

Broadly, the problem is that of how *specific* stress tests and model risk estimation should be designed to deal with, very broadly speaking, AI and ML applications to finance.

Who should this be of interest to and why?

In short,

- to financial regulators who have made stress tests as well as model risk management generally compulsory for at least a subset of financial institutions (e.g. banks). This can be further detailed with specific regulators per geography and specific types of financial institutions in scope;
- to anyone exposed to this risk who would need to quantify it and manage it appropriately – i.e. anyone making use of such applications for pricing, trading etc.

Staying with the former category, two closely related entities of interest would be the Bank for International Settlements (BIS: <https://www.bis.org/about/index.htm>) and the Basel Committee for Banking Supervision (BCBS: <https://www.bis.org/bcbs/>). More generally, encompassing financial regulation but not only, the European Commission issued a 2020 Technical Report on robustness and explicability of AI. Among the considerations they focussed on in the context of AI applications were those of explicability and robustness. As part of the broad solutions they highlighted would be *robust models*. What is key here is models which are robust to the particular challenges that AI applications pose (e.g. adversarial attacks).

Regarding model risk and stress testing, the core of the problem is how these can be further developed in order to correctly tackle the applications of the new type of models in use today.

Model risk and stress testing are not new to finance – a few references included at the end of this document – however, existing techniques would need to be at least revisited to ensure they can correctly tackle the new challenges 21<sup>st</sup> century models applied to finance pose.

### *References*

- Fed Reserve paper on model risk:  
<https://www.federalreserve.gov/supervisionreg/srletters/sr1107a1.pdf>
- A practitioner's view on model risk:  
[http://emanuelderman.com/wp-content/uploads/1996/04/gs-model\\_risk.pdf](http://emanuelderman.com/wp-content/uploads/1996/04/gs-model_risk.pdf)
- A consultant's view on model risk and regulations across geographies:  
[https://www2.deloitte.com/content/dam/Deloitte/fr/Documents/risk/deloitte\\_model-risk-management\\_plaquette.pdf](https://www2.deloitte.com/content/dam/Deloitte/fr/Documents/risk/deloitte_model-risk-management_plaquette.pdf)
- Model risk of risk models  
[http://eprints.lse.ac.uk/66365/1/Danielsson\\_Model%20risks\\_2016.pdf](http://eprints.lse.ac.uk/66365/1/Danielsson_Model%20risks_2016.pdf)
- Model risk and capital reserves  
<https://www.academia.edu/download/48520712/j.bankfin.2009.07.02520160902-27467-57ea13.pdf>

- Estimation risk

<https://pdfs.semanticscholar.org/4c13/024f022f6d8827faeac20a6ddfc83d23c985.pdf>

<http://www-sop.inria.fr/members/Denis.Talay/fichiers-pdf/fs2.pdf>

- Model risk in the context of options

<https://pdfs.semanticscholar.org/8847/182a6b5d8058f7df74c98f4e40184ff0fa33.pdf>