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How Robust Is Your Pricing Process?

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ABOUT ME

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Jan Küthe is a German actuary (DAV) and works at Akur8 as an Actuarial Data Science Manager, helping insurance companies improve their pricing processes. Prior to this role, he spent three years as an actuarial consultant. He holds a Master's degree in Mathematics from the University of Bonn and is an avid reader of works by Anna Seghers and Dietmar Dath.

Why accurate models are important

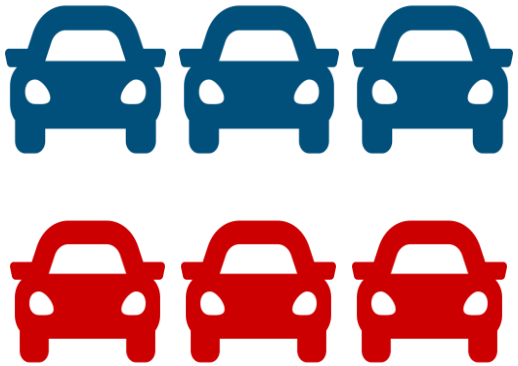
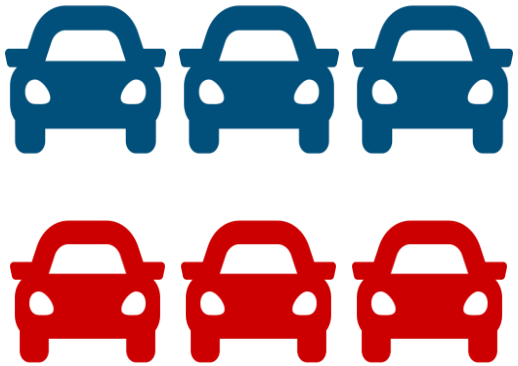
Hypothetical market - two competitors with identical strategy

Claim costs are €80 on average

Company	Alpha Insurance	Beta Insurance
Premium for blue car (€)	100.00	100.00
Premium for red car (€)	100.00	100.00

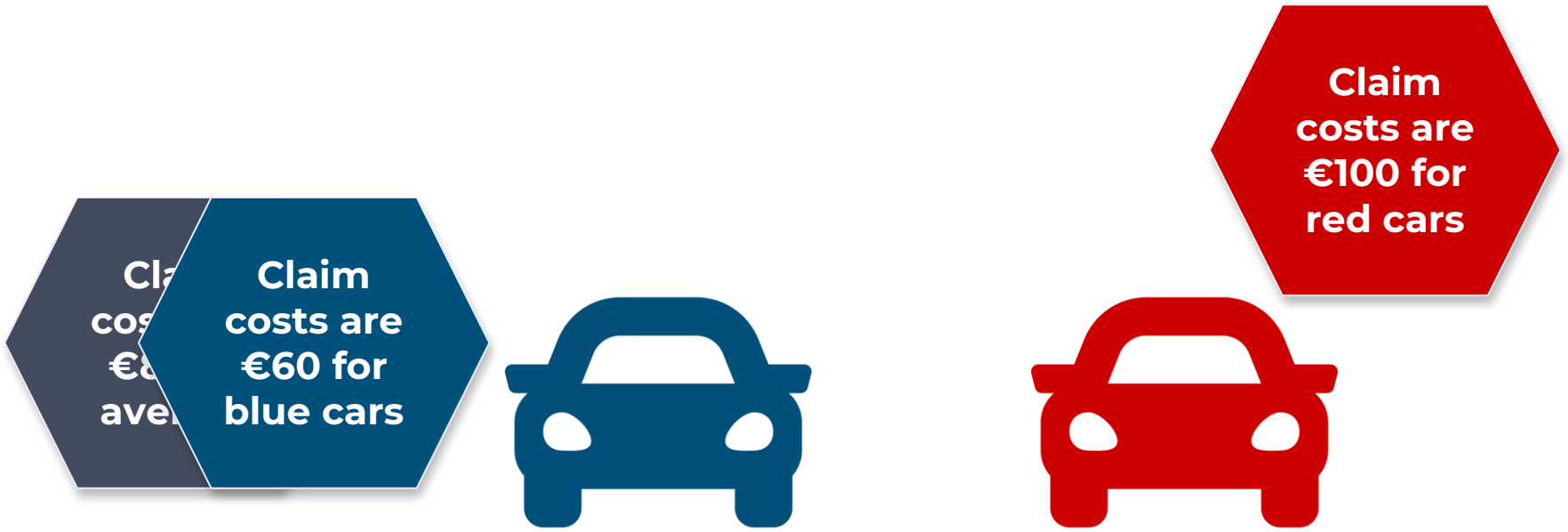
Adverse selection example

Results for identical strategy are the same

Company	Alpha Insurance	Beta Insurance
Customers		
Av. Claim Cost (€)	80.00	80.00
Av. Premium (€)	100.00	100.00
Loss Ratio (%)	**80.00**	**80.00**

Adverse selection example

Company B updates strategy to better reflect risk



Company	Alpha Insurance	Beta Insurance
Premium for blue car (€)	100.00	90.00
Premium for red car (€)	100.00	110.00

Adverse selection example

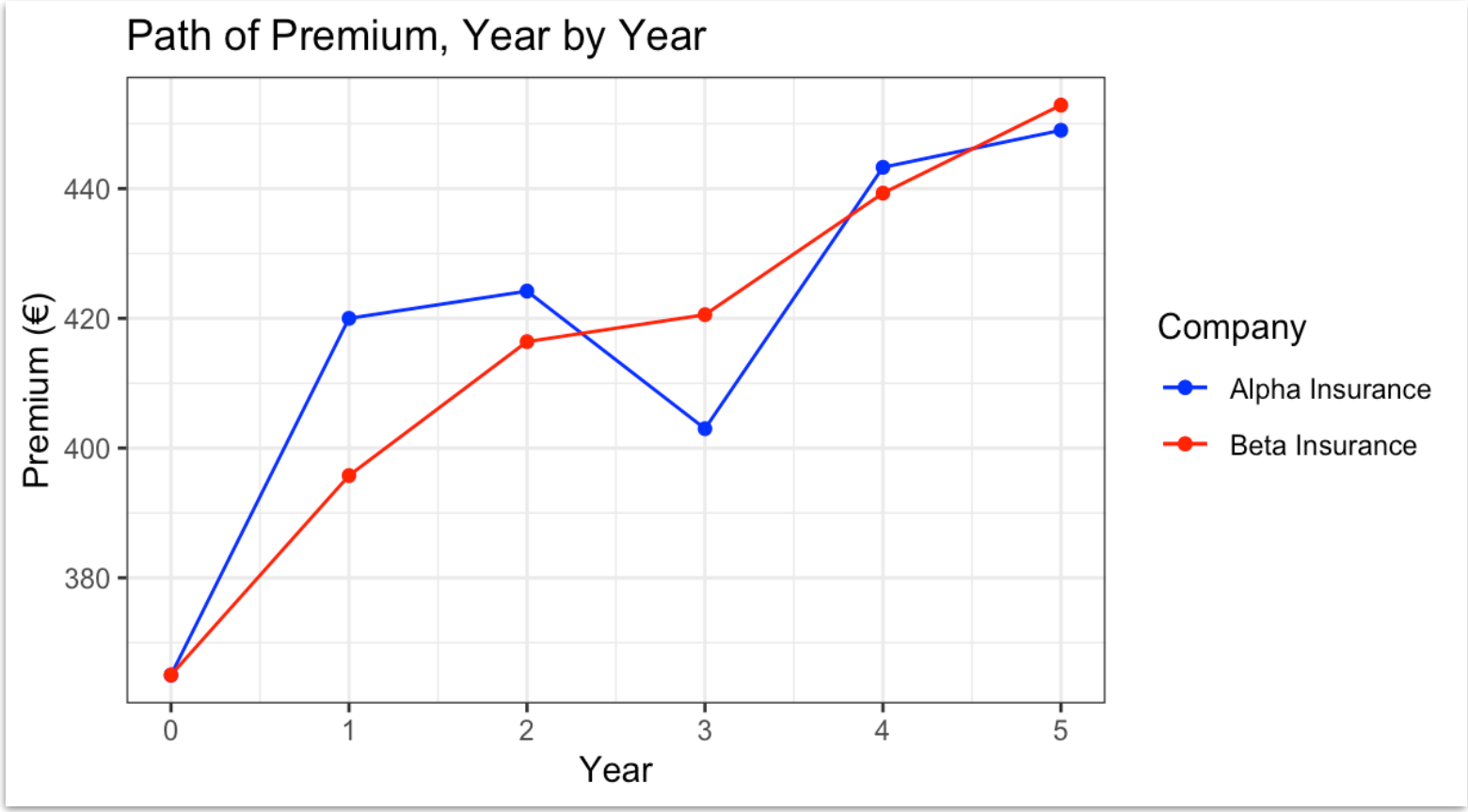
Company A attracts worse risks despite sticking with the same strategy

Company	Alpha Insurance	Beta Insurance
Customers		
Av. Claim Cost (€)	93.33	66.67
Av. Premium (€)	100.00	93.33
Loss Ratio (%)	**93.33**	**71.43**

Why stable prices are important

Stable pricing leads to better customer experience

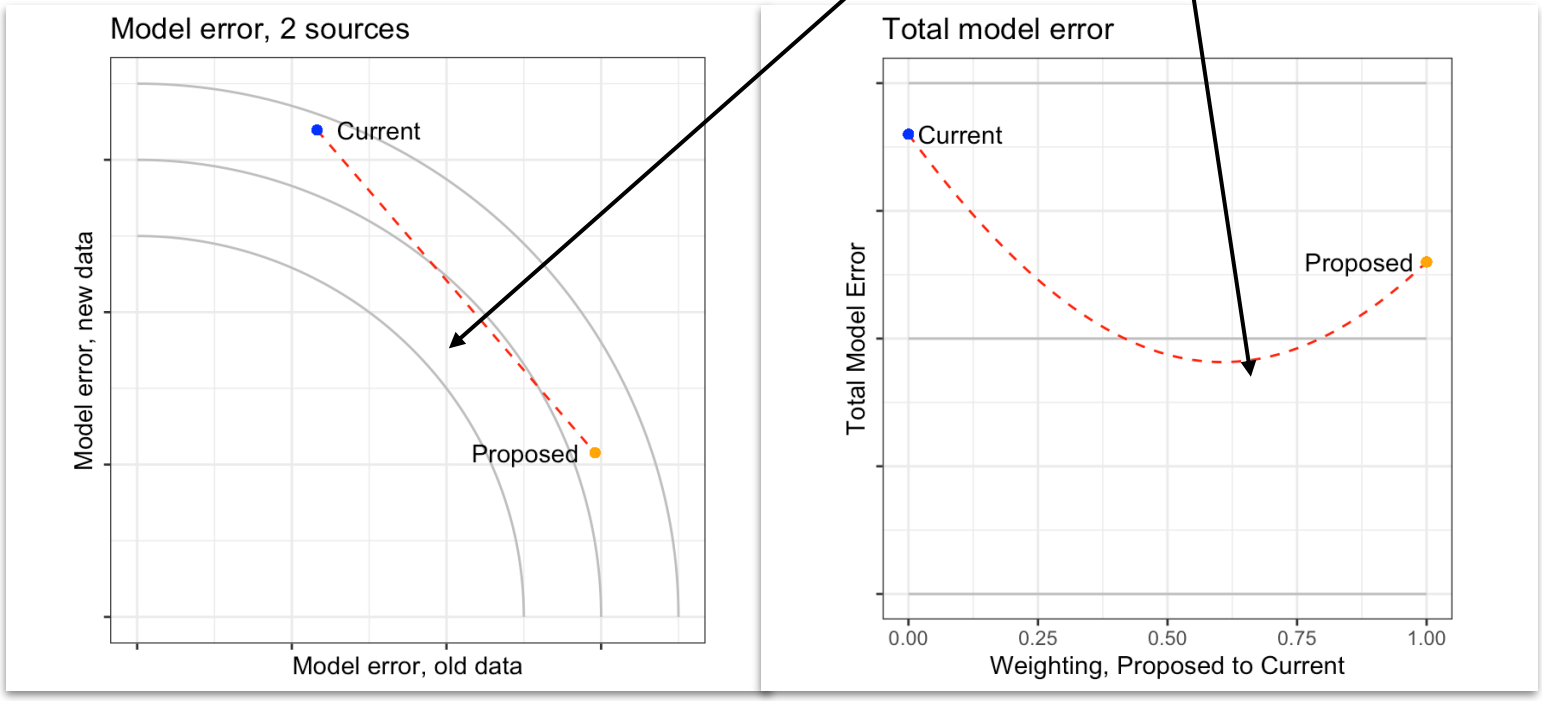
Which customer is most likely to be retained?



Not all change is motivated

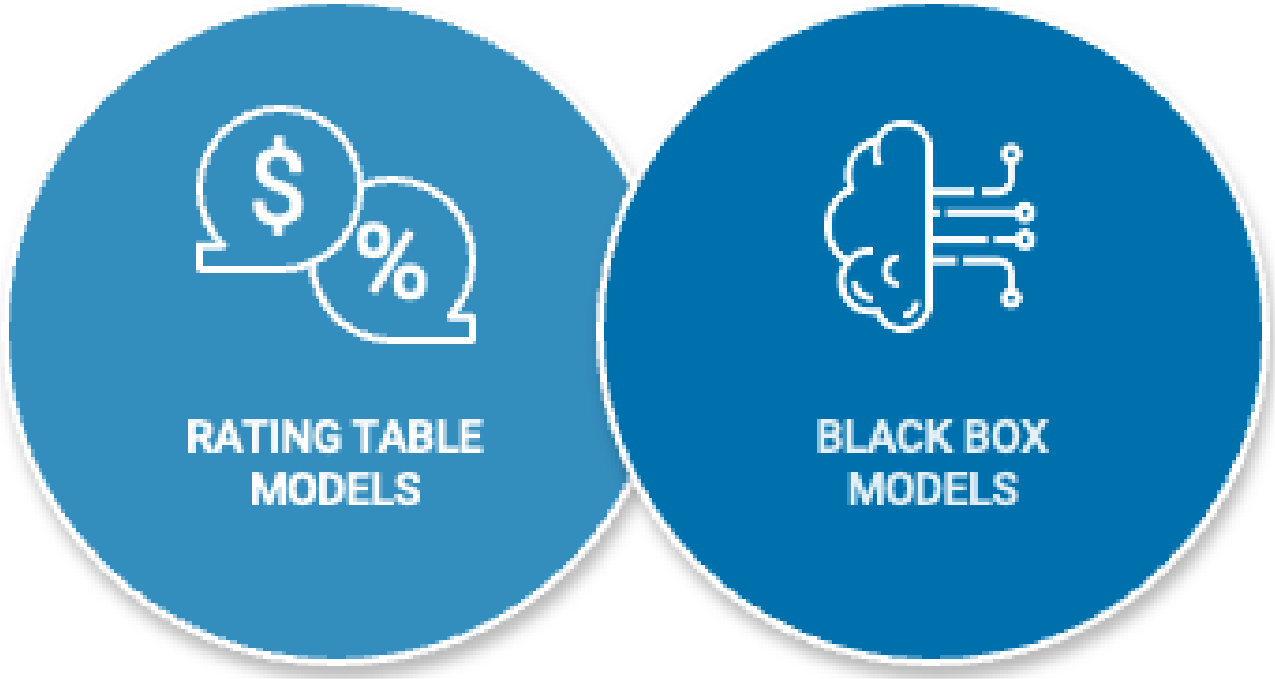
Ensembling models usually leads to better results

There exists a combined model that performs better than either



Transparent vs Black box models

- Transparent
- Flexible
- Easy to implement

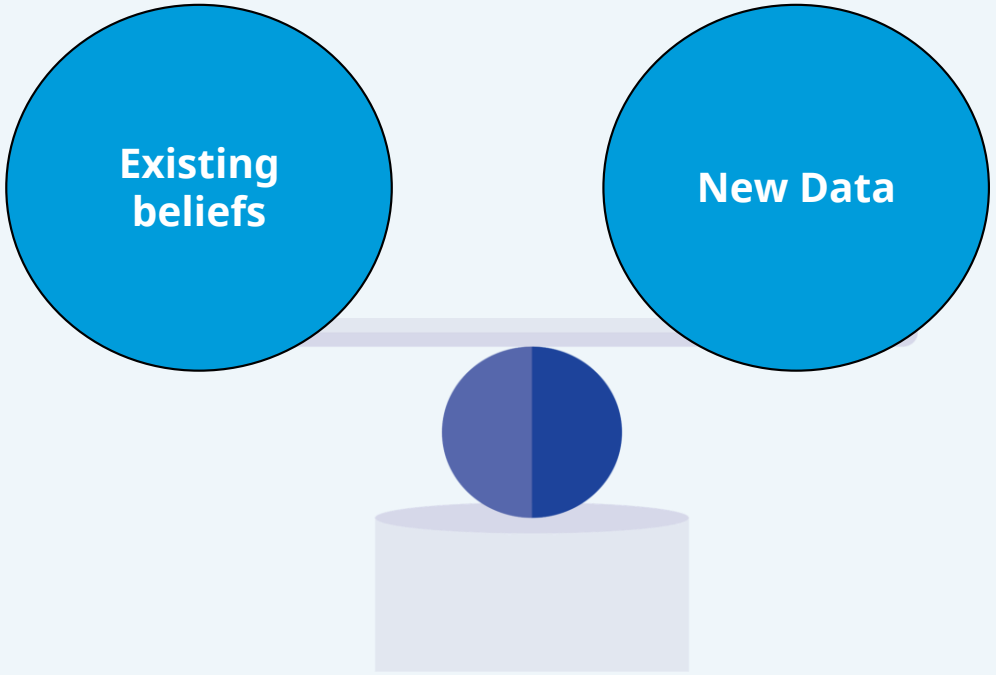


- Accurate
- Quick to fit

New data will not be fully credible (low volume / not fully developed)

A credibility procedure is an approach that combines claims experience with existing beliefs to achieve a more accurate assessment of risk.

This is really useful for quickly incorporating signal from new data without overfitting!



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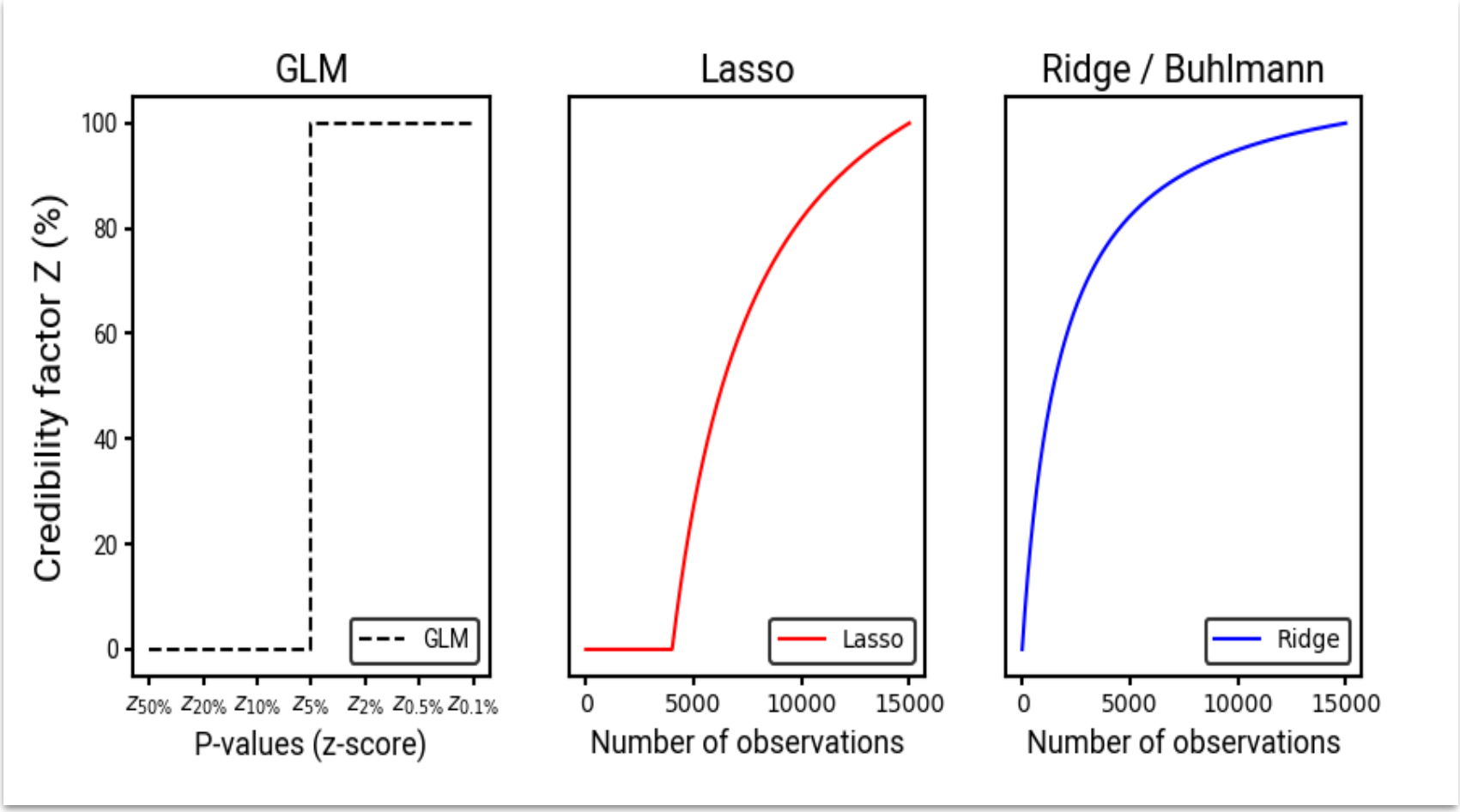
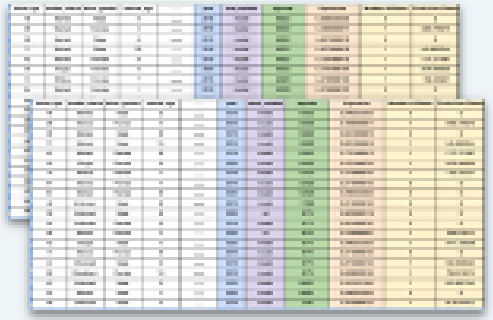


Why time matters

Insurance Pricing is Backwards Looking

The closer the Future resembles the Past, the more confidence we can have in our pricing

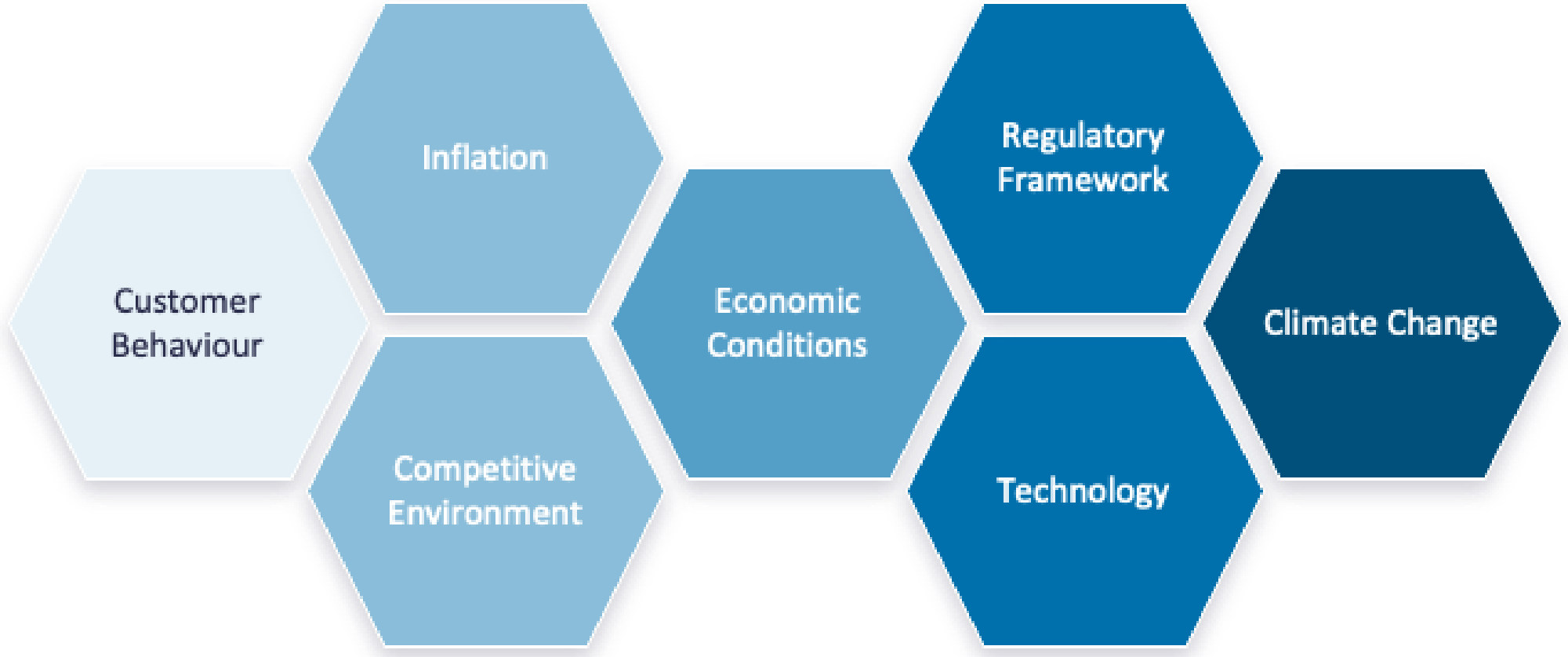
With historic data...



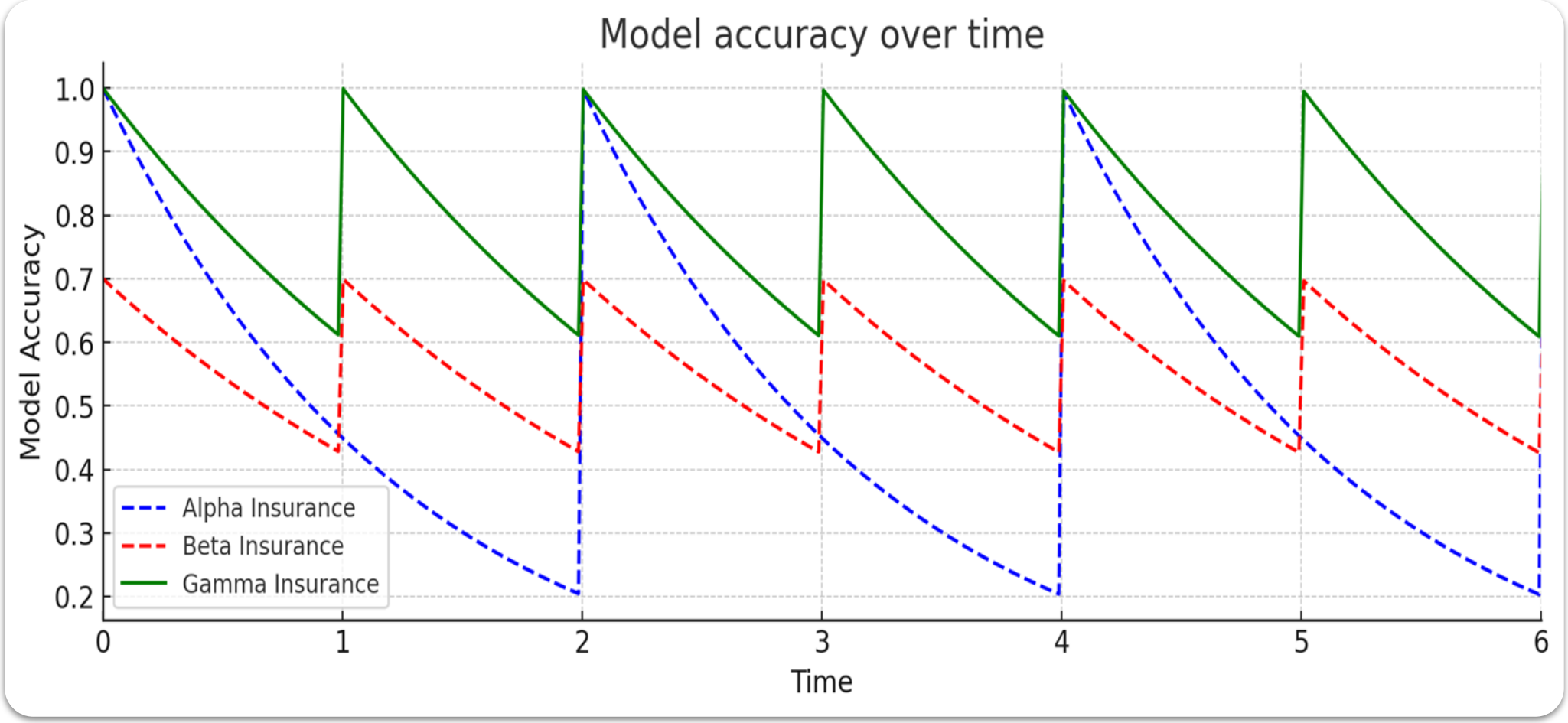
... we build pricing models and assumptions...

... to price for future risks

...but the Future is always different!



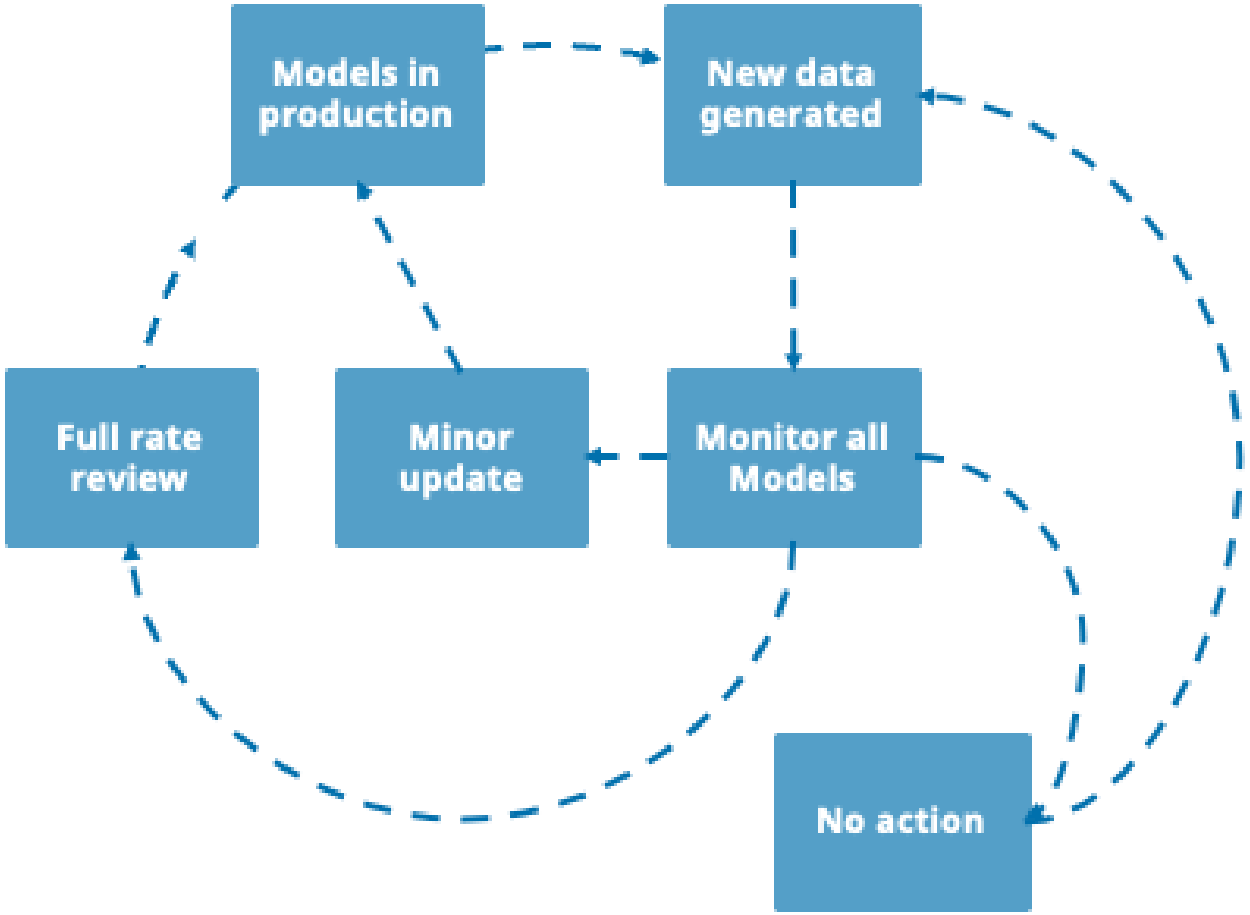
The benefits of technical sophistication with fast deployment



Conclusion

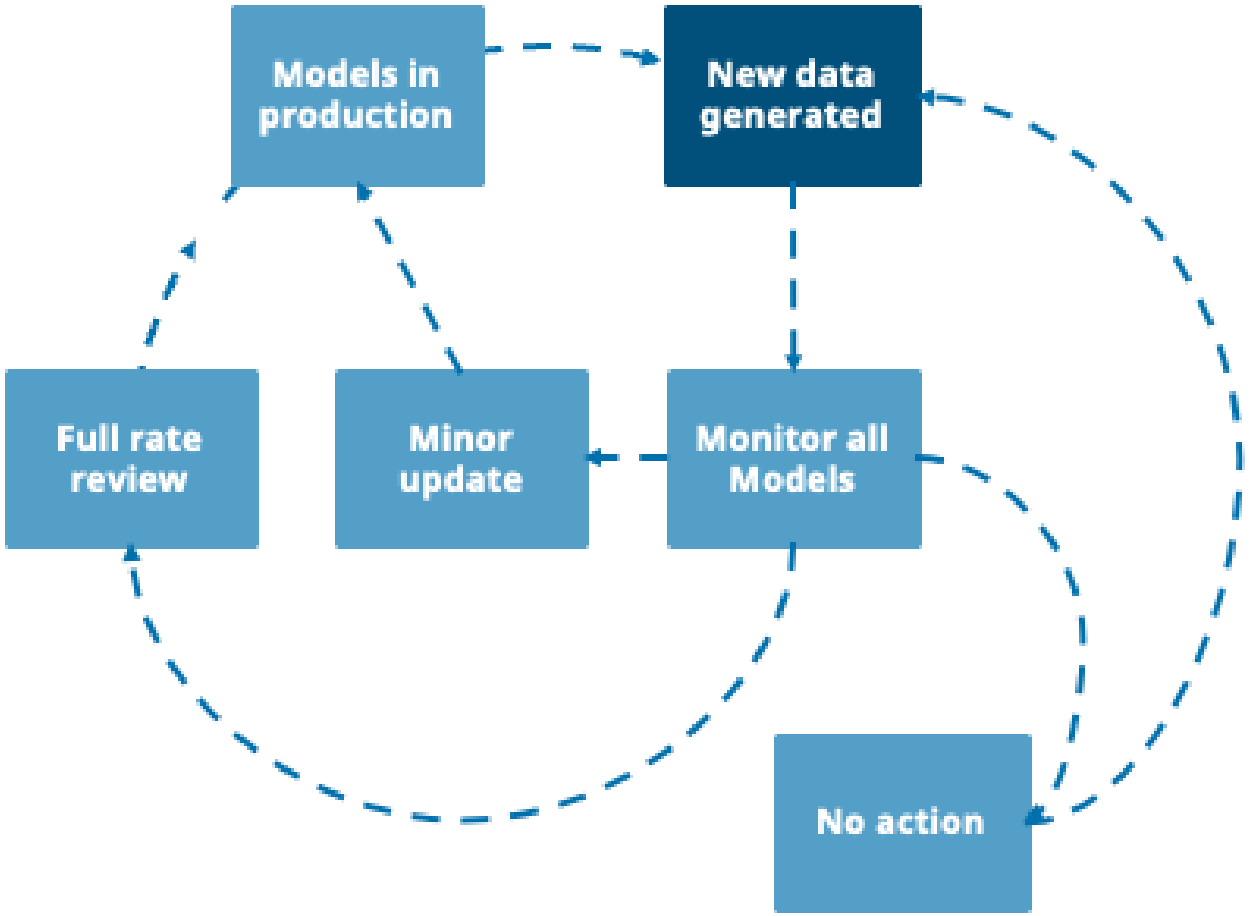
Model monitoring feedback cycle

How often do you run your feedback cycle?



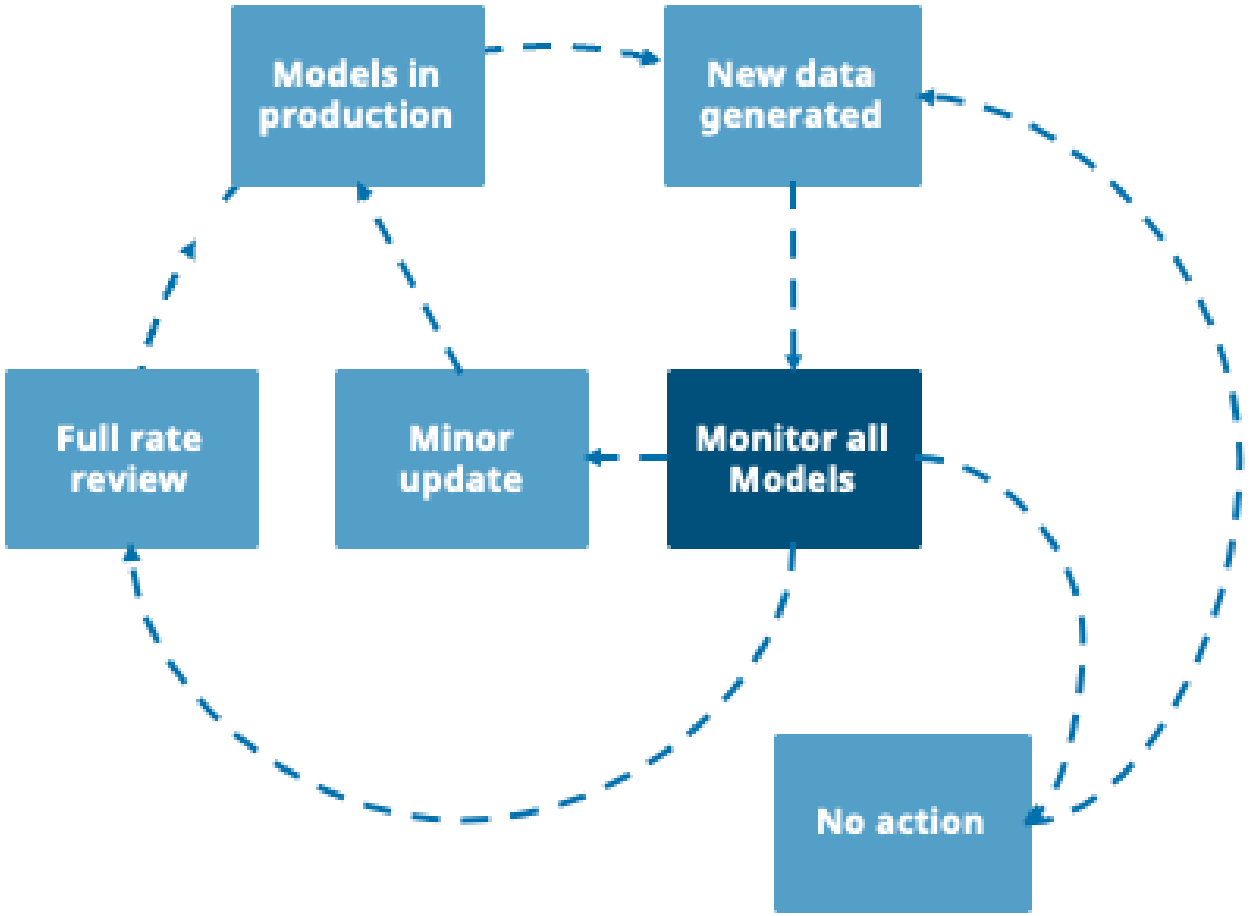
Model monitoring feedback cycle

How long does it take you to extract and transform new data?



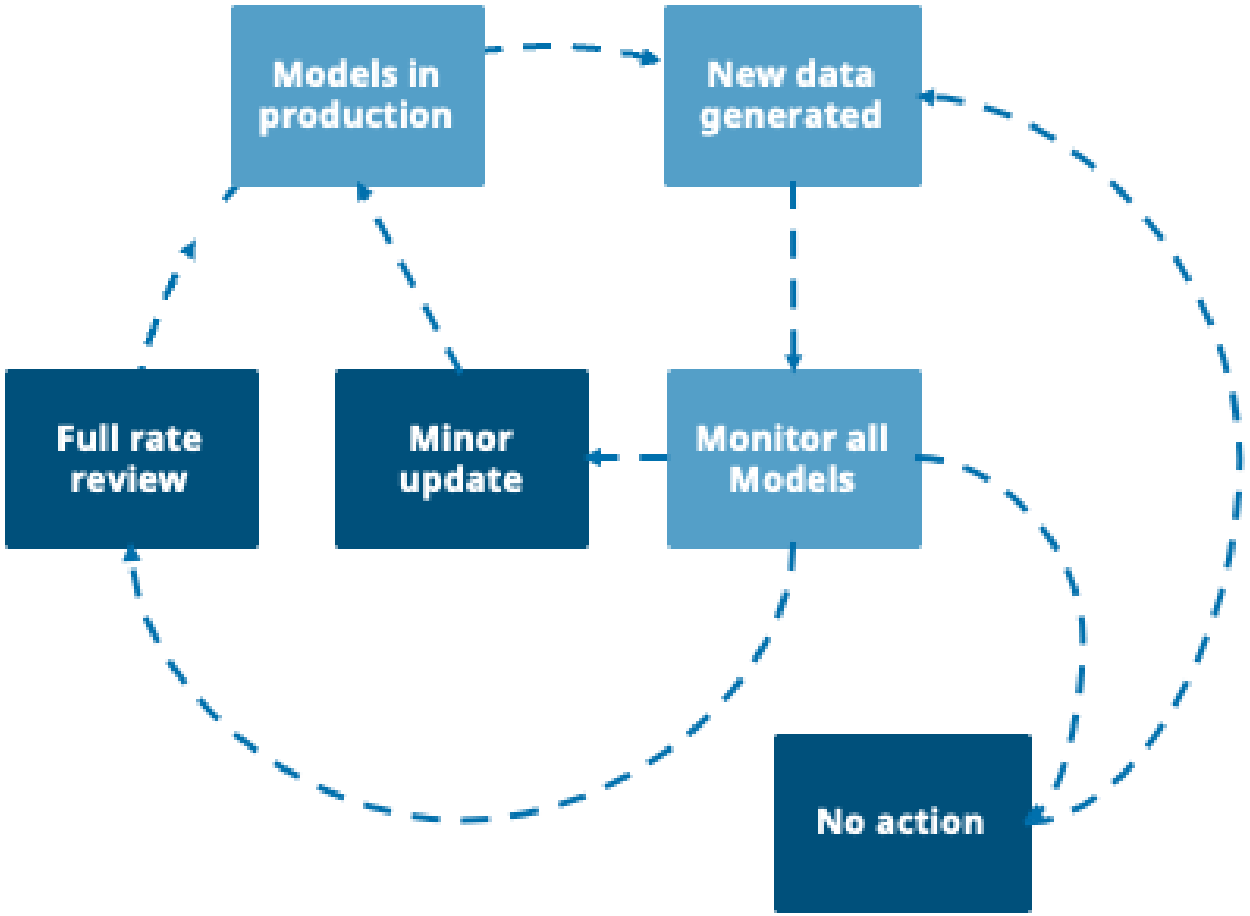
Model monitoring feedback cycle

How long does it take you to monitor and decide on your models?



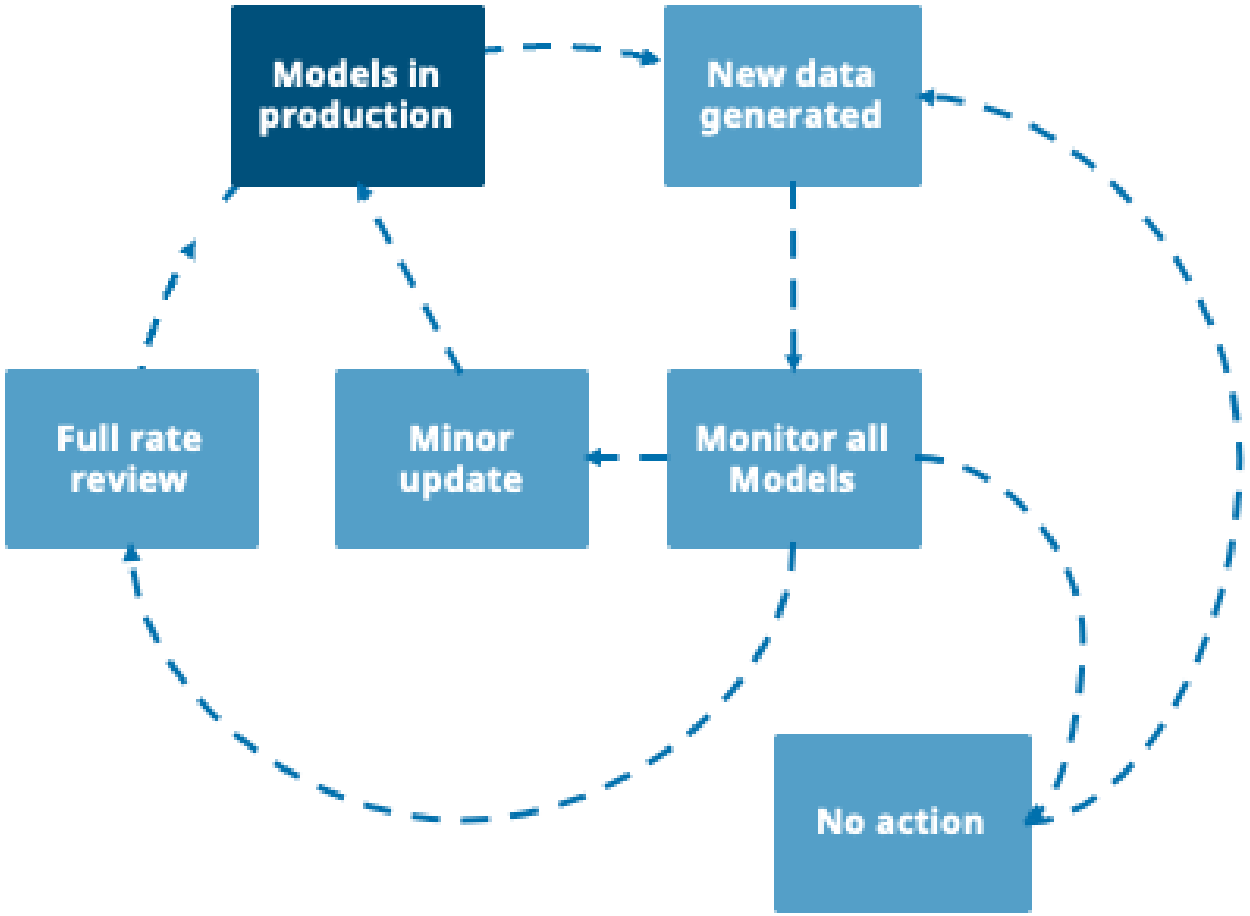
Model monitoring feedback cycle

How long does it take you to do minor or major updates?



Model monitoring feedback cycle

How long does it take you to push new models, new coefficients, new variables to production?



The three key properties of a pricing update

A pricing update should be:

Motivated

The updated rates should better represent reality than the old rates

Timely

Once we have credible evidence that our rates should be updated, then there should be no unnecessary delay

Minimal

All else being equal, the update should represent a minimal update on the existing rates

Conclusion: Regularly make small motivated price changes

In order to achieve:

Short-term value

In the short term, we realize the value of our data more quickly to write better performing business.

Long-term stability

If we don't act on credible information then we store up changes that will need to be made all at once in the future.

Automation

We can use automated and credibility driven approaches to reduce the effort in finding credible signal amongst the noise.

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