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Getting fit for TRIM

Impact of the ECB's Targeted Review of Internal Models

September 2017

TRIM aims to assess whether internal models used by banks in the European Union are reliable and comparable. It seeks to reduce inconsistencies and unwarranted variability between banks' internal models, which are used to calculate their minimum capital requirements.

TRIM was launched in late 2015, so time is now ticking towards its expected finalisation in 2019.

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Executive summary

The Targeted Review of Internal Models (TRIM) forms a part of the European Union's (EU) supervisory assessment program conducted through the European Central Bank (ECB). As part of this program, the ECB has in 2017 embarked on a series of onsite investigations covering more than 60 directly supervised banks. Their aim is to enforce compliance by internal models of banks with existing regulatory requirements and to reduce unwarranted variability in capital requirements for Pillar I approved internal models.

TRIM sets the supervisory expectations for modeling approaches such as the internal ratings based (IRB) method for credit risk, the internal model approach (IMA) for market risk, and the internal model method (IMM) for counterparty credit risk.

In recent years, we have observed global convergence of regulations on Model Risk Management (MRM). This framework has evolved across jurisdictions, starting with guidelines in the US and then spreading to Canada, the UK and the EU. TRIM is the latest chapter in this evolution.

In this report, we critically examine TRIM's structure based on three components – Model Development, Model Validation and Model Governance – which have emerged from various regulations and best practices.

Our analysis shows that implementation of a similar MRM framework forms an effective pre-requisite for adoption of the TRIM guidelines. However, TRIM imposes additional regulatory demands on internal models, which we set out across all relevant areas of credit risk, market risk and counterparty credit risk. It is essential for banks in the EU to understand these additional TRIM requirements.

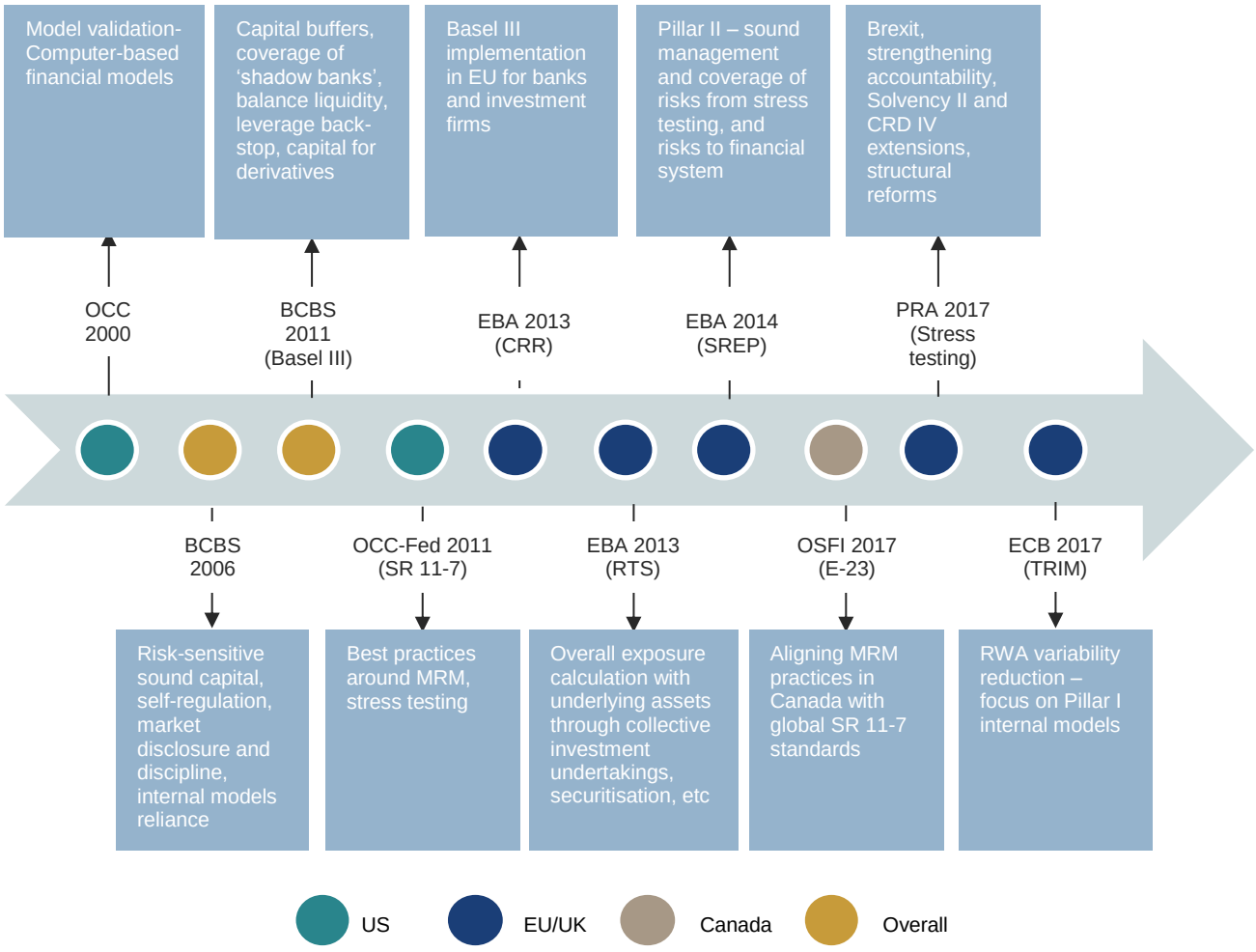
We also discuss the challenges and regulations-driven processes that TRIM will usher in for banks in the EU.

Convergence of MRM regulations

The timeline of MRM guidelines put forth by regulators across jurisdictions, as shown below, provides a historical perspective. We argue here that the SR 11-7 guidelines (introduced by the Office of the Comptroller of the Currency [OCC] and the Federal Reserve Board [FRB] in the US in 2011) define the best practice principles for effective MRM framework and have been widely accepted.

The acceptance of SR 11-7 as a standard is further evidenced by the adoption of SR 11-7 principles within many recent regulatory guidelines such as the SR 12-7 in the US, the OSFI E-23 in Canada, and the Prudential Regulatory Authority (PRA) Stress Testing MRM in the UK. In our view, the current best practice MRM framework consists of three components – Model Development, Model Validation and Model Governance.

The path to TRIM, and PRA MRM guidelines on stress testing framework



For example, both the OSFI E23 guidelines,[1] which define the standards to be used in Canada for MRM, and the recent PRA guidelines on stress testing models are consistent with SR 11-7 supervisory guidelines. The TRIM guidelines are similar to both these in that they are also consistent with SR 11-7 principles. TRIM also aims to

[1] *In December 2016, the Canadian regulatory authority of the Office of Superintendent of Financial Institutions (OSFI) released a draft of their Enterprise-wide Model Risk Management Guideline ('Guideline E23').*

enhance the credibility of internal models by imposing granular guidelines to internal models under different risk types.[2]

In our view, banks that closely follow the SR 11-7 principles will be compliant with most of the non-model specific mandates of TRIM. However, they will additionally need to address TRIM's new prescriptive guidelines applicable to internal models across credit, market and counterparty credit risk.

We provide an overview of TRIM immediately below and then set out some examples of the additional guidelines within it.

[2] *Credit, market and counterparty credit risk types.*

TRIM overview

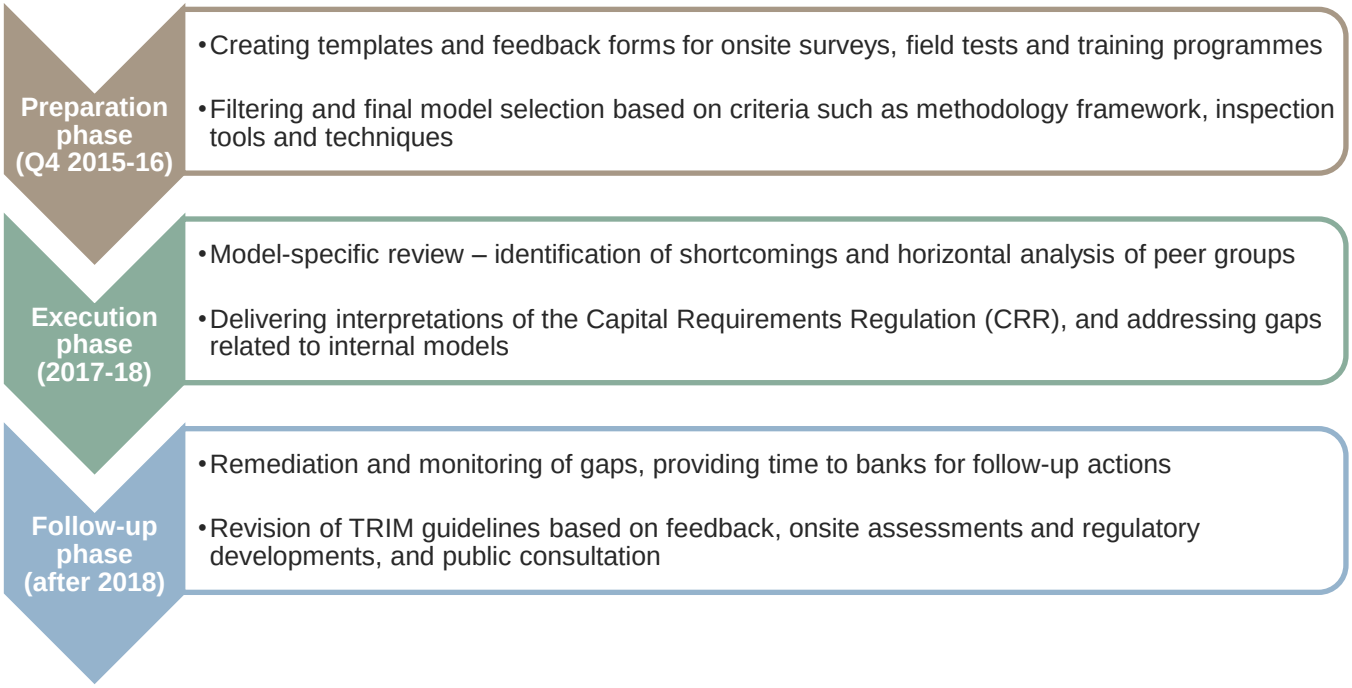
Scope, coverage and timelines

The concept of TRIM was originally proposed by the ECB in 2015 to enhance the credibility and appropriateness of the Pillar I approved internal models used across more than 60 directly supervised banks, covering 15 nations within the EU.[3] The stated objectives of TRIM are:[4]

- To reduce non-risk based (unwarranted) variability in risk-weighted assets (RWA) stemming from use of internal model approaches by banks, across different risk categories.
- To harmonise supervisory practices in the Single Supervisory Mechanism (SSM).
- To ensure compliance of internal rating systems and models with existing regulations[5] and to address the current regulatory gaps that the banks face related to their internal models.
- To verify adequacy of calculated capital requirements based on internal models.

Below is the outline of timelines and execution structure that the ECB has introduced for banks during the implementation of the entire TRIM exercise.

Regulatory actions and expected responses of supervised entities under TRIM phases



The TRIM exercise has been designed to be executed in three phases, as shown immediately above.[6] The guidelines are aligned with upcoming changes to regulations on internal models, such as those mentioned in the

[3] *Three eligible banks are exempt from this exercise because of various reasons such as being in the process of a merger. The project, however, does not cover US or foreign banks outside the euro area with a holding in the EU.*

[4] *(See European Central Bank, 'Guide for the Targeted Review of Internal Models', 2017)*

[5] *These regulations are: CRR, the Capital Requirements Directive (CRD IV), relevant Commission Delegated Regulations and Commission Implementing Regulations, EBA Regulatory Technical Standards (RTS) and the approved ECB Banking Supervision guidelines*

[6] *TRIM-Media briefing conference call, February 28, 2017*

Fundamental Review of the Trading Book (FRTB)[7] and European Banking Authority (EBA)[8] guidelines. Recently, the ECB released its draft Onsite Inspection Guide for TRIM,[9] which sets out an overview for its ongoing inspection process over the internal models of banks.

Following the onsite missions, an operational act indicating the deficiencies pointed out after peer reviews will be issued to banks by the ECB. This may result in future regulatory developments. As a final step, banks[10] will be required to address any remaining shortcomings based on the final version of the guide after public consultation.[11] Depending on the final results of TRIM, the use of internal models by the banks may be restricted to certain portfolios; if so, this could create significant increases in regulatory capital compared with current practices.

The scope of the TRIM guidelines for the Pillar I approved internal models covers three areas: Credit Risk, Market Risk and Counterparty Credit Risk. Operational risk is out of scope for the TRIM guidelines, due to forthcoming regulatory changes for the advanced modelling approaches to operational risk.[12]

In the next section, we attempt to delve deeper into the elements of the TRIM guidelines.

[7] *Available at http://frtb.info/summary-of-the-frtb-regulations/*

[8] *Available at http://www.eba.europa.eu/*

[9] *ECB guide to on-site inspections and internal model investigations, July 2017, available at: https://www.bankingsupervision.europa.eu/legalframework/publiccons/pdf/osi/ssm.osi_draftguide.en.pdf?c545ba56129bf07158420cc9b436dedb.*

[10] *Sufficient time would be allocated to the banks for adjustment, especially the ones for which expectations differ from existing national supervisory standards before the TRIM guidelines*

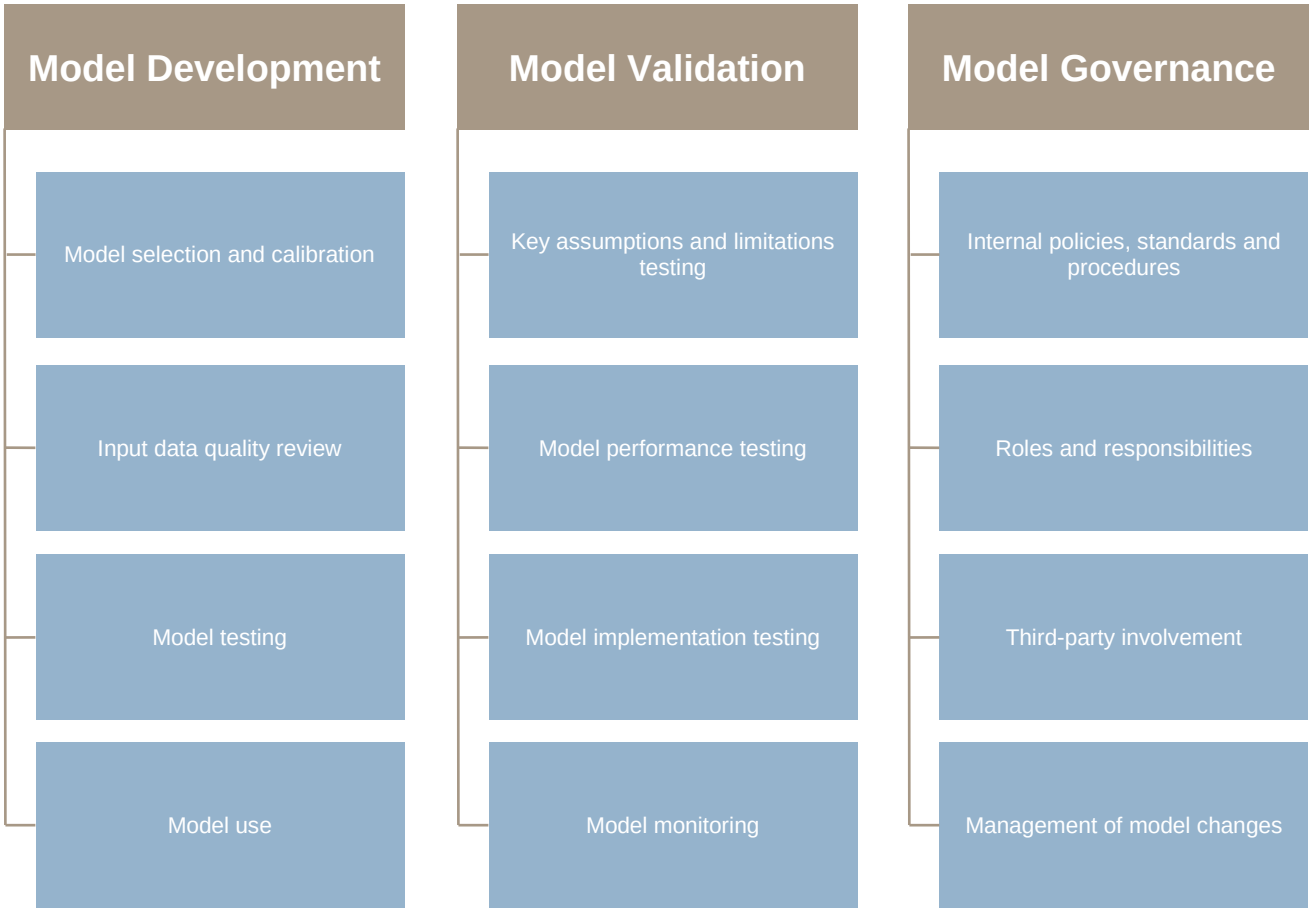
[11] *(See 'What is the targeted review of internal models?', available at: https://www.bankingsupervision.europa.eu/about/ssmexplained/html/trim.en.html.)*

[12] *TRIM media briefing conference call, February 28, 2017*

Critical elements identified as per MRM framework

As shown below, the TRIM guidelines focus on three broad elements of the MRM framework: Model Development, Model Validation and Model Governance. Model documentation is also present for each of the three elements. The generally stated expectation for model documentation is that banks document all internal models and related processes in such a way that a third party would be able to understand the methodology, assumptions, limitations and use of the models.

SR 11-7 guidelines on the three broad MRM aspects



As shown immediately above, we have also identified four specific TRIM principles applicable for each of the three elements of the MRM framework. Over the course of the following pages, we now discuss these principles in more detail.

Model Development

Model selection and calibration

TRIM provides guidelines for sound model selection procedure and robust calibration for internal models in credit, market and counterparty credit risks. For example, within market risk, TRIM says banks may use different methodologies (e.g. absolute, relative or mixed approach) to calculate the returns used to calibrate the Value at Risk (VaR) and Stressed VaR models for different risk factors. However, for a given risk factor, returns based on the same methodology are expected to be used for calibration of VaR and Stressed VaR estimates. Banks are expected to explain deviations from this requirement on the basis of regime changes occurring between the VaR and Stressed VaR periods.

TRIM also mandates that risks not in models be captured in an appropriate way. To take another example from market risk, TRIM says the potential impact on VaR, Stressed VaR and/or Incremental Risk Charge (IRC) should be estimated under the assumption that there is no diversification effect. This means that Risks not in VaR, Stressed VaR or IRC, respectively, should be estimated on a standalone basis.

Input data quality review

TRIM guidelines require institutions to use adequate processes and controls to ensure data quality. For example, within credit risk, it states that institutions are expected to establish a complete framework to assess data quality in the modelling and risk quantification processes. Data quality assessment includes checks for completeness and appropriateness, soundness of the process for vetting data inputs and representativeness of modelling data. This framework applies throughout the Internal Ratings-Based (IRB) process from data entry to reporting. The framework should ensure reliable risk information for an accurate assessment of a bank's profile and is intended to drive sound decision-making within institutions and by external stakeholders.

Model testing

Model testing to establish accuracy and reliability of the model output is a critical step in a sound model development process. TRIM provides guidelines on testing and emphasises compliance with current regulations. For example, within credit risk, it provides a specific framework that institutions should follow for performing reviews of estimates, in accordance with Article 179(1)(c) of EU Regulation 575/2013. This framework needs to include: a) performing minimum scope of analyses, including predefined metrics chosen by the institution to test model performance and predictive power; b) adhering to predefined standards, such as thresholds and significance levels for relevant metrics; and, c) taking predefined actions in case of any adverse results. Another example, this time from market risk, is that back-testing analysis should not only be performed at the overall bank level. In particular, it should also take place at the lower portfolio levels (including sub-portfolios), to identify the main positions that caused breaches of VaR thresholds.

Model use

TRIM specifies a use test requirement for certain models. As an example, for IRB models within credit risk, the degree of use of internal ratings and risk parameters in credit processes is expected to be more extensive for probability of default (PD) than for loss given default (LGD) or credit conversion factor (CCF). Institutions may also use adjusted or transformed IRB parameters, removing certain constraints or adjusting the time horizon. The use of risk parameters and their integration into internal policies and procedures is intended to continuously improve their accuracy and reliability. The conditions for an effective and beneficial feedback loop include a good understanding of the model, its assumptions and constraints and an adequate level of interaction between users, credit risk control unit (CRCU) and internal validation.

Model Validation

Key assumptions and limitations testing

Independent testing of the impact of key model assumptions and limitations is an integral part of the validation procedure. TRIM guidelines establish many best practice principles on validation of various model assumptions. For example, within market risk, TRIM states that the differences in the pricing functions/methods used for the calculation of the VaR compared with the ones used for the calculation of the economic P&L should be subject to validation.[13] These differences include any simplifications of pricing functions/methods introduced for VaR purposes (e.g. reduced number of parameters or simulations). The validation should be performed at least initially, at which time the impact of the use of these different pricing methods should be assessed. Additionally, a regular validation should be performed in order to check that the impact remains low.

Model performance testing

Validation should incorporate various testing procedures across the risk types. As an example, for IRB models within credit risk, it states that internal validation should undertake stability analyses. These analyses should involve assessment of stability of the internal ratings and risk parameters over time, while excessive or unexpected variability needs to be justified. Another example, this time within market risk, is that TRIM expects banks to carry out validation on hypothetical portfolios. In particular, banks should conduct validation exercises on hypothetical portfolios in order to test that the model is able to account for particular structural features.[14] These hypothetical portfolios should have targeted compositions, so that the VaR model can be tested at a level that enables the identification and isolation of specific behaviors (e.g. specific business lines, features and/or trading strategies).

Model implementation testing

TRIM provides guidelines on implementation testing for certain models. As an example, for IRB models (or rating systems) within credit risk, TRIM states that banks should perform regular IT implementation tests from data entry to the reporting stage. Furthermore, the overall approach for IT testing should be clearly defined and formalised in an organisation-wide policy or procedure. The policy should clearly state triggering events such as software releases, IT-related changes, regulatory changes, methodological changes to models or new scope of data. Moreover, implementation testing should include unit tests, integration tests, system tests (including functionality, performance – in normal and stress scenarios – and tests of security and portability), user acceptance testing (UAT) and regression testing. All the tests and their results should be documented, with clear labelling of the corresponding responsibilities.

Model monitoring

Ongoing model performance monitoring ensures that the model outputs remain relevant and also forms an early warning system for performance deviations. TRIM provides many principles related to the monitoring of models or their components. As an example, for IRB models within credit risk, TRIM mandates that institutions should have a procedure and policy in place to ensure compliance with requirements for permanent partial use (PPU) of the non-IRB Standardised Approach. This requirement, which is also listed in Article 150 of the CRR, is to ensure that PPU is applied appropriately. In particular, banks should develop a reporting process for materiality of PPU treatment, triggers for re-assessment of PPU treatment and processes and guidelines to assess whether further exposure types may be suitable for PPU (e.g. business run-offs or discontinued business). Another example, this time within counterparty credit risk, is that TRIM states that statistical error, or expected prediction error, should be estimated and monitored on an ongoing basis.

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[13] *The validation of pricing functions used for economic P&L purposes is expected to be regularly performed by a bank and thus is the basis for this additional requirement.*

[14] *These portfolios should not be limited to portfolios defined in the benchmarking exercises for market risk conducted by the EBA or the BCBS. Participation in such benchmarking exercises is thus not sufficient to meet the requirements of this section.*

Model Governance

Internal policies, standards and procedures

A key component of an effective governance structure is the establishment of policies, standards and procedures for internal models. TRIM provides specific guidelines around how to set these up for various aspects of the model risk framework. For example, TRIM states that institutions should have internal validation policies for all internal models. These should involve proven procedures and methods that adequately endorse the accuracy, robustness and stability of their estimation of all relevant risk parameters. TRIM also specifies independence of the validation process from the development stage. All internal models and internal estimates should be subject to a thorough and consistent internal validation (initially and then on an annual basis). The main role of the internal validation function should be to ensure that the quality of the internal models is adequate and that they comply with the relevant requirements. As another example, for IRB models within credit risk, TRIM specifies there should be policies around data review as part of an effective data quality framework to affirm the quality of the data used for IRB models.

Roles and responsibilities

As best practice for an effective MRM framework, a bank needs to define clear roles and responsibilities for various stakeholders involved with the development, validation and monitoring of models. For example, according to TRIM guidelines on the identification of the management body and senior management, it is expected that the institutions clearly identify, differentiate and document the roles and responsibilities of their management body and senior management in their governance structures (as per CRD IV). This governance structure is intended to ensure smooth functioning of the entire MRM practice and adherence to internal policies.

Third-party involvement

TRIM sets out expectations around the governance required over third-party involvement. In particular, as part of the global outsourcing policy, it states that a bank should have a policy in accordance with the 2006 Committee of European Banking Supervisors (CEBS) Guidelines on Outsourcing.

Management of model changes

TRIM puts forward clear expectations around management of model changes. For example, it states that the units responsible for managing model changes or extensions must possess the necessary expert knowledge to assess concrete model changes or extensions as well as to have an overall perspective on them. This is an example of how the TRIM guidelines ensure adherence to the existing regulations and also encourage supervised banks to establish and follow best practices for management of model risk.

TRIM impact and future solutions

In view of the legacy of SR 11-7 guidelines published by the OCC and FRB, many US banks already have a mature MRM function compared with their EU counterparts. By contrast, EU regulators have only recently established guidelines (including TRIM) around MRM practices. In particular, recent regulatory trends have been towards standardised approaches for use in capital charge calculations (e.g. FRTB Standardised Approach).

Although TRIM addresses internal models, rather than moving towards standardised rules for capital calculation, nonetheless it prescribes more standardised MRM policies and processes for banks to follow. TRIM also has imposed costs upon banks as charges for direct supervision by the ECB,[15] with 92% of the cost borne by the 68 directly supervised banks (under the scope of TRIM) and the rest by nationally supervised smaller firms. This adds to the existing regulatory burden of banks. During the implementation phase of TRIM, banks also have to undergo various response activities such as:

- Preparation for TRIM investigations based on existing regulations such as the CRR, CRD IV, EBA Regulatory Technical Standards, etc.
- Designation of response teams to address the ECB's inspections.
- Submission of survey forms and feedback forms, with adequate documents and Q&A sessions, both before and after the inspections.
- Mitigation and resolution of identified gaps from the inspections. These could be related to model methodology, validation, IT and data structures, model governance or organisation structure.

It can be seen that TRIM brings in new adjustments, even for banks already compliant with a standard MRM framework. Therefore, it is already clear that considerable work will be required by banks to be compliant with TRIM.

[15] *Source: Reuters - http://uk.reuters.com/article/uk-ecb-banks-costs-idUKKBN17U20C?il=0*

How CRISIL can help banks comply with TRIM

CRISIL's expertise across various asset classes, regulations and modelling techniques make us a unique partner in understanding the requirements of banks in these fields.

CRISIL has experience in implementation of effective MRM frameworks (including Model Development, Validation and Governance) across geographies, with banking institutions of all sizes.

For example, CRISIL has been a partner with 14 US-based CCAR banks during the evolution of best practices in MRM, since SR 11-7 Guidelines emerged. Being an active participant in industry conferences, round tables and our regular interaction with regulatory bodies has also helped us to gain extensive market insights.

We aim to provide significant insights and innovative solutions to address the new regulatory challenge of TRIM.

In this direction, our in-house MRM documentation templates, regulatory checklists and technological solutions can be tailored to meet each of our clients' internal standards. This has resulted in our platform of best-practice solutions across the industry.

We are well-equipped to support banks in the EU to address the imminent needs of compliance with the TRIM supervisory exercise. We are able to prepare banks to be aware of any gaps in their MRM framework that the TRIM investigations can reveal. In case of any gaps, we are able to assist them in remediation and follow-up actions. Our understanding of different models across risk-types continues to assist banks to identify the changes that need to be adopted for TRIM compliance.

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