Prudential Regulation Authority
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21 October 2022

PRA Consultation Paper 6/22: Model Risk Management: Principles for Banks

Response from Institute and Faculty of Actuaries (IFoA)

1. The IFoA appreciates the opportunity to respond to the PRA's Consultation Paper 6/22 on Model Risk Management Principles for Banks. We believe the actuarial profession is well-placed to comment on these matters, not only because of our members' strong reputation for developing and implementing a wide variety of financial models, but also because of our awareness of the ethical issues which should be considered. The IFoA is independently regulated, we have a duty under our royal charter to promote the public interest, and our members are bound by the ethical standards in the Actuaries Code.

2. The IFoA welcomes these Principles which we believe to be sensible steps to manage and mitigate model risk, noting that amongst other things, errors in models may lead to resources to cover existing risks being under-estimated and/or inadequate pricing of new risks. The Principles are broadly consistent with recommendations made by our Model Risk Working Party.

3. We also note the potential for model risk to de-stabilise markets. For example, if a firm uses a flawed model that systematically under prices risk, then while in the short term it may offer lower prices to consumers, in the longer term it may undermine its financial strength and that of any other firms reducing their prices to compete. The model risk event when CDOs including sub-prime mortgages were mis-priced helped to precipitate the Global Financial Crisis. In some areas, were there to be errors in models, these would not be identified for a long time. For example, for long term illiquid assets and liabilities, risks may be priced using models for many years before there is an opportunity to check the model against the eventual realised cash flows through back-testing. These examples show that model risk can distort competition in financial services markets. Paragraph 3.9 of the CP notes that one of the PRA's objectives in developing the Principles is to promote a more competitive banking market, and we support this.

4. It is worth commenting that the model risk management Principles relate to an important paradigm within our profession, the actuarial control cycle. This reflects the stages actuaries are trained to think about when approaching a problem / specifying a model, designing a solution / model, validating it, and monitoring the outcome and updating our understanding and model over time. There are similar cycles in data science too.

5. We see model risk management (MRM) as a common challenge for banks and insurers and believe there should be a common regulatory framework around the management of MRM. We therefore believe the proposed MRM framework could be extended to life and general insurance: the requirements would be appropriate, for example, for insurers calibrating Solvency II internal models, or for actuaries performing wider pricing, valuation, capital management or risk management modelling.

6. We do not see the Principles posing significant challenges to insurers having regard to existing model requirements including (a) the extensive calibration and validation requirements around Solvency II

internal models and more generally (b) Financial Reporting Council requirements (such as TAS-100) around actuarial models.

7. We believe the Principles could be strengthened in the following areas:

   a. **Culture** - This is critical to MRM given the judgement that is often required. We believe the Principles could be expanded based on section 4.5 of the IFoA Model Risk Working Party's paper *"Model risk – illuminating the black box".*

   b. **Expert Judgement** - This is considered in the context of adjustments to address model limitations in section 3.4 of the draft Supervisory Statement. However, this goes much further as the choice of the model itself will usually be an expert judgement. We think the Principles should say more about the expert judgements underpinning models and the framework for identifying these and quantifying their effect. The IFoA has produced a paper on how expert judgements can be managed which may be useful in this regard - see expert-judgement-paperfinal-8-june-2015-sessional.pdf (actuaries.org.uk).

   c. **Model specification** - This should be a basic requirement of model development but there is little about the need for this in the Supervisory Statement.

   d. **Events not in data (ENID)** - Model development should consider potential events that may plausibly arise but not be present in data e.g. the possibility of a protracted collapse in house prices like that in Japan since 1990; or a protracted period of deflation.

   e. **User feedback** - This will already be part of internal model use test requirements but could be extended more widely.

   f. **Systemic model risk** – Where model risk is mitigated through the use of industry benchmarking, this may give rise to the residual risk of herding, where the same or similar models may be relied upon across industry, making the model risk systematic.

   g. **Scope –** In some cases we think the paper could be clearer about the scope of application of the Principles, for example:
      i. whether regulatory as well as stress testing models are covered;
      ii. the definition of material models (does this depend on a capital threshold or on being subject to regulatory reporting?); and
      iii. which AI and ML techniques are included.

8. The consultation document asks one specific question, which we answer below:

In your view, are there any components of the MRM framework where the proposed principles are not sufficient to identify, manage, monitor, and control the risks associated with AI or ML models?

a. Model validation should consider how well these models address events not in data, such as impacts of climate change which have not yet been observed, given their reliance on past data.

b. Given the "black box" nature of many such models, there may be a case for developing simpler, more conventional models to operate in parallel and act as a sense check with any major differences in outcomes investigated further.

c. We note that GDPR gives individuals the right not to be subject to a decision based on automated processing which has a significant impact on them, including the right to request human intervention to explain the decision and to challenge this (albeit with some restrictions). This may include AI / ML pricing models and hence there will be a need to be able to understand and validate how individual pricing decisions have been arrived at.

d. AI / ML models may unintentionally discriminate against minorities in the underwriting of loans and insurance. There is a need to validate outputs of such models against population mix to ensure there is no such inadvertent discrimination.

e. ML models use backpropagation to improve their algorithms constantly. Since the algorithms are changing frequently, the models' results also need to be reviewed frequently, to ensure that they remain consistent and do not deviate from expectations. If the reviews show that the models' results are becoming inconsistent, then manual re-calibration of the models will be required.

If you would like to discuss any of the points raised in this response please contact Matthew Levine, Policy Manager (matthew.levine@actuaries.org.uk).

Yours Sincerely,

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