Institute and Faculty of Actuaries

Meddling with the Modelling – Who knows best?

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Meddling with the Modelling

~~How many sweets in the jar?~~

How many sweets were in the jar?

Meddling with the Modelling

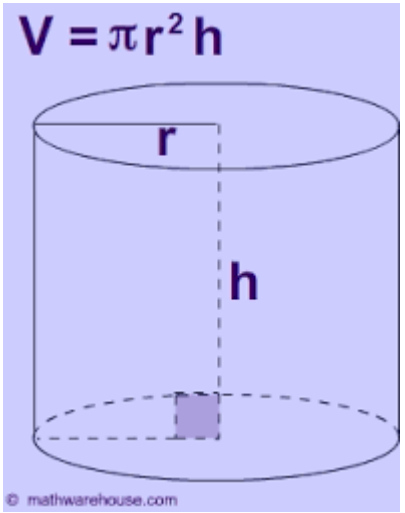
Meddling with the Modelling

Results of our collective expert judgement

Meddling with the Modelling

We guessed 197 and 178

Our basic model used estimates of how many sweets made up the radius and height to give



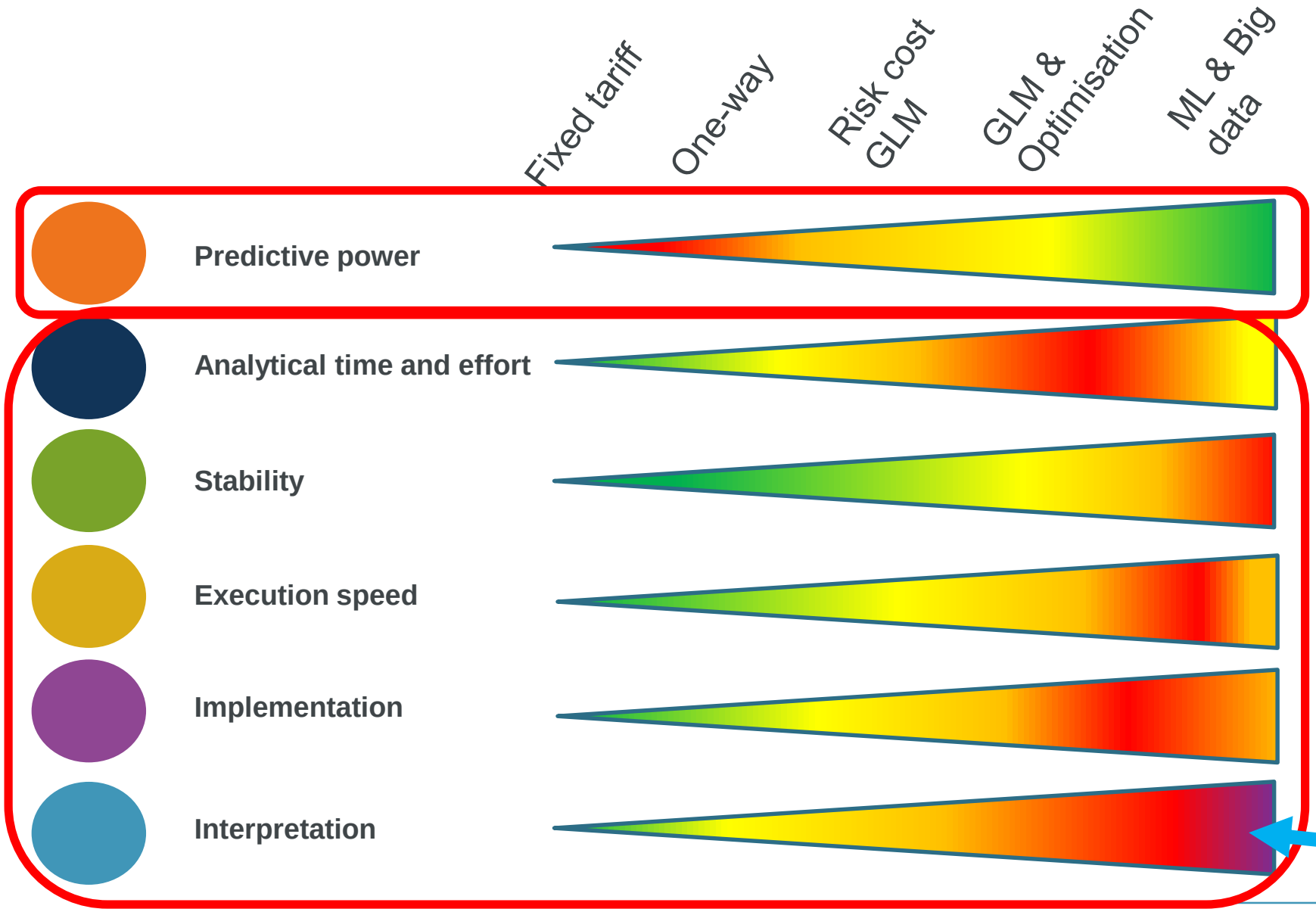
$$= 3.14 * 4^2 * 6 = 301$$

Did you use a simple model or your gut?

Meddling with the Modelling – Who knows best?

1. **Evolving models**
2. Experts and models
3. The customer

Evolving models – a Pricing example



- Model progression catalysed by competition and desire to improve predictability
- Typically to the detriment of other factors

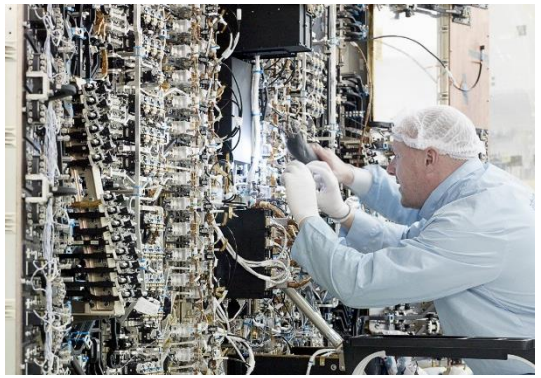
Evolving models – why do we do it?

Modellers:

- Are attracted to complexity
- Believe “better” models drive better outcomes

Observation – All things being equal, predictability rises with capability…
…but falls with competition

Meddling with the Modelling – Who knows best?



1. Evolving models
2. **Experts and models**
3. The customer

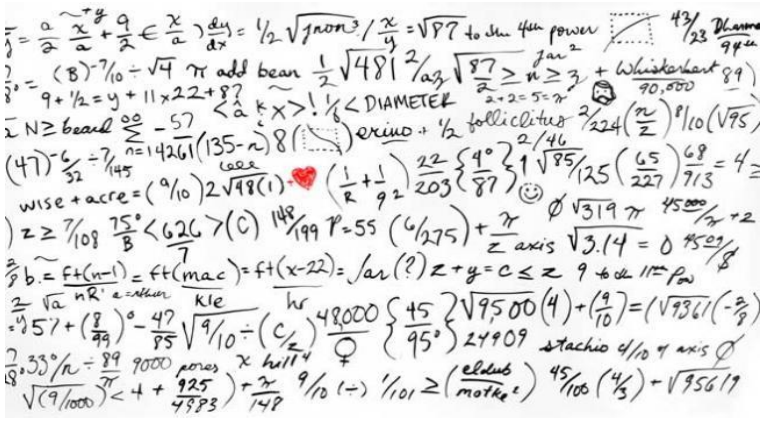
Experts and models

Are models better than experts?

What should expert underwriters do with pricing models?

Are we biased?

Experts vs Models



Vs.

Paul Meehl - 1954

Clinical vs. Statistical Prediction: A Theoretical Analysis & a Review of the Evidence

- Algorithm wins because it's consistent & unbiased
- Humans are biased and seek info to reinforce their views
- Humans make more mistakes

Experts and models – example 1

- A broker is getting quotes for fire cover on a commercial building.

- Your underwriter knows that the only rating factors in the model are
  - Sum insured,
  - Industry type and
  - Postcode.

- The property has a sprinkler system. Your previous underwriter, Bill, gave a 10% discount for sprinklers.

What price adjustment would you make?

-30%, -20%, -10%, 0%, +10%, +20%

Please write down the price adjustment that you would offer.

Experts and models – example 1

Results

Experts and models – example 2

Your ex CEO, Mark calls you because his daughter's motor insurance premium is "too expensive" but she is low risk:

- She is 19 but is a sensible and safe driver
- Doesn't drink
- Doesn't normally drive at night
- Only really uses the car to go to and from college

What price adjustment would you make?

-30%, -20%, -10%, 0%, +10%, +20%,

Please write down the price adjustment that you would make.

Experts and models – example 2

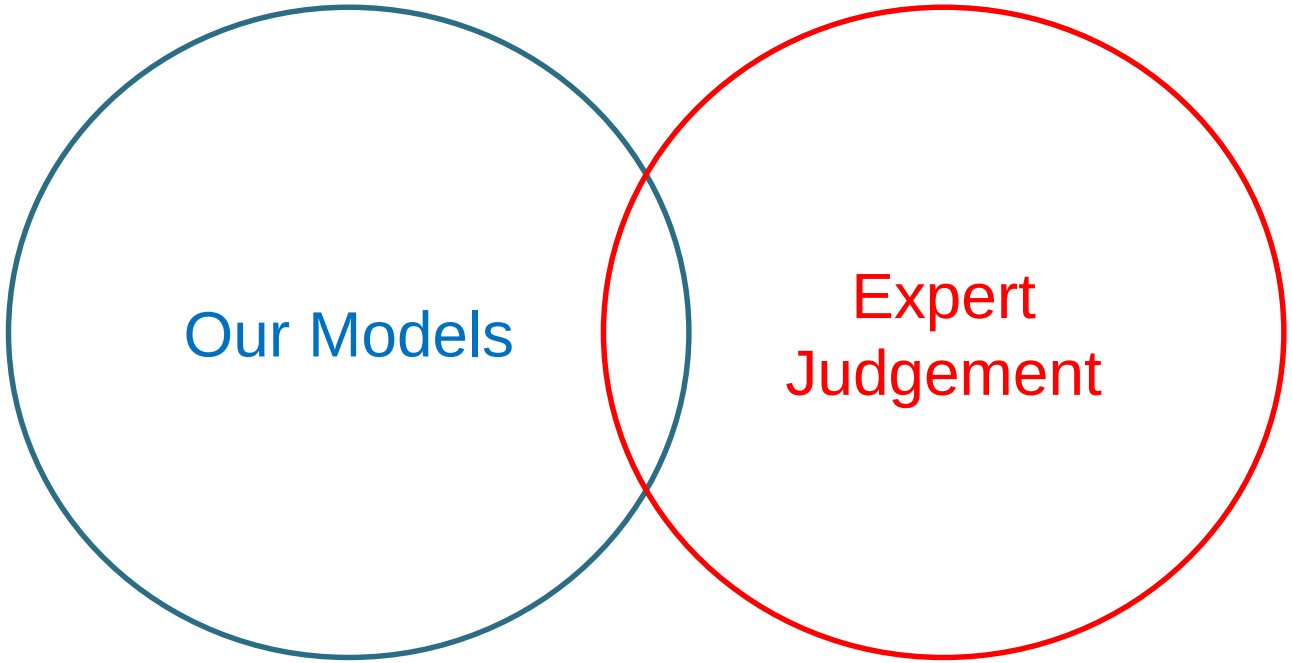
Results

- She is 19 but is a sensible and safe driver
- Doesn't drink
- Doesn't normally drive at night
- Only really uses the car to go to and from college

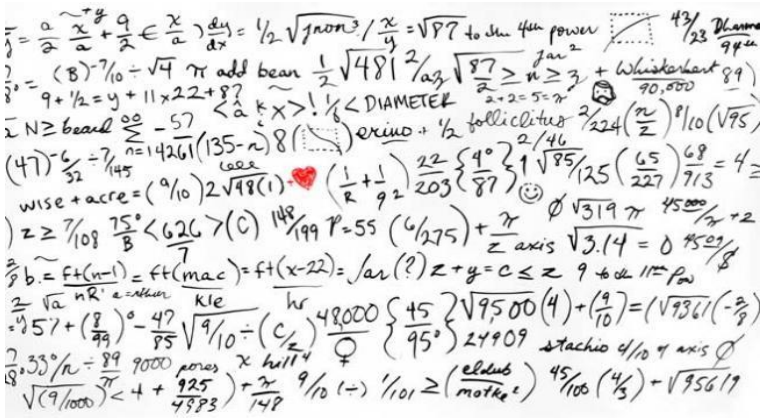
Experts or Models - Options

When it comes to models, we have three options:

1. **Rely exclusively on our models**
2. **Rely on expert judgement**
3. **Blend models and experts**



Experts vs Models



Vs.

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Clinical vs. Statistical Prediction: A Theoretical Analysis & a Review of the Evidence

- Algorithm wins because it's consistent & unbiased
- Even when clinicians saw the algorithm output, they were still less accurate

Experts with models

Are 45 year olds or 17 year olds better drivers?

Experts on Models – introducing bias

Anchoring bias

Bandwagon effect

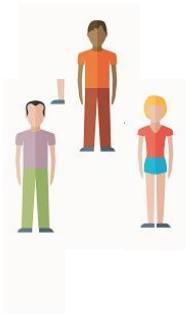
Confirmation bias

The crowd – an unbiased expert…

- How big does the crowd need to be?
- How expert on the problem?

- As expertise increases, your useable crowd shrinks.

The crowd – an unbiased expert…



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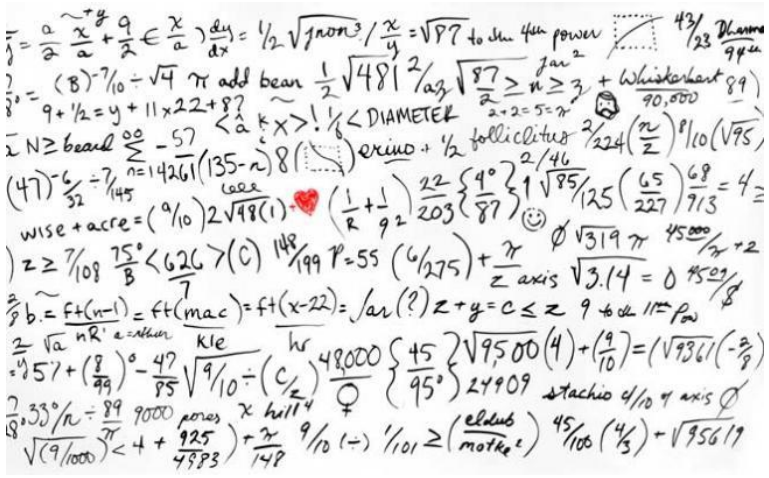

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…but there are rarely enough experts available to achieve this.

Adjusting models – is it worth it?

Models are better than experts!

Expert underwriters should adjust pricing models with extreme caution

We are all biased

Meddling with the Modelling – Who knows best?

1. Evolving our models
2. Experts vs models
3. **The customer**

Managing customer sentiment

Is model evolution always beneficial to the customer?

Does model evolution create fairer models?

…from who's perspective?

Customer sentiment – evolve with caution

Customers are becoming increasingly confused and annoyed with insurance pricing, in part due to model evolution

“my price has come down – was I overcharged last year”

“stop gaming me”

“how can you say my price is correct when it’s gone up 35%”

“well I haven’t flooded in the 5 years I’ve

wrong”

“ I feel betrayed”

Managing customer sentiment

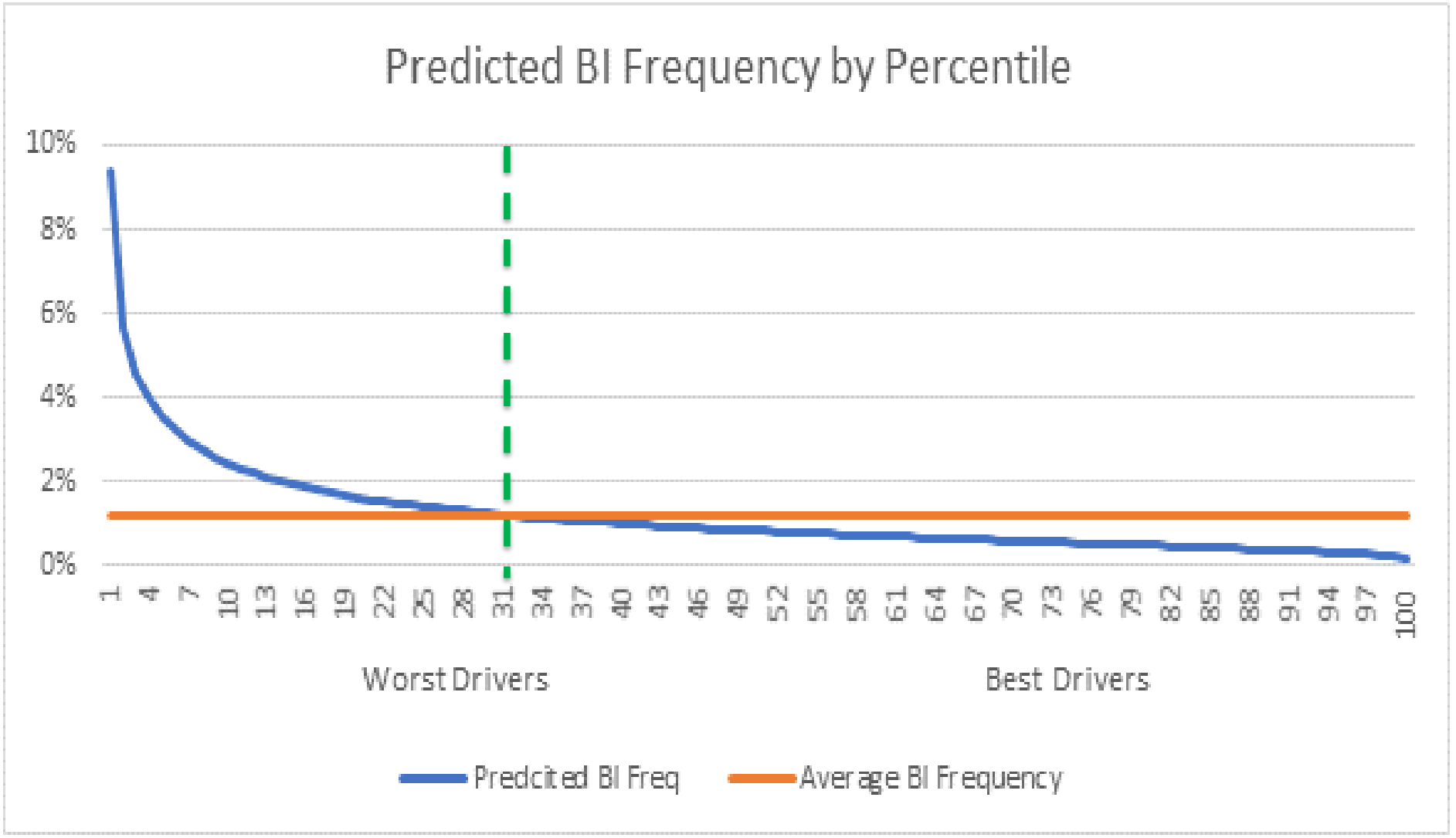
Customer expectation

- You can explain your pricing model to me
- Prices don't fluctuate much over time
- Use my information to give me a lower price…
- …not a higher price
- Don't penalise me for other people claiming
- Everyone in the market offers similar rates
- Prices reflect loyalty and experience
- Let me haggle…
- …but give me the best price first time

Misalignment between customer expectations and reality continues to grow

How many drivers do you think you are better than average? driver?

Aside: So many “better than average” drivers



It turns out that 70% of drivers **are** better than average

Customer sentiment – evolve with your eyes open

- **Optimisation can weaponise models**
  - A tool for profits or customer good?
  - Is customer sentiment on your efficient frontier?

- **Vulnerable customers are next to impossible to identify**
  - So what do you do with your models?
  - Very little if you already treat everyone fairly!

- **Customer interpretation**
  - Not always intuitive to us, so what about the customer?
  - Can machine learning help with this?

Managing customer sentiment

Is model evolution always beneficial to the customer?

Does model evolution create fairer models?

Probably not… unless you evolve with this in mind.

Meddling with the Modelling – who does know best?

Answer:

Highly likely it's the algorithm…

…but this is complicated and time consuming to prove…

…and we may not have enough data.

But we do need our expertise to help us understand when and how to build models

Summary

1. Evolving models is essential, but…

2. We rarely know how to overlay expert judgement onto model output

3. We are highly likely to get better outcomes by focusing on the customer

Our judgement and expertise is key to ensuring that models are valid and fit for purpose

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 presenter.

(There were 223 sweets in the jar)