

MODEL RISK MANAGEMENT IN THE CURRENT PANDEMIC ENVIRONMENT

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The Pandemic has created an environment of uncertainty to a level not seen by the industry, increasing the risks faced by financial institutions, including the risks associated with the use of models. For many institutions, models play an integral role in conducting day to day operations. Prominent examples of their use include evaluating risks and capital, defining funding requirements, understanding customer behaviors, managing data analytics, and making investment decisions.

The traditional guardrails to manage model risk may not be adequate given the unprecedented level of connectivity and nonlinear outcomes owing to what is described commonly as “fat tails” or statistically remote events. Models built on data from past recessions with known outcomes are inadequate for modeling pandemic tail risk, which has become reality in the current unknown environment.

Regulatory focus on model risk will likely be increased given the important role models play in day to day bank operations across all three lines of defense and the increased inherent risk due to the pandemic.

Sound model risk management involves having strong practices at various levels of the organization. Truly managing model risk relies on applying proper judgment and appropriately evaluating qualitative information, in addition to employing proper quantitative expertise. SR 11-7, interagency US federal agency guidance issued in 2011, incorporates lessons from the financial crisis, and discusses several elements for model risk management. These elements are intended to fall into the same framework for managing traditional risks such as credit, liquidity, operations, and others. Model risk management should be viewed as a process, not an event, utilizing the following key risk management practices consistent with managing other traditional risks:

- Governance
- Risk Identification, Ongoing Monitoring, Assessment
- Reporting

The rapidly changing environment of the pandemic has created a strain in the process of model development and independent validation functions. Discussed below are selected challenges institutions may face in its model risk management process and mitigants to address some of these challenges, leveraging its traditional infrastructure for managing all risks on an enterprise wide level. Also attached is an Appendix with a brief list of FAQs regarding models.

GOVERNANCE

Without an effective internal oversight environment in place to ensure adequate attention is given to model risk management, chronic entropic behaviors can emerge. Clear tone from the top is a prerequisite to a commitment to continuous improvement, an attribute that is particularly imperative in the current uncertain environment for risk management of models to function effectively. Firms will generally need to undertake adjustments more frequently to the current oversight process to contribute towards stronger governance during these unprecedented times. Clarity and focus matters, as represented by the company's policies, standards and controls, and the discipline to apply them consistently, along with management and the board being on the same page when it comes to the firm's appetite for model risk. "Tone at the top" is about clearly communicating from the Board and senior management that model risk is not an afterthought to strategy setting and business planning.

Key Challenges Faced by Senior Stakeholders Include the Following:

- Insufficient nimbleness in the governance process to tackle a wide array of issues, allowing each material form of issue to be considered individually and in sufficient detail, and potential new forms to be identified, assessed, and mitigated in a timely manner.
- Significant number of development and validation activities will likely occur as the latest data/information emerge, which may result in entropic behaviors with "oars pointed in different directions" creating-
 - » Strain on resources.
 - » Lack of coordination leading to contradictory messages and decisions.
- Inadequate knowledge in Internal Audit. In a transformation of the governance structure, the IA function will need to enhance the level of

sophistication of their audit approach and engage deep subject matter specialists to carry out the testing.

Banks may face increased regulatory scrutiny on model risk management in the current environment.

Mitigants

- Leverage existing framework, policies and procedures (P&P). These documents can serve as key guiding documents helping ensure practices are consistent and sufficiently rigorous to minimize chances for misinterpretation.
- Enhance P&P so that such enhancements are also consistent with risk appetite and tolerance. Tone from the top should help with the clarity of the risk appetite and tolerance in a pandemic environment.
- Clear to all in the firm which P&P have zero tolerance and the associated accountability of not adhering.
- Updating P&P regularly may be necessary, particularly in the current environment as new data and insights emerge.
- Firm has mechanisms to assess conformance with P&P- such as IA function. Resources and talent may be required from third parties, however, efficient rotational assignments within departments, while ensuring independence and subject matter expertise, can also be explored.
- Set up nimble sub-committee for model risk, acting as a quarterback in current environment for model risk oversight committee to help ensure appropriate oversight of short- term actions and that they are aligned with longer term plans. Some of the key activities of this committee can include the following:

- » Ensuring visibility and accountability of business-critical activities, such as model development, overlays, adjustments, review, and monitoring.
- » Escalating appropriate issues, enhancing transparency.
- » Timeliness of reviews.
- » Help provide sufficient resources.
- Be proactive and have discussions with regulators prior to exams to understand any sensitivities or specific expectations they may have. In the current fluid environment, regulators may welcome thought leadership from the industry on best/appropriate practices as well.

RISK IDENTIFICATION

Model Risk can be defined as the potential loss an institution may incur, because of decisions that could be principally based on the output of models, due to errors in the development, implementation or use of such models. (CRD IV, Article 3.1.11). The COVID-19 pandemic will likely result in a surge of model-related activity representing a range of challenges across the entire model management/ risk identification life cycle.

Key Challenges:

- Uncontrollable risks which arise due to inherent uncertainty of modeled environment.
 - » In the current environment, models lack sufficient data to be tested and validated, prior relationships between products and macro-variables, for example, may not be applicable (i.e. non-payment over 90 days due to pandemic and treatment of TDRs).
 - » Similarly, conceptual models with judgment and qualitative connections made in the past may no longer be valid in the current environment.

- » Rushed actions leading to expert adjustments and overlays to models and replacing existing models with expert views only, which may not be transparent. Further, cognitive decision-making biases, increasing model risk, may creep into models through the increased use of management/expert judgment and overlays.

Any model changes or (re-)development requires adjusting for events over the coming months (for example, resurgence of illnesses, development of vaccine) which might fundamentally change the nature of the work that needs to be done.

Increased number of staff working from home also creates challenges on version control, availability, and consistent understanding of approach to any model adjustments.

Rushed, uncoordinated actions may lead to contradictory modeling approaches for products with analogous properties and risks which may prevent cohesive, accurate assessment of risks affecting the efficacy of the models.

Increased use of “black box” vendor models and/or models with AI based platforms that are marketed based on their suitability of use in current environment. Regulatory expectations have not kept up with the speed of technological transformation, particularly in the AI space.

Mitigants:

- Revisit requirements on compensating controls such as overlays, particularly for both conceptual and quantitative driven models. For example, traditional requirements on supporting documentation for overlays with historic data and analysis could be replaced with appropriate, robust qualitative judgment supported with sensitivity analysis, leveraging slices of analogous historic occurrences if applicable.
 - » Update the existing model overlay process to support the expected increase in overlays,

with an appropriate balance between rigor, expediency, and transparency.

- » Where appropriate, model breakdowns in this environment can be linked to taking specific actions associated with products. For example, model driven pre-approved loans can be temporarily stopped.
- Obtain a good understanding of the model inventory and each model's limitations.
 - » Prioritize inventory based on importance to key businesses, its use and impact. Two questions to answer that may help in the prioritization process are i) what is the model used for? ii) how accurate does the model need to be?
 - > Consensus building is important; however, prioritization framework should allow senior stakeholders to quickly agree.
 - > Models are always subject to periodic review. Given the various impacts of the pandemic, the review schedule should be revisited and modified along with the prioritization, such that those models most affected by the various uncertainties are moved forward for more immediate review with thought to the prioritized inventory.
 - For some institutions, there are probably models in use that have yet to be validated and approved. Depending on the prioritized inventory, such models may require immediate review and decisions revisited as to the acceptability of their use.
- Do not overreact and create biases towards recent unsustainable trends, consider multiple scenarios, utilize different approaches for similar models to obtain a balanced view. Short time horizons to allow a modular approach to model adjustments

and validation may also be desirable for an increasingly uncertain environment.

- » Establish a flexible well governed model testing process, under the oversight of the “nimble subcommittee” referenced above in “GOVERNANCE”, to allow for rapid identification of redevelopment / adjustments and overlays along with transparent well understood exceptions.
 - > Consider parallel validation processes rather than waiting for model to be fully redeveloped or adjusted. In this type of process careful attention should be paid to validation staff not making any decisions about the model to preserve independence and “effective challenge” of the validation process.
 - > Frequent testing of contingencies underlying overlays may also help identify cognitive biases resulting in increased model risk.
- Thorough dissection of vendor models / AI based models to assess limitations, particularly if the model(s) are relatively important for decision making. Obtaining the necessary documentation from the vendors, such as their own model validation assessments may be helpful in this exercise, including demonstrating that the data and information underlying the model(s) are suitable and consistent with the current environment.

REPORTING

The overall objective of model risk reporting is to provide insightful, meaningful information about the internal and external environment in a timely manner. Such reports should be understood by a broad audience and not inundated with math, formulas, and statistics, but rather actionable metrics and information enabling a bank to monitor and take action to reduce model risk.

Supervisory guidance does not contain the expectation that firms should develop a single measure of model risk. Distilling down all aspects of model risk into a single number presents significant challenges.

- Also, for other risk types (credit, market, IRR, etc.), firms usually do not make assessments of aggregate risk using a single measure
- Even for individual models, supervisors expect there to be several measures employed (e.g., performance, robustness, stability)

Key Challenges:

- Reported metrics may not adequately reflect risk in this unprecedented environment. Increased use of qualitative, judgmental factors may result in higher “behavioral complexities” beyond traditional technology and other interfaces.
- Measuring how the increased use of compensating controls, versus the use of data, has changed the risk profile of aggregate model risk.
- Inflexible systems to provide the necessary data in reports reflecting a rapidly changing environment, proved to be a challenge for many institutions in the last financial crisis and likely in the current environment.

Mitigants:

- Reports developed in consultation with all key stakeholders generally prove to be more effective. In the current environment, foresight into future risks and early warning signs, such as the number of overrides and the magnitude of overlays for critical models will help identify the magnitude of model risk.

- The team should quickly perform an effective challenge of all model adjustments and underlying assumptions, taking an agile approach and applying a focused “rinse and repeat” review methodology to a changing environment whereby judgment, overlays, and adjustments may also change quickly. Transparency about model limitations in reports are imperative going well beyond just statistics and include assessments such as how error(s) might manifest itself during model use and the implications of such error(s) in the current environment.
- In addition to internal complexities such as technology and interfaces with existing systems, a dynamic uncertain environment such as this pandemic also introduces behavioral complexities associated with increased modeling activity with reliance on expert judgment. Frequent testing of contingencies underlying overlays and adjustments based on gathering sufficient information and data points. Reporting such test results may provide insight about the quality of the judgmental overlay process and adjusting accordingly. This would be particularly relevant for cognitive decision-making biases in models that may build over time in the current environment.
- Utilize advancements in coding and technology to mitigate inflexible reporting infrastructure without significant, costly, time consuming IT project work.

Collaboration across risk functions coupled with leveraging new technologies and tools are critical success factors to increase the speed, accuracy of information collected, analyzed, and escalated when appropriate, to support informed decisions.

CONCLUSION

Managing model risk is analogous to processes of managing other traditional risks and should not just be incumbent on model validation. In a fast-evolving situation with many moving parts, an agile, flexible approach to model risk management becomes imperative. Banks face several challenges regarding model risk management in the current environment, including a surge of model activity from different parts of the bank to deal with unclear boundaries of uncertainty. A nimble, well governed, transparent process backed by an appropriate level of analysis, testing, and reporting to particularly validate qualitative decisions and assumptions on an iterative basis are some of the key mitigants to the challenges.

APPENDIX MODEL FAQs

What is a Model?

A method, system, or approach that applies statistical, economic, financial, or mathematical theories, techniques, and assumptions to process or input data into quantitative /estimates and/or qualitative outputs.

Generally, models can fall into three categories:

1. *Conceptual Models* are judgmental, qualitative models that highlight connections and interdependencies in real world processes and events. This approach can be the first step to develop more complex, quantitative, data driven models. With no data in an unprecedented environment, conceptual qualitative models will likely be relied upon.
2. *Mathematical and Statistical Models* are quantitative, data driven models based on statistical, equation driven relationships between inputs and outputs. When ample, or sufficient data is available, these types of models are typically developed by banks for their business activities.
3. *Data, Analytics, Visualization models* are a direct link between underlying data and graphic in form of a table, chart, image (2D, 3D), overlays. As there is no quantitative estimate being calculated in the traditional sense of a model, coding of the linkage of the data with the desired graphic is the critical success factor as opposed to the integrity of an equation.

How does a Model work?

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.

How is Risk Defined in Mathematical Terms?

There is no single precise definition. However, if one had no choice and had to pick or determine one, a likely popular definition would be:

Risk = Probability of Negative Loss Event X Loss on occurrence of Negative Loss Event

The above "Risk" calculation is also often called "Expected Loss" consistent with Bank for International Settlements (BIS) definition.



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