claims made under these endorsements included in overall rate adequacy, or do premiums stand on their own?

Base Rate (\$)
* Territory Factor
* Amount of Insurance Factor
* Construction Type Factor
* Number of Stories Factor
* Year Built Factor
* Roof Type/Age Factor
* Protection Class Factor
* Credit/Insurance Score Factor
* Protective Device Credits
* Deductible Factor
Policy Premium



# OIR Rules and Regulations



# Catastrophe Pricing

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- Use of cat models
  - Models must be approved by FCHLPM (Florida Commission on Hurricane Loss Projection Methodology)
    - Vendors submit models for review
  - Long term hurricane frequency perspective only
  - One model to determine rate adequacy (can't use blend of multiple models)
    - Can use blend to determine relativities
- Separate rating and indications for hurricane vs. non-hurricane
  - Minimum by-peril rating
  - Sinkhole?
  - Non-hurricane cat wind?
  - Non-modeled cat?
- Reinsurance allocation
  - Proportional ceded loss to layers
  - Cannot always recover full FHCF premium
    - 20% margin over ceded loss
  - Goal: Recover an adequate premium relative to the reinsurance charge needed to cover the risk
    - Risk concentration drives higher reinsurance costs
  - May file to only adjust reinsurance expenses

## Promulgated Profit Provision

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- Rule 69O-170.003
- Recent profit and contingencies provisions
  - 10/2017: 4.2%
  - 6/2016: 4.0%
  - 4/2015: 4.1%
- Larger provision will be accepted if expected rate of return is determined reasonable under the following criteria:
  - Is adequate with the rate of return anticipated for other industries having similar risk
  - Is sufficient to guarantee confidence in insurer's ability to maintain credit, attract capital, or accumulate surplus
- To support a high profit provision, the OIR has historically required that companies:
  - Reproduce the OIR methodology using their own data
  - Demonstrate that this produces an insufficient return on surplus
  - Provide support for an alternate profit provision
- Have seen filings approved with profit provisions in 8-15% range



# Improvements to Ratemaking and Underwriting

## Getting the most out of Best Practices in Ratemaking

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- “Best Practices” tell us about methods and practices which have worked well for someone
  - Many are high level practices which almost always apply
  - Typically vetted and compared to other options
  - Variations on commonly used methods
- For highly specific best practice recommendations we suggest evaluating alternatives
  - Mostly applies when methods can be evaluated empirically
  - Examples
    - Loss trend, IBNR loads, and large loss load methods
    - Loss models use of pure premium for frequency and severity separately

**Whenever possible, empirically evaluate accuracy of ratemaking methods**

## Understanding Accuracy of Rate Indications

- Include track record of historical selections with each update
  - Users will develop sense of risk in the indication
  - Actuaries will know their selections will be memorialized

How accurate have ultimate loss picks been?

### Ultimate Incurred Loss (\$M)

AY	Valuation					
	Jul-13	Jul-14	Jul-15	Jul-16	Jul-17	Jul-18
2012	15.0	17.0	17.5	17.3	17.6	17.6
2013		16.0	18.5	18.8	18.7	18.6
2014			22.0	21.0	20.0	20.0
2015				23.0	22.0	21.5
2016					21.0	21.0
2017						27.0

How accurate have trend picks been?

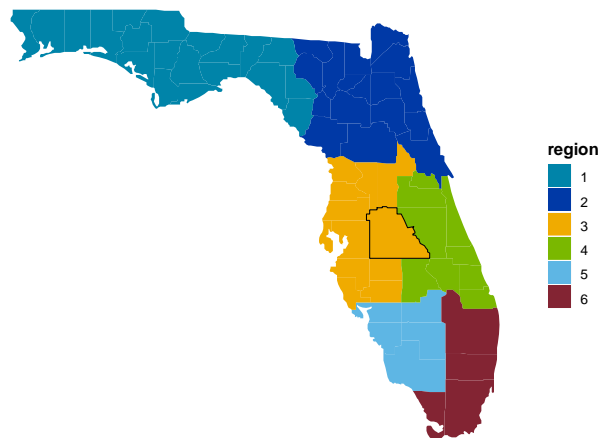
### Predicted Pure Premium

AY	Valuation						Latest	Error
	Jul-13	Jul-14	Jul-15	Jul-16	Jul-17	Jul-18		
2012	1,345							
2013	1,412	1,450						
2014	1,483	1,523	1,634				1,625	-8.7%
2015	1,557	1,599	1,683	1,590			1,600	-0.1%
2016		1,679	1,734	1,622	1,650		1,660	4.4%
2017			1,786	1,654	1,716	1,690	1,690	-2.1%

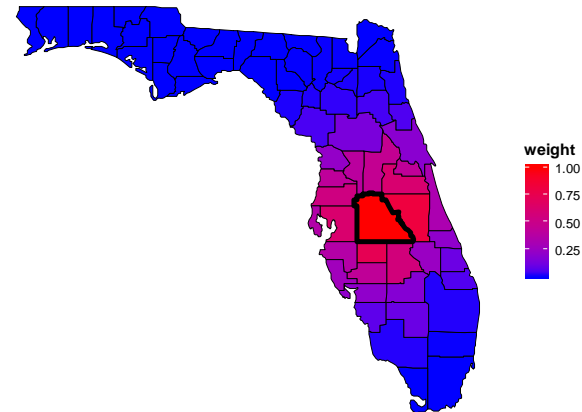
# Territorial Ratemaking

- Problem: No single territory had enough exposure to credibly estimate its indicated rate change
- Solutions
  - Old standard: Temper indicated changes for each territory against the statewide indicated change
  - New standard: Temper indicated change for each territory against a “territory group” and a statewide indicated change
    - Gives more weight to nearby territories and less to far away territories
  - Future standard (??): kernel smoothing

Non-Cat Territory Groups



Credibility Weight based on Distance





## Indicated Rate or Rate Change in Class Plan Analysis?

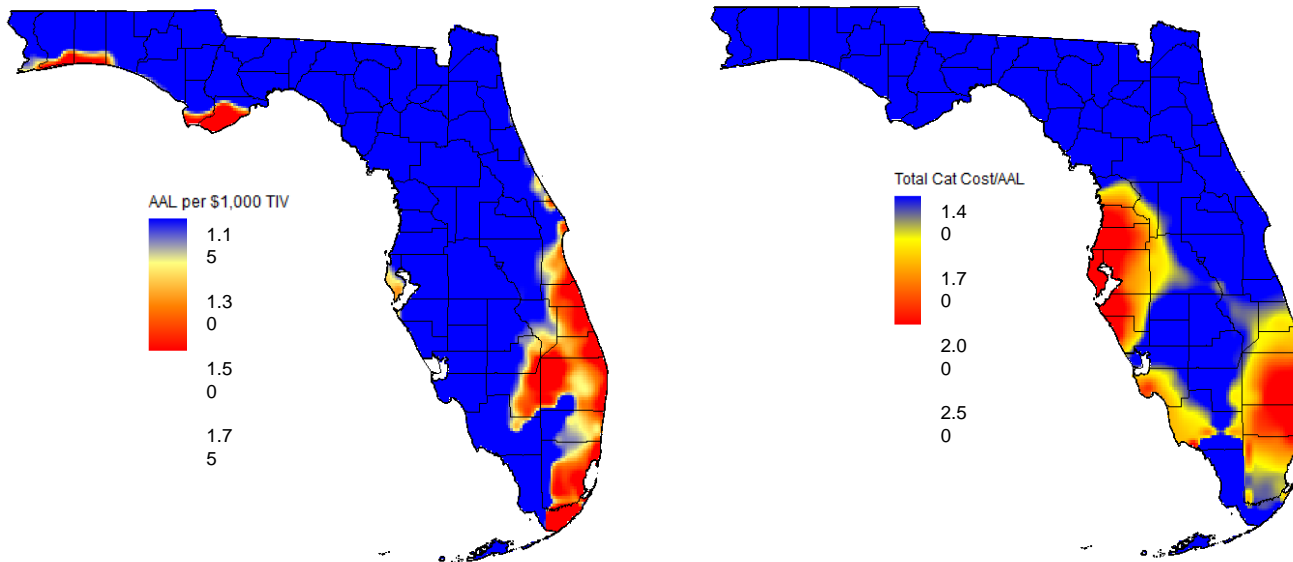
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- Optimized Rate
  - Analyze loss relative to exposure to solve for indicated loss provision in rate
  - Requires accounting for many variables at once
  - Standard approach when replacing a legacy rating plan
  - Typically causes large pricing disruptions
  - **Aims for the perfect rate all at once, but will miss due to fitting “noise”**
  
- Optimized Rate Change
  - Analyze loss relative to premium (trended and on-leveled) for indicated changes to rate
  - Requires looking only at selected variables of interest
  - Easy to temper changes
  - **Aims to move toward a more accurate rate, and takes less risk**

## Catastrophe Ratemaking

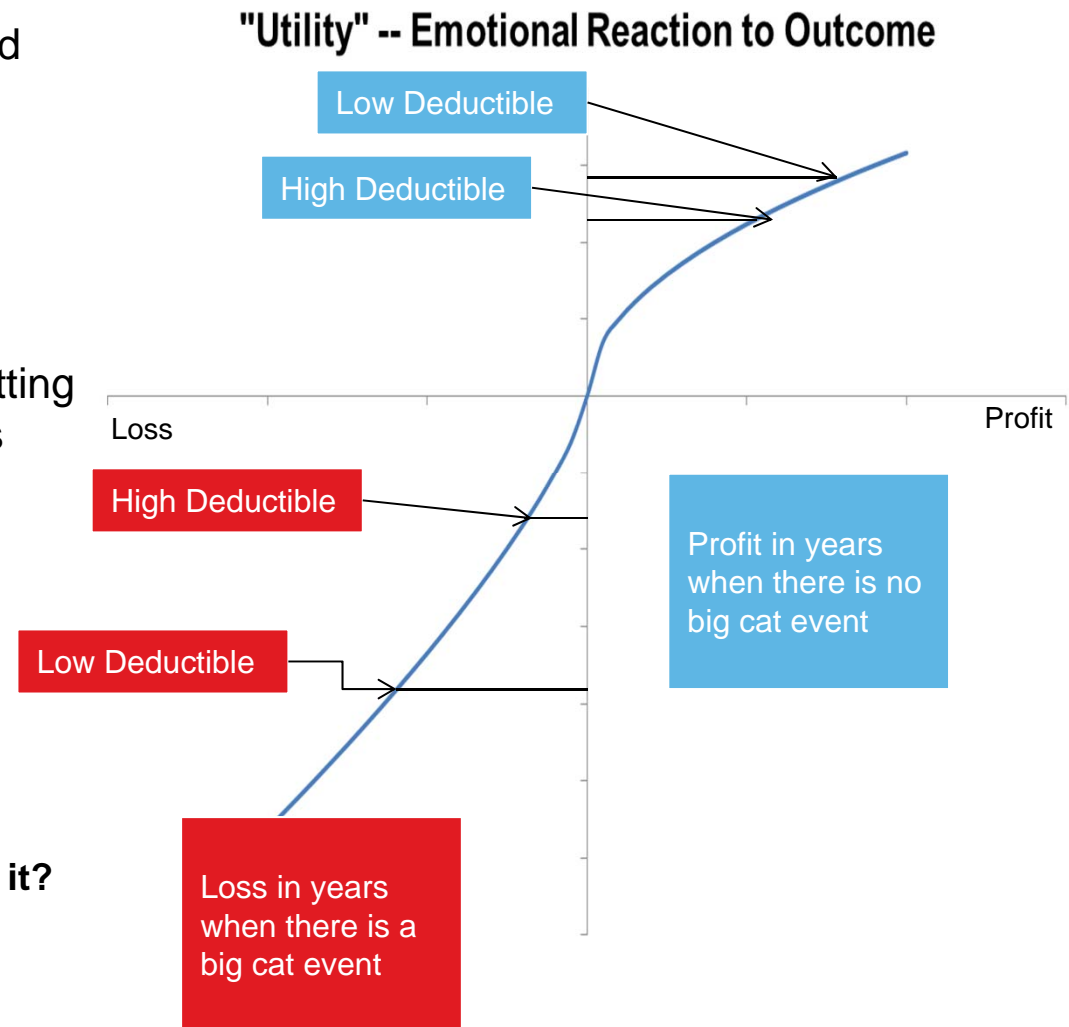
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- Cat Load include both a provision for AAL and a provision for AAL, Reinsurance Cost and Profit
- Exposure concentration is a drive of reinsurance cost and varies by location



# Cat Deductibles and Cognitive Bias

- Forgoing long term profit feels good
- We react emotionally to short term outcomes
- Our subjective experience is not consistent with the best long-term financial outcome
  - Like not feeling good about splitting 10's even when you \*know\* it is optimal



**Big savings in a cat year, but is it worth it?**



# Q&A

## Contact List

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## About Aon Benfield

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