Model Risk Management

A Southeast Asia Perspective

Model Risk Management – The Current Landscape

There is currently no substantive guidance with respect to Model Risk Management in the Southeast Asia region, which creates the opportunity for the market to define and advance industry practices ahead of regulations.

Introduction

At a basic level, model risk can be defined as the potential for loss as a consequence of decisions based on the output of a financial model. Losses may arise due to:

- Fundamental Errors – a model produces inaccurate results when compared to the design objective and intended use; and
- Incorrect use – use of the model is not aligned with its limitations and assumptions.

Various factors such as, but not limited to, input data, model development conditions and model implementation affect the model output, which informs management's decision-making.

With the increased use of and dependence on complex models for pricing financial derivatives or regulatory capital calculations, model risk is emerging as a prominent type of risk in its own right.

Zero tolerance of model risk akin to operational risk is neither achievable (due to complexity) nor desirable (from cost-efficiency perspective). Rather, model risk appetite needs to be calibrated and the exposure managed to a risk-efficient level similar to market and credit risk. Governance of models throughout their lifecycle and internal risk ratings become key.

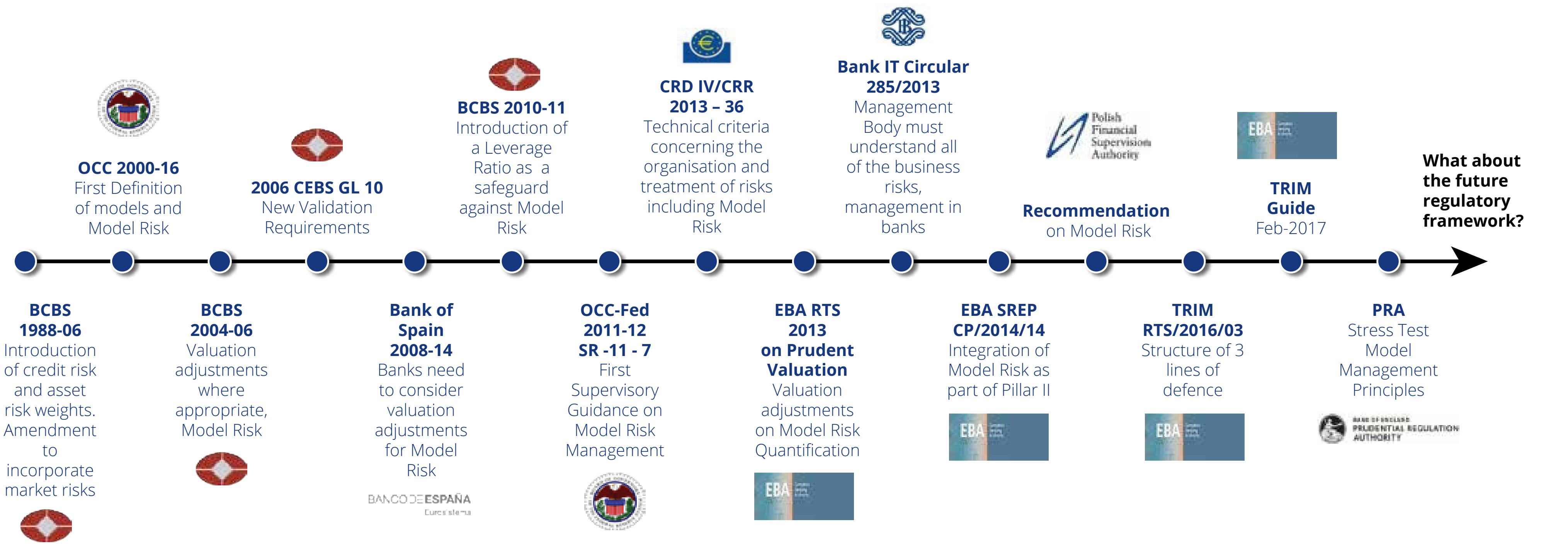
Model Risk Management (MRM) then takes on responsibility beyond traditional model inventory, validation and controls like periodic reviews. With MRM frameworks designed for the future, organisations can advance their model risk-related activities from a compliance-exercise to proactive assessment and management of model risk.

Regulatory Landscape

In Southeast Asia, there is currently no substantive guidance with respect to MRM. The Monetary Authority of Singapore (MAS) and other regional regulators have notions[1] within their supervisory guidance with respect to model governance, organisation, testing, validation and acceptance yet lack definitive requirements.

Regional regulators and the wider industry have looked to American[2] and European[3] regulators for probable baseline requirements and best practices. This provides certain advantages:

- Banks in the region can learn, incorporate and enhance industry best practices.
- Banks can engage with local regulators as they build infrastructure to ensure current and ongoing compliance.



The Industry Landscape

Whilst there is an absence of definitive model risk requirements in Southeast Asia, American and European regulators have increased scrutiny and pressure on financial institutions' response to model risk. The industry has ramped up investment in MRM capabilities by increasing headcount in respective areas and establishing robust MRM frameworks.

Increased pressure by regulators on model risk, governance, controls and documentation amplified by increasing scope, complexity and dependence on models is a material cost driver. The attempt by industry to curb these costs has led to outsourcing model validation and other related efforts to offshore low-cost locations or third party vendors. The trade-off for lower costs is reduced control and oversight of the process.

Banks in Southeast Asia find themselves at the cusp of MRM developments as they are not yet bound by prescriptive regulatory requirements. This is a unique opportunity to look to global industry peers and assess the appropriate approach forward to adapt and incorporate MRM as a risk management tool.

Deloitte's Perspective
A lot has been done in the name of MRM and respective regulatory compliance, particularly in the US and Europe. We believe this expertise can be leveraged to benefit banks in Southeast Asia to create a customised and balanced MRM framework, which is both compliance-effective and commercially efficient. Further, the current absence of regulatory requirements implies that organisations can maintain a dialogue with local regulators during design and implementation to help establish industry norms and ensure compliance moving forward.

Regulatory developments are usually reactive measures resulting in increased compliance costs after periods of losses or reduced profitability due to a catalyst like a market crisis or operational incidents. The growing presence of model risk calls for proactive development of a robust and effective MRM and governance framework that can help organisations manage risk without the need to experience a major and expensive catalyst.

Acknowledging and embedding MRM into the organisation as part of the daily operations and management decision-making allows banks to break the perspective of it being limited to a compliance exercise. Advanced use of data and analytics can further aid derivatives of internal risk ratings and self-improvement of models, and have a positive impact on profitability.

The unique features of the SEA region and its institutions call for bespoke and custom approaches to MRM. Tested knowledge and expertise from American and European markets can be tailored to best fit the region and the risk profile of the respective bank. Simply mirroring a western model has its limitations; a careful balance between costs and control must be struck to best fit local and regional perspectives and culture.

Evolution of Model Risk Management

Model Validation

Model Validation: The traditional scope for model risk is comprised of model validation and periodic review. In essence, when a new model was created it went through an approval and validation process after which it would be periodically tested for its appropriateness.

This is an ineffective control processes, which takes a lagging, reactive and snapshot approach to potential emerging problems: A model failure or weakness may only be spotted upon review or at time of failure, or not at all. Backtesting techniques as detective measures, post-facto and statistical, again may fail to surface the specific or thematic issues of models.

Furthermore, model documentation and audit trails are heavily scrutinized by regulators and are a challenge to maintain. Appropriateness and applicability of a model during selection become crucial as the testing of such is limited to the reviews.

Model Risk Control

Model Risk Control: As an advance, activities around model risk are expanded to form a tighter and more timely closed control framework for model risk by introduction of model lifecycle management.

As an example, detective processes on operational aspects of model uses were established across an organization such as regular reports of all pricing models used, to ensure they are to the latest versions and are appropriate for the product.

A more systematic approach to validation and testing promises more successful capture of model failures, and with reference to the actual use cases such as stress testing.

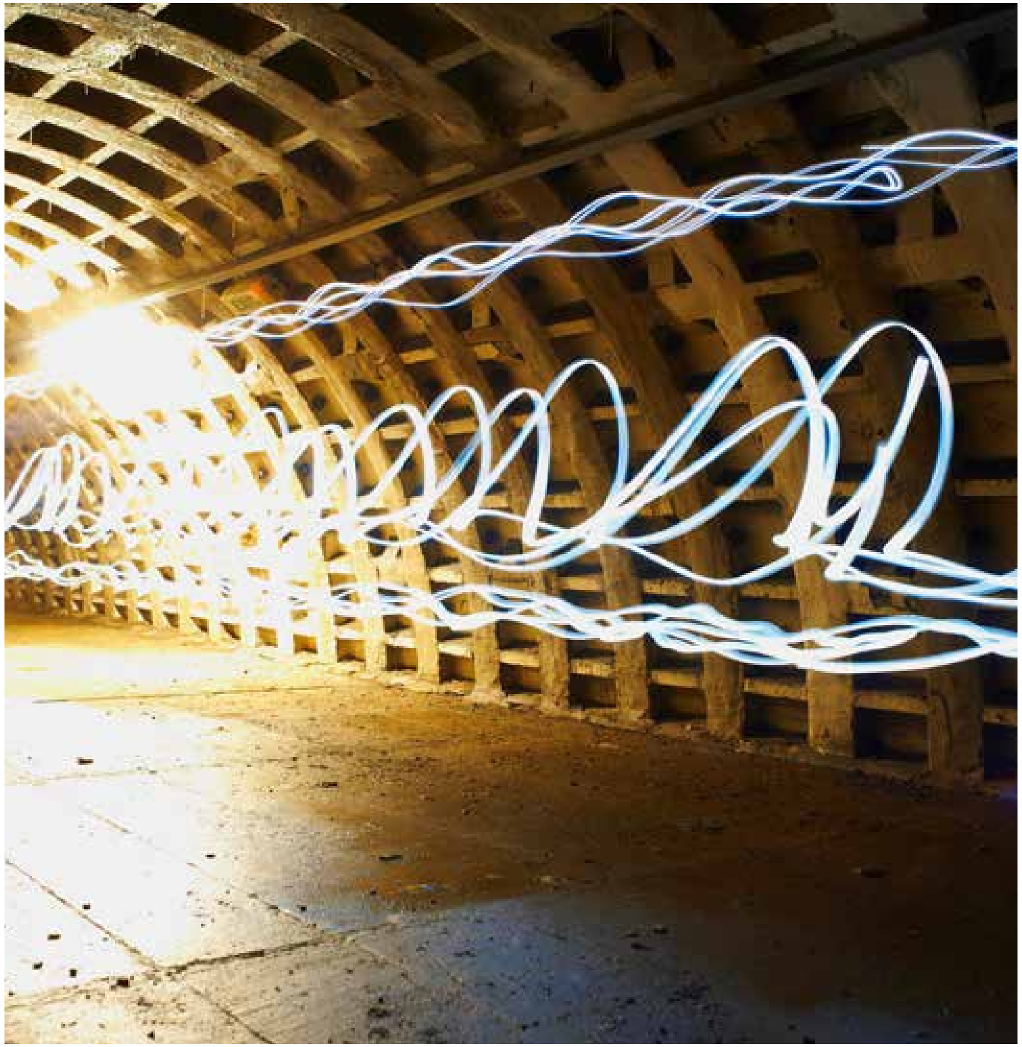
Such systematic testing further informs a more comprehensive understanding of potential P&L impacts on the actual portfolio of financial instruments across a range of models.

Model Risk Management

Model Risk Management: The three lines of defence are fundamental to sound governance and organization, further help to establish clear management transparency and accountability for model risk.

- Deployment of algorithms for pro-active model improvement suggestions.
- In this light, model risk controls can be supported and enhanced with technology. For example, model lifecycle management tools ensure consistent and timely approach to process and document most aspects of model risk control.

Future of Model Risk Management



Besides more effective, timely and proactive controls however, the natural progression of Model Risk Management is to leverage design principles and analytics.

MRM as a tool for risk optimiation creates a new opportunity to define and manage risk appetite. The key difference arises from reporting and use of data proactively.

The instrumental design change is to fully integrate and embed challenger and benchmark models upstream into production environments. Frequent runs for a variety of models and calibrations creates proactive insights:

- Generation of analytics to review model performance.
- Pattern analysis to identify exceptions for review.
- Deployment of algorithms for pro-active model improvement suggestions.
- Stress testing and scenario analysis for regulatory requirements.

In such a data-driven setup, model review is no longer a periodic assessment, but a more powerful and integral part of production.

Use of machine learning and robotics also becomes feasible through the generation of data and exception management, which can enhance self-improvement capabilities and better management of internal model risk ratings. Big data analytics can be upgraded to smart data.

Conclusion

Deployment of an enhanced MRM framework in the region is arguably simpler as banks can design and implement infrastructure that best suits their needs, structure and capabilities.

Using design principles and leveraging analytics, regulatory compliance becomes an afterthought as risk management is embedded in the daily operations and decision-making.

Key Contacts

Contributors

Michael Rey
Managing Director
Financial & Regulatory Risk
Singapore
Mobile: +65 9837 4076
Email: mrey@deloitte.com

Siddharth Agarwala
Associate
Regulatory Risk
Singapore

Key Contacts

Benny Koh
Partner
Regulatory Risk Leader
Southeast Asia
Mobile: +65 9368 9898
Email: bekoh@deloitte.com

Timothy McAndrews
Managing Director
Regulatory Risk
United States
Mobile: +1 646 385 6783
Email: tmcandrews@deloitte.com

Nadège Grennepois
Director
Risk Advisory
France
Mobile: +33 6 80 48 65 78
Email: ngrennepois@deloitte.fr

01. MAS' guidance is available primarily in the Risk Management section of the Regulatory and Supervisory Framework. There are no specific sections pertaining to model risk or its management. http://www.mas.gov.sg/regulations-and-financial-stability/regulatory-and-supervisory-framework/risk-management.aspx
02. The US Federal Reserve's (Fed) guidance stems primarily from SR 11-7: Guidance on Model Risk Management. https://www.federalreserve.gov/supervisionreg/srletters/sr1107.htm
03. The Bank of England Prudential Regulation Authority's (PRA) guidance stems primarily from the principles around stress test model management. http://www.bankofengland.co.uk/pra/Documents/about/letter270317.pdf