
How do banks manage model risk in 2016?

Public Summary

August 2016



Executive summary

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At a glance

Areas of convergence include:

- Model risk definitions are broadly aligned
- Most banks manage model risk as part of operational risk
- Robust governance, appropriately skilled staff, and backtesting are banks' key model risk mitigants
- Model approval processes are aligned

But:

- Ownership of model risk is disparate
- Quantification of model risk is not common
- Treatment of model risk as part of Pillar 2 varies materially
- The BCBS's move away from internal models could increase model risk

Further detail

In June 2016 we surveyed 12 ORX Members on their model risk practices. This report summarises how these banks define, manage, and mitigate model risk in their institutions. Many thanks to the banks and individuals for investing their time to help create this report. Collaborative efforts like this are impossible without their contributions.

Banks and their supervisors appreciate that model risk management is crucial but are at different stages of evolving practice. From a fractured range of practice today we expect convergence as the importance of model risk grows. The areas of convergence and divergence we identified are summarised here.

Converging practices

- Banks are using similar definitions of model risk in the absence of a standard definition from regulators. But there is room to standardise definitions to improve comparability.
- Most banks explicitly include model risk in their risk taxonomy. Most banks manage model risk as part of operational risk. Some elevate it to a principle risk type.
- Robust governance, skilled analysts, and back testing are the main model risk mitigation tools.
- Model approval processes appear to be aligned in the industry.

Diverging practices

- Ownership of model risk is disparate compared to ownership of major risk types such as credit, market and operational risk.
- Quantification of model risk is not common, and in the majority of cases where quantification is performed it is based on expert judgement.
- Treatment of model risk as part of Pillar 2 varies materially, ranging from being unconsidered to qualitative treatment and explicit quantification.

Participants felt that model risk will rise up supervisors' priority list in the future. It appears model risk is a tension inherent to the Basel Committee on Banking Supervision's (BCBS') move away from internal models in Pillar 1. Paradoxically model risk could increase as a result of BCBS' drive for fewer internal models.¹ It's proposals for more standardised approaches could impose a systemic model risk, as a larger number of institutions determine their capital requirements using an identical model, sharing the same vulnerabilities.

1. For example BCBS d362 (2016), Reducing variation in credit risk-weighted assets – constraints on the use of internal model approaches, www.bis.org/bcbs/publ/d362.htm or BCBS d355 (2016), Standardised Measurement Approach for operational risk, www.bis.org/bcbs/publ/d355.pdf

Introduction

Introduction

At a glance

Model risk is a relatively new focus area so management practices are likely to be less mature than more established risk types.

Model risk is one of the few risks deliberately created.

BCBS' move away from internal models will impact model risk.

Further detail

Banks use models for a wide variety of tasks; from informing expected losses (e.g. credit provisions) to unexpected losses (e.g. capital demand), client origination (e.g. application scorecards), product pricing, financial instrument valuation and stress testing. These models can impact both the profitability and solvency of a bank. In the extreme, unquestioned reliance on model outputs could threaten a bank's going-concern status.

Our Members have reported heightened supervisor scrutiny of model risk management practices and model risk capital demand quantification. This could be a consequence of the BCBS' growing discomfort with the adequacy of models, especially those informing capital demand. The BCBS is overhauling the Pillar 1 capital framework² where models have been questioned. These reforms will ultimately impact models and model risk.

We felt a snapshot of model risk management in the industry was timely. Therefore, in June 2016 we surveyed ORX Members on their model risk practices. Twelve banks from eight countries spanning four continents anonymously submitted information on their model risk frameworks, governance, and supervisory expectations. This report summarises how these banks define, manage, and mitigate model risk in their institutions. These findings have been supplemented with opinions and feedback received during individual discussions on model risk with select survey participants as well as the ORX Analytics Working Group.

We hope that the insights gained from this report will assist you to further improve your model risk management practices and also help in discussions with your supervisors.

"With the ongoing Basel Pillar 1 reforms increasing the standardisation of risk measures, and also increasing the Pillar 1 capital requirements, the gap between Pillar 1 and Pillar 2 capital levels and methods might reduce the incentive to further advance internal model development and therefore could increase model risk."

- Risk Manager

2. Basel Committee on Banking Supervision (2013), The regulatory framework: balancing risk sensitivity, simplicity and comparability, www.bis.org/publ/bcbs258.pdf

Defining models and model risk

Defining models and model risk

At a glance

Model risk definitions are broadly aligned.

Further detail

When does a spreadsheet become a model worthy of attention from senior management and supervisors? In its 2011 guidance on model risk management³ the US FED defines a model as:

"...a quantitative method, system, or approach that applies statistical, economic, financial, or mathematical theories, techniques, and assumptions to process input data into quantitative estimates. A model consists of three components: an information input component, which delivers assumptions and data to the model; a processing component, which transforms inputs into estimates; and a reporting component, which translates the estimates into useful business information."

So if forecasts are relied on elsewhere in the business, supervisors could look at the risk attached to outputs and determine the model risk. But not many regulators have produced a standard definition of model risk. As

demonstrated in previous research,⁴ the FED's 2011 paper on model risk management appears to be leading the industry's expectations. It seems to be the most comprehensive source of guidance from banking supervisors and provides a definition of model risk and outlines expectations around managing that risk.

Banks globally are reportedly in various stages of implementing these guidelines. But we found three quarters of banks work on model risk without their regulator providing a definition. Of those without a definition from their regulator, 55% use a definition similar to:

"The risk that a finance, capital, product, risk, or portfolio model has not been correctly calibrated or built to support the intended process."

The other definitions provided in our study identified the differences between model intentions and results.

"The current working definition...is: risk that a model may become inadequate or be used inadequately w.r.t. the original goal of describing in a simplified but accurate way a real life phenomenon."

– an Italian bank

"To further advance model risk management and quantification practices, standardisation of definitions and ownership, and improved methods in the industry are crucial."

– a South African bank

3. Board of Governors of the Federal Reserve System and Office of the Comptroller of the Currency (2011), Guidance on Model Risk Management, www.federalreserve.gov/bankinfo/reg/srletters/sr1107a1.pdf

4. Management Solutions, Model Risk Management, www.managementsolutions.com/PDF/ENG/Model-Risk.pdf

Governance and ownership

Governance and ownership

At a glance

Banks are starting to separately flag model risk incidents in their operational loss databases indicating increasing focus on model risk management.

Model risk is mostly managed as a subtype of operational risk.

Some banks elevate model risk to a separate principle risk type similar to market and credit risk.

A wide range of methods are used to mitigate model risk.

Surprisingly, ownership of model risk differs materially between banks.

The most popular methods are robust governance, backtesting forecasts, and having appropriate skilled developers, validators and auditors.

Model approval governance appears to be a mature practice.

Further detail

Two thirds of banks explicitly feature model risk in their risk taxonomies, mostly under the umbrella of operational risk, as illustrated in Figure 1 (right).

A majority of 63% of those with model risk named in their risk taxonomy classify it as a subtype of operational risk, and a third as a standalone risk type. And only half of those with model risk in their taxonomy have a separate flag for model risk incidents in their operational risk loss database.

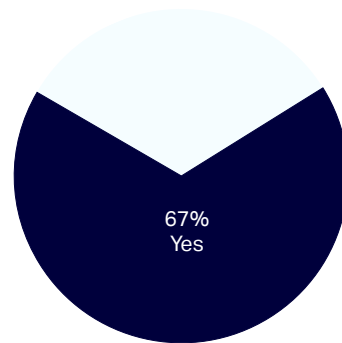
We saw a clear convergence of practice around three methods for mitigating model risk. Three quarters of banks we surveyed rely on a robust governance process to mitigate model risk. This mitigation is supported in 66% of banks by back testing of predictions against results and a skilled team of developers, validators and auditors.

Given the popularity of governance structures for mitigating model risk it was surprising to see a divergence in who takes responsibility for this risk. A third of banks referenced the CRO as ultimately responsible, a third leave the responsibility to model developers and validators, and the remaining third distribute responsibility across the three lines of defence (model development, model validation and audit).

It was most common for banks to distribute responsibility across seniorities from the model owner through to the Board.

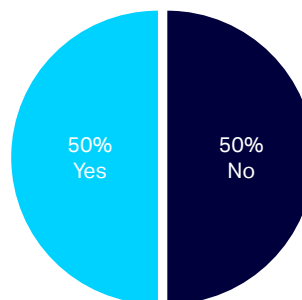
Figure 1

Does model risk feature in your risk taxonomy?

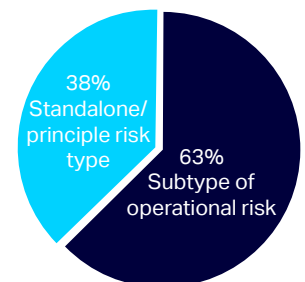


Of this 67%...

Do you separately flag model risk incidents in your operational risk loss database?



What is model risk treated as?



Model risk capital | Next steps

Model risk capital

At a glance

Treatment of model risk as part of Pillar 2 varies materially.
Quantification of model risk is not common.

Further detail

We found one third of banks are expected by their regulators to quantify model risk for Pillar 2 capital purposes, but only a quarter do. The remainder satisfies its supervisor's expectations with qualitative arguments whilst it refines its measurement approach.

Next steps

Our survey results and discussions with Members suggest banks and their supervisors appreciate that robust model risk management is crucial, but practices in the industry vary.

To advance the effectiveness and comparability of model risk management globally, we suggest that supervisors and industry continues:

- Standardising the definition of model risk
- Defining the optimal place for model risk in risk taxonomies
- Defining appropriate and consistent ownership of model risk
- Publishing comprehensive guidelines on model risk management practices mirroring the 2011 FED paper
- Developing appropriate quantification methods for model risk
- Publishing guidelines on the Pillar 2 treatment of model risk

"We are not convinced that it is possible to credibly quantify model risk since models are simplifications by design, which introduces uncertainty, and to quantify this uncertainty would need a model which in turn contributes to an unknown quantity of model risk!"

– Risk executive

Managing risk together

ORX believes many heads are better than one. We're here to bring the best minds of the international operational risk community together. By pooling our resources, sharing ideas, information and experiences, we can learn how best to manage, understand and measure operational risk and become less vulnerable to losses. We work closely with over 90 Member firms to develop a deeper understanding of the discipline and practical tools. We set the agenda, maintain industry standards, and garner fresh insights.

ORX is owned and controlled, on an equal basis by its Members.

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About this report

ORX Members received a more detailed version of this report which included further analysis and opinion. This public summary is taken from the full report, and is edited for non-members.

Contact: research@orx.org

