The Art of Running Model Validation in a Bank

A growing regulatory focus on the model validation warrants a robust framework and, more importantly, uncompromised implementation standards.

Through this paper, we present the regulatory expectations of model validation, evaluating the present-day role of model risk management (MRM) and the efficacy of industry practice. We also present examples of some of the widely identified inefficiencies in implementing robust MRM framework, and discuss the independent roles of validators.

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Evolution of MRM

Over the last 20 years, financial institutions across the globe have come a long way from building simple business-rules-driven tools to developing complex algorithms to assist business decision making. As the saying goes, reform is usually possible only when a crisis takes hold. We cannot solve our problems with the same thinking we used when we created them.

The 2008 financial crisis has taught the banking industry that even sophisticated models that are built for pricing some complex derivatives such as mortgage-backed securities or forecasting portfolio losses are not completely reliable and accurate. There are several underlying assumptions and limitations for all such models which require thorough assessment and understanding by bank's senior leadership and the users of these models. This awakening led to the advent of the SR11-7 regulation, which all the banks had to comply with.

All financial services businesses have implemented fragmented approach towards model risk management (MRM) framework, with varying degrees of controls and governance. The intention of this guidance is to ensure banking organizations were aware of the adverse consequences (including financial loss) of their models.

In this paper, we attempt to describe the true ambition of MRM and how, over the past decade, banks across the world have failed to objectively deliver the core ideologies of MRM. Further, we intend to shed light on the efficacy of model validation, which is gradually being reduced to an annual ritual as opposed to an exercise that was designed to identifying and mitigating risks arising from financial institutions.

Regulatory Expectations

Global regulators, including the European Central Bank (ECB) and the U.S. Federal Reserve, have unequivocally emphasised the need for a stronger MRM framework. While ECB's recent update on the targeted review of internal models (TRIM) findings and subsequent launch of annual validation report, indicates growing supervisory focus on model validation, the Fed's Guidance on Model Risk Management (SR11-7) necessitates banks to undertake frequent validation commensurate with their overall use of models, factoring in the size of each bank's operations, complexity and materiality of its models.

Both the Federal Reserve and ECB in their guidelines have specified common expectations for an effective management of model risks through its key principles of:

- **Governance, policies and controls**: The regulators expect the Banks to clearly define the policies and controls governing the model inventory, controls, roles and responsibilities, model risk rating and aggregation, exercise of effective challenge, usage of vendor models and interpretations of the models throughout the lifecycle of the model

- **Development, Implementation and Use**: Effective procedures for design, development, implementation and use of model, including but not limited to model design, data and model testing, identification of model risks and limitation and continuous assessment of model use vs intent.
- **Model validation**: Further, the regulators globally emphasize on the following core principles for strong model validation approach:
  - Conceptual soundness - Quality and construct of model design
  - Model assumptions, expert judgement,] and their limitations
  - Data validation – external and internal inputs
  - Model Performance - testing of model performance and limitations, e.g. through sensitivity, stress, benchmarking, and outcomes analysis (e.g., back-testing of model outputs); and
  - Model risk rating and quantification of error
  - Documentation

In addition to the outlined principles, regulatory guidelines emphasize the need of strong governance policies to ensure that validation mechanism followed is not merely to confirm that a process has been followed but the necessary model assumptions and judgements are assessed independently while identifying the accurate model risk and mitigation plans.

MRM Responsibilities

Following regulatory scrutiny and increased reliance on models, banks globally adopted a blueprint of streamlining the model risk management process. The blueprint played a crucial role in defining the expectations of MRM and standardizing the model validation process. The outline provided guidance on all aspects of model validation – identification of model inventory, associated risk and materiality rating of model, direction to identify performance metrics and corresponding thresholds, and providing detailed list of procedures to complete a comprehensive model validation process.

Here are the high-level sub-components of any model validation –

1. **Risk based model validation** – The rigour of model validation needs to be in line with the tiering of the models. Additionally, validation of similar models needs to be consistent in terms of identification and severity of findings and final rating of the model.
2. **Evaluation of conceptual soundness** – The validation team needs to have access to all the relevant databases (both market data and portfolio specific data). The conceptual soundness is expected to be in line with the leading industry practices and in compliance with regulatory expectations
3. **Performance assessment** – Validation should include assessment of performance of the model key metrics, continued applicability of model assumptions and limitations. Additionally, the model performance in stress scenarios and sensitivity to key risk factors needs to be assessed
4. **Ongoing monitoring** – Performance monitoring should be done on a regular frequency
5. **Model governance** – MRM should assess the governance process setup as per the MRM policy

Mutations - While the centralized model validation approach helped banks achieve regulatory expectation of frequent assessment (at least annually) of the models and build trust on the outcome of these models, it has distracted the MRM from delivering its core responsibility – "Adding value".

In the subsequent sections, we evaluate the efficacy of the model validation practices followed by banks and the potential reasons that have over the years mutated and diluted the core objective of a strong model validation framework.

Paradigm Shift

MRM, which was created with the sole objective to provide an independent assessment of the models and provide value to enhance bank's approach towards risk quantification has inadvertently been transformed to a process-driven activity, requiring validation professionals to complete the designated tests and render model outcome suiting banks' best interest.

Our experiences working with clients in the financial services have revealed that more often than expected, banks have blurred boundaries of independence between business and MRM. Growing focus on "*making the bank look good*" is gradually digressing MRM from its core agenda of objectively assess the accuracy and

ensuring fitment of the model. Focus of model validation has gradually shifted to the ease of use rather than fit for use, to adjustments rather than objective assessment and to making exceptions to scope rather than expansion of scope in order to approve a model.

Model Validation – Current trends

Standardization of model validations

Banks, today, depend on a standardized model approval approach, which directs a definitive advanced ways to deal with approval. The standardized processes often include a handbook of the checks, tests and thresholds required to assess the model, giving an early indication to the model developers about the areas being investigated by MRM. A standardized validation process limits the capacity of approval group to think beyond the set principles. Further, owing to transparency and the knowledge of the process and metrics, model developers often endeavour to create models that adhere to the pre-defined and specified measurement standards of MRM and still the model can be problematic. In summary, a standardized and foreseeable approach constricts ingenuity of the MRM and misemploy the framework.

Reducing focus of senior leadership

The main purpose of MRM is to ensure that all the models used by the Bank are trusted and fit for purpose. Owing to heightened regulatory expectations and increasing purview of regulatory models, banks today are faced with the pressure to prove the fitness of the models, an aspiration which is drifting the focus of senior leadership away from the core objective of fairly assessing of the quality of the models.

In specific cases, the intent is to compose an exceptionally voluminous validation report to fulfil the regulators and not to give any significant discoveries to the developers owing to time constraints of potential increased re-work. Such misplaced aspirations have hurt the banks in the past and the continued diminishing focus continues to pose threat to the banks especially during stress times.

MRM leadership – is it completely independent?

Commonly, MRM leadership is inclined on showing the bank in a decent light to bank's business partners and regulators owing to financial stakes in the bank. Consequently, surface level issues such as inaccuracy of documentation, code structures foreshadow extreme discoveries, which could possibly have adverse consequence for the bank, especially regulatory compliance models. MRM's dependence on bank's business partners raises concerns on their authority and their ability to fairly discover the issues concerning the bank's models.

Models – Increasing complexity and opacity

Over the last few years, a lot of the Banks are moving towards more complex models. For example, in the credit / CCAR forecasting space, simple regression models are replaced with more complex machine learning models using wide variety of data. In MR and CCR space, more complex distributional assumptions go into the models to generate Monte-Carlo paths for pricing and XVA.

Similarly, there are some pockets where Banks rely on vendor models which are typically black box for the business as well as validation team. In all these instances, the validation team typically relies a lot on developer testing without a clear understanding of the outcome of these assumptions related to data, model development, variables selection or simulation techniques.

Lack of business understanding and reducing timelines for validation

Typically, in a bank, the model development team takes roughly 4-6 months to develop a medium complex model with multiple discussions with the business team. However, owing to the standardization of validation tests and diminishing focus, the validation timelines are reducing drastically. Now-a-days, the expectation from several banks' leadership is to complete a lower tier (tiering is based on model materiality, complexity and inter-dependence) model validation in 2 to 3 weeks and higher tier models in 6 weeks' time. The validators do not have enough time to understand the business and they are forced to adhere to the strict timelines due to leaner validation teams and increasing inventory of models. This might potentially lead to

validators approving models as "fit for the purpose" with only a cursory validation basis standardized tests. In addition, the validation professionals often move across roles, restricting the ability to historically evaluate the prior year's discussions and mitigation actions to affirm the models' effectiveness.

Way Forward

The advent of SR11-7 and independent model risk management unit was definitely a step in the right direction. However, as can be seen during the Covid times of 2020 and beyond, the predictive models have failed across the board and even more importantly, MRM functions have approved all those models.

We completely appreciate the efforts of all the banks to ensure regulatory compliance, some of the steps that can be considered by all the Banks to ensure implementation of an enhanced MRM framework are –

1. **Completely independent MRM leadership** - MRM leadership should be independent of interests in performance of the business or the bank in general. MRM roles should be redefined, ensuring that the MRM leaders act as stronger and independent MRM Heads, who function as propellors of change than defence mechanism and reinforce robust practices. A more prudent measure would be assigning MRM heads, who are independent of financial ownership interest in the firm and can serve as custodians of the risk management process and act in the interest of the regulators and shareholders.
2. **Reduction in subjective judgments** – Historically, the failure of risk management is one of the primary reasons for banks' severe losses. Often, banks' leadership tends to override model risk issues with subjective judgments, a frequent practice that dismantles the sanctity of the model risk management. As such, emphasis should be laid on objective classification and mitigation of model risk issues rather than subjective overrides that could hurt the bank in the longer run.
3. **Shift in MRM focus to more rigorous quantitative testing** – Banks need to bring back the focus of MRM towards identification of model related issues such as conceptual soundness, assumptions, limitations and performance testing, whilst ensuring effective, not necessarily voluminous validation reports.
4. **Stronger business understanding for validation team** – The validation team should be included from the initial phases of the development process and not just during the approval stage. Early involvement of the validation team would ensure continuous involvement and feedback in all the business discussions with developer and would contribute towards a holistic validation.
5. **Realistic timelines and increase in budgets** –Validation timelines should be well planned and realistic, ensuring less reliance on a standardized validation approach and more focus on objectively assessing the models across all areas. Most importantly, it is imperative that validation checks should be unforeseen and innovative to ensure that validation tests are comprehensive and expand beyond the standardized and developer designed tests. In addition, in case of budget and time constraints banks should focus increasing the validation timeline per model and reducing the models in scope through stratified sampling of the model inventory to ensure robust coverage of the models and thorough validation of the models in scope.

Furthermore, regulators should also ensure that banks are effectively and independently adhering to the principles of effective risk management. Regulator appointed independent auditors and consultants, who do not have any vested interest in the outcome of the validation exercise and cannot influence business decisions, can play a crucial role by ensuring that they bring in industry expertise across different peer banks, helping banks identify limitations/issues in the modelling choice. Such indiscriminate checks and controls will ensure that the model validation outcomes are not sanitized for business purposes.

Having barely survived the COVID era, banks now need to ensure that their MRM framework extends well beyond satisfying the regulatory regimes and evolves as an independent entity that serves the true purpose of adding value. It is time that banks foresee MRM function as an investment that helps place them in a more comfortable position in crisis, leading to increased value for the shareholders.

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