

From Physics to Finance

Katherine Rybacki

My Background

- PhD at Lancaster analysing data from the ATLAS experiment at CERN
- Search for exotics/dark matter
- Now a risk analyst at Zopa



What is Zopa?

- Zopa was founded as a fintech, a company developing/selling software with applications in finance
- When the peer-to-peer lending industry collapsed, Zopa became a 'challenger' bank.
- Challenger banks are digital-first banks that disrupt aspects of the industry where established banks all have identical offerings.

IFRS9 Regulations

- Based on the 2008 financial crisis, where indiscriminate lending drove the collapse of multiple huge banks.
- Case studies on these events drove the new capital requirements, where banks must keep aside a set amount of money that will protect them from insolvency, even during financial shocks.




What do we model?

- Probability of default – what is the probability you will default in the next six months? Or twelve? Higher values mean we allocate a higher provision amount.
- SICR – sudden increase in credit risk. Does the data indicate you've just experienced a financial shock? Did your mortgage go up, did you start missing payments?
- Risk score – before we lend to you, our model puts you into one of seven categories, from high risk to low.
- ... and so so many more!!!

Modelling Losses After Default

- Default – when an individual stops making payments and will be unable to recover.
- Very granular models – output is personalized to the individual.
- We don't just care about the total amount we get back, we care about when.



What type of model should we use?

- Definitely a candidate for machine learning!
- ... but our data science team already maintains many models
- This is challenging and resource intensive for many reasons.



Data History

- Any type of model needs good input data. But Zopa only became a bank in 2020, and we need to model losses over a longer period and on many thousands of examples.
- The first model was simplistic and built exclusively on data bought from credit bureaus.
- Not a good match for our customer base. We now want to use our own history.

Simple Historical Modelling

- We look into our data and find groups within our customers that have behaved similarly in terms of repayments and the sale prices we've received for them.
- For example, we might group together people who have never made a payment on their loan.
- We maintain definitions for 7 groups. Deciding on these is a large part of the work.



Overlays

- Then we consider many other factors that begin to make the model more and more complex.
- What if there is a sudden economic shock? How much more would we lose?
- What did we expect at origination?
- What is the remaining balance?

Skillset

- No prior knowledge of finance is needed
- Coding – most commonly in Python
- Some exposure to models will help. Monte Carlo is far more complex than this!
- Basic analytical mindset – asking lots of questions.