

# MODEL MANAGEMENT IN THE COVID-19 ERA



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## INTRODUCTION

As economies around the world gradually come to terms with the COVID-19 pandemic and consider reopening plans, businesses will continue to grapple with the uncertainty and lagging impacts of the pandemic for the foreseeable future.

The pandemic has introduced new and unprecedented challenges for financial institutions across the model life cycle — in development, validation, and monitoring. And COVID-19 will continue to drive a major surge in necessary model management efforts over the coming months to address the expected performance deterioration of existing models.

Senior stakeholders will need to tackle a host of difficult questions to guide these efforts, leveraging existing frameworks where possible, while considering alternate solutions that might have previously seemed unacceptable or nuanced approaches that might have previously seemed suboptimal. Financial institutions will need to appropriately preempt the significant surge of model management efforts during and coming out of the pandemic by implementing six immediate actions.

## SIX IMMEDIATE ACTIONS

1. **Develop a set of guiding principles** to inform model management decisions during the pandemic
2. **Apply a tiering framework to the model inventory** to concentrate on the most material areas of increased model risk
3. **Leverage existing model monitoring standards** to allow for more nuanced interpretation of results
4. **Develop decision trees** to identify potential pathways and guide decision making in a more consistent way between models
5. **Update the existing model overlay process** to support the expected increase in overlays and better balance rigor and expediency
6. **Convene a “Model Management SWAT team”** of experienced stakeholders to provide oversight and guide triage decisions

# CHALLENGES OF MODEL MANAGEMENT DURING COVID-19

The COVID-19 pandemic has put large parts of the global economy on “pause” and greatly disrupted the way other parts operate on a day-to-day basis. While financial institutions have grown more resilient through the accumulated experience of previous crises such as the global financial crisis, there are many aspects of the COVID-19 challenge that are unique in nature.

## **The origin of this global crisis is unprecedented**

Never in our lifetime have we witnessed an economic shock of the current scale driven by a public health concern — one that impacts both the demand-side and supply-side of business. The nature of the challenge is further complicated by uncertainty around the duration and possible recurrence of the COVID-19 impact. A range of future scenarios are plausible, including those that require substantial changes to our daily lives until we reach “herd immunity” or effective treatments or vaccines are developed.

## **The impact on the macroeconomy is unprecedented**

Economic activity over the past quarter has substantially slowed, with a spike in unemployment more dramatic than that observed in previous crises. Furthermore, macroeconomic forecasts have been revised at an unparalleled speed, deteriorating over the course of several weeks in March and April 2020 from indicators of a possible recession to a 40 percent decline in annualized US gross domestic product (GDP) in the next quarter<sup>1</sup>, and leaving financial institutions with limited time to prepare and appropriately respond to the challenge.

## **The government response to the pandemic is unprecedented**

The scale and breadth of fiscal stimulus packages and forgiveness schemes proposed and implemented by countries across the globe dwarfs previous such efforts. For example, the US has introduced the Coronavirus Aid, Relief, and Economic Security Act (US CARES Act) and the Federal Reserve Main Street Lending Program; and the Federal Reserve has intervened to inject liquidity in capital markets at an unprecedented speed.

## **The customer and business response is unprecedented**

Precautionary measures and restrictions implemented in response to the pandemic have caused massive shifts in consumer and corporate behavior, such as the rising popularity of video conferencing platforms; the surge in use of delivery services; and the increased economic activity through online channels.

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<sup>1</sup> Swagel, Phil. “CBO’s Current Projections of Output, Employment, and Interest Rates and a Preliminary Look at Federal Deficits for 2020 and 2021.” Congressional Budget Office, April 24, 2020.

All these pressures increase model management challenges. The models that senior management and day-to-day decision makers rely on will, in many cases, underperform, and in some cases may simply fail to work adequately. When such models underperform, the decision of when and how to adjust or replace these models is a difficult one, especially when there is limited data to rely on in terms of measuring the impact of the pandemic. We therefore expect a flood of model development and validation related efforts to hit late in the second half of 2020 and stretch into 2021 and beyond, as experience and model performance data becomes available.

**Financial institutions need to understand the impact of the pandemic on model management and start acting now.**

## **IMPACT ON MODEL MANAGEMENT**

The COVID-19 pandemic presents a range of challenges across the entire model management life cycle. Model developers and validators across the first and second lines of defense will need to confront these difficult issues while working against time pressure and resource constraints. We see challenges across each stage in the model life cycle including model performance/model monitoring, model (re-)development, and model (re-)validation. Some example issues:

### **Potential issues related to model performance/model monitoring, include**

- **Models “break” and do not produce sensible results** given the extreme swings in macroeconomic variables, well beyond the macroeconomic outcomes embedded in the previous development or back-testing data.
- **Models do not meet performance acceptability thresholds** identified under existing monitoring plans.
- **Models structurally no longer match available products or market activity** (for example, models to project commercial lending volumes following the US CARES Act and the Federal Reserve Main Street Lending Program; and retail credit models projecting the timing of customer defaults impacted due to deferrals delaying defaults).

### **Potential issues related to model development, include**

- **Models lack (sufficient) outcomes** on which to be tested or (re-)developed (for example, final outcomes for currently deferred retail loans).
- **Relationship between products and macroeconomic conditions are broken** (for example, between macroeconomic conditions and default due to deferrals, between unemployment rate and default given government stimulus, and stock market rallying due to government stimulus).
- **Any model changes or (re-)development requires** “chasing a moving target” events over the coming months (for example, development of vaccine) might fundamentally change the nature of the work that needs to be done.
- **Lack of consensus and guidance on treatment of pandemic period** in development of models (for example, “inclusion in” or “exclusion from” development dataset; and calibration for stress period).

### **Potential issues related to model validation, include**

- **No clear historical data or precedent that developers can rely on** to establish defensible conclusions around model changes.
- **Need to rely on substantially more “judgment calls”** than in typical model validation processes, given the likelihood of overlaying or replacing some quantitative aspects of models with assumptions and expert judgment.
- **Surge in model validation efforts** due to models failing monitoring standards and potential delays in model (re-)development.

Dealing with the implications of COVID-19 on models will entail making some difficult decisions upfront that need to be approached in a structured manner with guidance from senior stakeholders. These decisions will ensure consistency while allowing for controlled flexibility to address the uncertainty surrounding the pandemic and the expected increase to model management workload.

Financial institutions might even consider approaches and options that were previously, in more typical environments, considered to be unacceptable (for example, increased reliance on expert judgment) or suboptimal (for example, using limited data to inform adjustments). Models that rely on less data-driven approaches will still be preferable to models that fail to meet performance expectations, and therefore model (re-)development frameworks will need to allow for prudent expert judgment to guide performance assessment and decision making. While the solutions will vary based on specific characteristics such as the model family (for example, pre-provision net revenue, retail credit) and model purpose (for example, business-as-usual decisioning, stress testing, regulatory capital), there are some key practical actions that financial institutions can take now to better manage the model management challenges due to the pandemic.

# ADDRESSING THE CHALLENGE

When models need to be adjusted or replaced due to COVID impacts — whether due to performance deterioration or other structural factors that make them inappropriate for use — a logical response for most models may be to wait to make changes, in order to have a better understanding of epidemiology, macroeconomy, government response, and customer behavior outcomes. Only in the third quarter or fourth quarter of 2020 will we start to have any real experience based on which to revise models or test the impact of any judgmental changes made now (and that experience will be nascent). The implication is that the main surge of model management challenges will begin in late 2020 and continue through 2021 and going forward.<sup>2</sup>

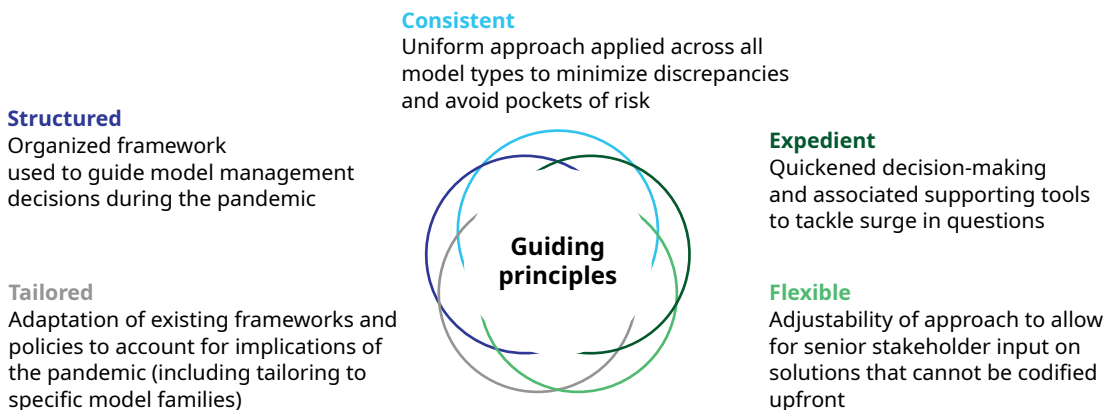
## SIX IMMEDIATE ACTIONS

There are six immediate actions for financial institutions to take to address the challenge and guide upcoming model management activities.

### 1. Develop guiding principles for model management during the pandemic

Model developers and validators should jointly align on a set of carefully thought-out principles to provide guidance to involved teams and drive consistency in model management decisions during the COVID-19 pandemic. Achieving alignment on such guiding principles may require a few focused, and possibly contentious, discussions upfront between relevant stakeholders, but will yield dividends throughout the pandemic. Financial institutions should continue to revisit and refine these principles as necessary once new learnings emerge during the pandemic.

#### Exhibit 1. Sample overarching guiding principles for model management approach



Source: Oliver Wyman




<sup>2</sup> For some model types such as retail credit models that rely on final outcomes, there may not be a way to develop quantitative models until late 2021 or even 2022. Nonetheless modelers will be required to make adjustments or explain outcomes in the meantime, even if the adjustments do not rely on quantitative approaches.

## 2. Establish a tiering framework based on the pandemic impact

Financial institutions should tier the impacted models from the overall model inventory based on expected COVID-19 impact. The tiering will be critical to effectively control the increased model management workload and to concentrate on the most material areas of increased model risk.

- A “pandemic prioritization framework” should be developed, building on the existing model risk assessments/prioritization mechanisms, and accounting for factors such as the deterioration in model performance; the current focus on some models given regulatory scrutiny and internal considerations (such as shifting strategic priorities and new business initiatives or existing models already flagged for re-development); and sensitivity of the model to the pandemic (both model components and adjacent models).
- The pandemic prioritization framework factors and/or thresholds should be carefully selected and calibrated to right-size the number of higher tier models for revision to account for practical considerations like existing plans and resource constraints.
- The tiering framework that is agreed to should allow for judgment to be applied; what is important is that the framework enables senior stakeholders to relatively quickly agree on the highest priority models that will require development and validation focus and resource appropriately.

**Exhibit 2. Sample prioritization framework, including key factors and example tiers**

Current Model Risk Assessments			
Focus efforts on models that have existing 'High' (and potentially 'Medium') risk ratings			
<b>Performance Impact</b>	Performance Deterioration	Extent of deterioration in model performance (for example, impact outside of existing acceptability thresholds; model not suitable for continued use)	 <p><b>Tier 1</b> Models that are relevant across all three dimensions</p>
	Redevelopment Feasibility	Availability of data to redevelop model and/or address performance deterioration in quantitative manner or through model overlays	
<b>Current Focus</b>	Immediate Importance	Models aligned to the strategic priorities and new business initiatives, or existing models identified for redevelopment	 <p><b>Tier 2</b> Models that are relevant across two dimensions</p>
	Regulatory Scrutiny	Existing regulatory commitments related to remediation plans and submissions, as well as anticipated regulatory focus areas	
<b>Pandemic Sensitivity</b>	Component Sensitivity	Model component (input, calculation, output) most likely impacted by the pandemic (for example, models related to businesses with most dislocation)	 <p><b>Tier 3</b> Models that are relevant across one dimension</p>
	Network Dependencies	Upstream linkages and downstream use cases for the impacted model that might lead to outsized importance to the organization	

Source: Oliver Wyman

### 3. Adopt a more nuanced interpretation of model performance results

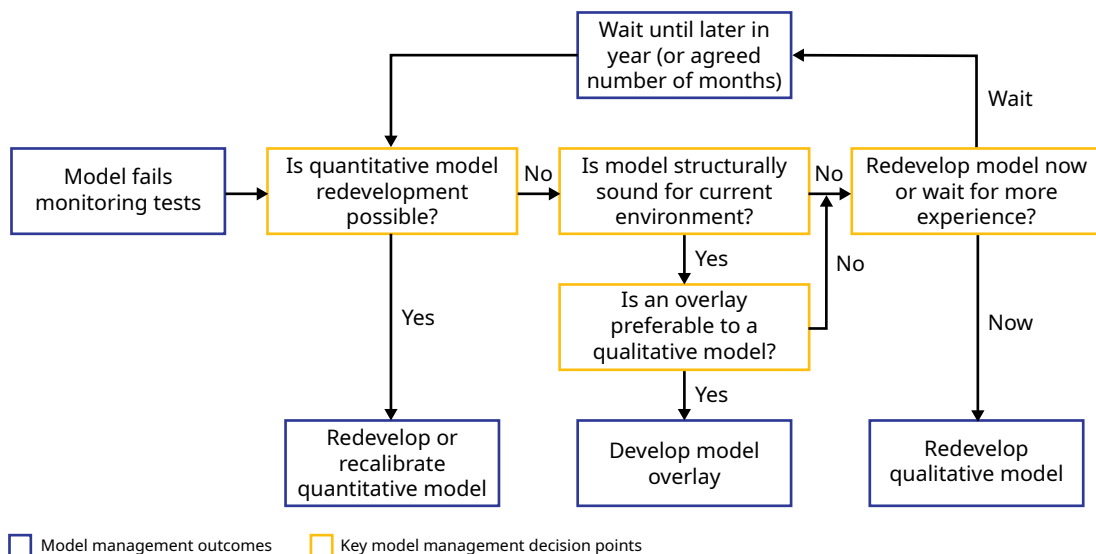
Model developers and validators should align on how to interpret model performance and monitoring results, and work closely together to understand areas of concern and implications of monitoring exceptions for in-use models. Adopting a more nuanced interpretation of model monitoring results will help manage the expected large volume of exceptions. Here are some actions to take across the key steps of the model monitoring process:

- **Performance evaluation:** An approach relying more prominently on judgment and expert justification should be adopted when interpreting monitoring results to account for temporary performance deterioration vs. more permanent performance deterioration.
- **Monitoring plan:** Modelers should consider adjustments, especially for expected areas of concern, including potentially collecting additional information or qualitative considerations to facilitate more informed decision making.
- **Action plan:** More effective processes should be established to allow for rapid testing and implementation for re-developed models and the governance of compensating controls to deal with monitoring exceptions.

### 4. Create standardized decision trees to guide model treatment during the pandemic

Worked examples of standardized decision flow charts — both generalized versions and “case law” for specific model families or model purposes — should be developed to identify key decision points, highlight potential pathways, and guide decisions on model treatment more consistently across the institution. Given the expected surge of model monitoring exceptions, these decision trees will provide templates to guide the decision-making process and support convergence on model management outcomes. The decision trees will require critical thought and socialization to reflect the complexity of the issues for specific model types (for example, by model family).

**Exhibit 3. Sample logic flow for decision making**



Source: Oliver Wyman



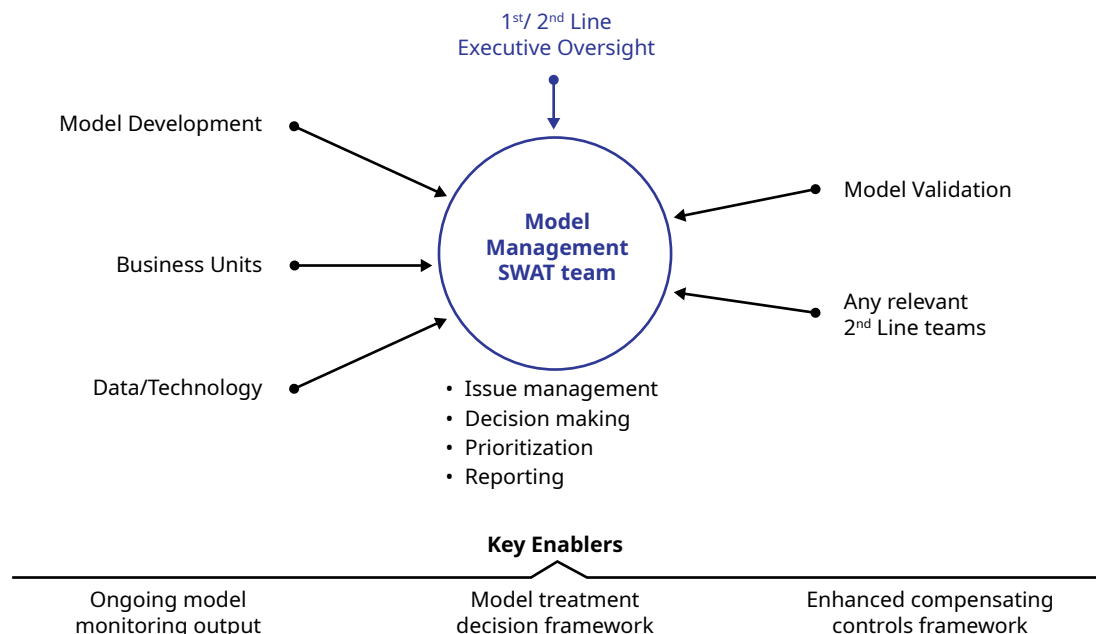
**5. Revisit the approach to compensating controls needed during the pandemic**

Financial institutions should review and update the approach to compensating controls given the heightened need for these controls (for example, overlays) during the pandemic. A key step is to assess the full range of compensating controls available for use, including, but not limited to, overlays, assumption changes, adjustments, use of challenger models (where available), and the use of benchmarking/reference points. These compensating controls can be applied to all components of a model, ranging from the inputs to the calculation engine to the outputs. Finally, detailed consideration should be given to the oversight of compensating controls to find the right balance between rigor and expediency, and account for the nature of the pandemic relative to a typical economic environment. For example, existing templates used for the overlay process will likely rely more on expert judgment and recent experience than on historical data and data-driven evidence.

**6. Establish a senior “Model Management SWAT team” to triage decisions during the pandemic**

Financial institutions should convene a “Model Management SWAT team” comprised of experienced model development and validation staff, as well as other relevant senior stakeholders, to help manage the process tightly and to provide oversight and guidance on triage decisions. Given the challenges that will need to be thoughtfully addressed over the coming months, the “Model Management SWAT team,” supported by key enablers (such as better ongoing model monitoring output), can help improve the efficiency and effectiveness of the approach through improved issue management, better decision making, prioritization, and more reporting on the situation to senior management and the board.

**Exhibit 4. Illustration of a Model Management SWAT team**



Source: Oliver Wyman

## **PATH FORWARD**

The extraordinary and rapidly evolving nature of the COVID-19 pandemic poses a host of new and unprecedented challenges for model management practices across the financial services industry. Most notably, the pandemic will cause a significant surge in model management activity over the coming months. While the need for increased effort and resources will likely be more acute starting towards the end of 2020, the time for financial institutions to prepare is now.

A critical step for senior executives is to take tangible actions upfront to ensure that institutions are focusing on the right set of problems and effectively managing the increased workload. The six actions outlined in our paper will help financial institutions better deal with the situation and develop a model management plan — including timelines and resources, that guides the remainder of 2020 (and beyond) activities. Financial institutions able to implement these six actions will be in a position to best monitor and address model management issues as we navigate through the pandemic. These actions will help financial institutions reduce the operational burden by focusing on the most material model management questions, and emerge with a stronger and more resilient model management program.

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