Note: This publication is discontinued.

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EUROPEAN CENTRAL BANK

BANKING SUPERVISION

Second update on TRIM outcomes (as of March 2019)

For the attention of the Board

3 April 2019

Interim update on the Targeted Review of Internal Models (TRIM)

Dear Sir or Madam,

Following up on my previous communication on the first outcomes of TRIM, dated 11 June 2018, I would like to provide you with further aggregated information that has emerged so far from TRIM on-site investigations.

The note enclosed in this letter provides an overview of the TRIM project and supplements the information already shared with your institution in June 2018, updating it where necessary. In particular, the note complements the analysis on credit risk internal models,[1] presenting an overview of the main findings related to the data quality review, and reports the most common or critical shortcomings identified during TRIM investigations on internal models for market risk.

Similarly to the above-mentioned letter, the enclosed note will also be made publicly available on the ECB Banking Supervision website. Going forward, your institution will be informed about possible updates of the note to reflect additional analyses conducted in the meantime.

I hope that the information contained in the note regarding the updated outcomes of TRIM will facilitate the involvement of your institution in the supervisory follow-up process and foster a better understanding of the context of the procedure.

Yours faithfully,

Korbinian Ibel

Director General – Directorate General Microprudential Supervision IV

[1] Related to "Retail" and "Corporate – SME" exposures.

Interim update on the Targeted Review of Internal Models (TRIM)

The purpose of this note is to provide an overview of the TRIM project and to share aggregated information on its outcomes. The note subsumes and complements the information already shared with the institutions within the scope of the project on 11 June 2018, and subsequently published on the ECB Banking Supervision website.[2] Going forward, the note may be updated and expanded as necessary to reflect additional analyses conducted in the meantime.[3]

The note is organised as follows: Section 1 contains background information on TRIM's objectives and timeline, and provides a high-level summary of the main achievements of TRIM on its way to reaching those objectives. Section 2 provides a more detailed overview of the main insights that have emerged so far from the horizontal analyses conducted within TRIM. Finally, Section 3 concludes, summarising the next steps within the project and some implications for internal model supervision beyond TRIM.

1 Status update on TRIM

The Targeted Review of Internal Models is a multi-year project launched at the end of 2015 by the ECB in close cooperation with the national competent authorities that are part of the Single Supervisory Mechanism (SSM). TRIM aims to assess whether the internal models currently used by significant institutions in the SSM comply with regulatory requirements, and whether their results are reliable and comparable.

One major objective of TRIM is to reduce unwarranted (i.e. non-risk-based) variability when institutions use internal models to calculate their risk-weighted assets (RWAs). TRIM also seeks to ensure a consistent use of high supervisory standards across the euro area. TRIM covers internal models for credit, market and counterparty credit risk (operational risk has been excluded, given the Basel Committee on Banking Supervision's stance against using internal models for such risk).

The project foresees the execution of about 200 on-site investigations on internal models at 65 significant institutions across the SSM. These investigations are conducted with common methodologies and techniques developed by means of dedicated preparatory work (2016-Q1 2017) ahead of the execution phase and constantly enhanced during the course of the project.

The execution phase of TRIM started in Q2 2017 and can be divided into two key parts:

[2] See also:

https://www.bankingsupervision.europa.eu/press/letterstobanks/shared/pdf/2018/ssm.letter_on_targeted_review_of_internal_models_TRIM.en.pdf?a9e3f962aed4a04b475741d0cb7318c1

[3] The reference date and version of the document are indicated at the top of the page. The sections of the note that are taken (with limited edits) from the letter sent to the institutions on 11 June 2018 are indicated at the beginning of the relevant sub-sections.

- part one (Q2 2017-Q2 2018) involved a review of the internal credit risk models for retail and small and medium-sized enterprise (SME) portfolios, as well as all market risk and counterparty credit risk models;
- part two (Q3 2018-2019) is still ongoing and mainly focuses on the models used to assess the credit risk for low-default portfolios.[4]

The institutions within the scope of TRIM have been investigated across a broad range of topics, ranging from model governance to detailed technical aspects of internal models for different risk types (depending on the institution). The institutions are expected to undertake significant actions to address the shortcomings identified in the decisions adopted in the context of TRIM. It is recommended that institutions also monitor the need to align with the envisaged regulatory developments entering into force in the coming years (e.g. in connection with the European Banking Authority's IRB repair program).

In addition to the individual assessment of models, and from a more general perspective, it is worth recalling that TRIM has already achieved overarching results that are important in paving the way for the application of consistent and high standards in the supervision of internal models used by significant institutions within the SSM.

(i) **TRIM has contributed to a common understanding across the SSM of regulatory requirements related to internal models. The ECB has provided transparency of its understanding of such regulatory framework in the "ECB guide to internal models"** ("ECB guide").[5] This common understanding is a key prerequisite to ensure a consistent use of supervisory practices and standards within the SSM and, as such, its importance can hardly be overestimated: it is one of the main achievements of TRIM and it will greatly benefit SSM internal model supervision beyond the limited timeline of the project.

(ii) **A consistent approach to assess internal models has been designed and systematically rolled out in the context of TRIM (e.g. in dedicated on-site investigations).** The use of common inspection techniques by the various on-site inspection teams involved in TRIM has helped to effectively translate and implement the common understanding of regulation mentioned in the previous point into a consistent and transparent approach to internal model on-site investigations. Going forward, this approach will be

[4] Investigations on low-default portfolios cover the following exposure classes: corporates (including corporates – other and specialised lending) and institutions.

[5] The ECB guide to internal models aims to provide transparency on how the ECB understands the regulatory requirements for internal models and how it intends to apply them when assessing whether institutions meet these requirements. The guide is composed of a chapter covering non-model-specific aspects ("general topics") and three risk type-specific chapters (for credit risk, market risk and counterparty credit risk). See also:

https://www.bankingsupervision.europa.eu/ecb/pub/pdf/ssm.guidegeneraltopics201811.en.pdf

https://www.bankingsupervision.europa.eu/ECB.guide_to_internal_models

extended to standard internal model investigations beyond TRIM (to the extent relevant and with the necessary adjustments).

(iii) **TRIM provides a systematic overview of the key features and weaknesses of internal models of significant institutions.** The **horizontal analyses** carried out in the context of TRIM have enabled the ECB to **identify the most common or critical shortcomings** of internal models assessed during on-site investigations. This formed the basis for a consistent supervisory follow-up and allowed the identification of areas which would need particular attention in future internal model supervision.

(iv) **In the context of TRIM, model improvements are required in supervisory decisions with the aim to address the deficiencies detected.** In fact, TRIM-related supervisory decisions have already started inducing tangible changes in internal models across the SSM to reduce unwarranted (i.e. non-risk-based) RWA variability by ensuring that the shortcomings identified are duly remediated by the institutions.

The remainder of this note focuses in particular on the third achievement referred to above, providing a detailed overview of the main outcomes of the horizontal analyses conducted in the context of TRIM so far.

2 Outcome of TRIM investigations and horizontal reviews

Against the background described in Section 1, and to provide the institutions with a broader context regarding the decisions adopted by the ECB in the context of TRIM, this section provides a summary of the most common or critical shortcomings identified in TRIM for general topics, for credit risk (for retail and SME portfolios) and for market risk.[6] Sub-sections 2.1 and 2.2 reproduce, and where necessary update, the information already communicated in the letter sent on 11 June 2018 to the institutions participating in TRIM.

2.1 General topics

(Extract from the "Outcome of the general topics review" section of the June 2018 letter)

The purpose of the general topics review is to consistently assess the institutions' positioning with regard to non-model-specific topics of the existing legal framework for internal models, with a particular focus on internal ratings-based (IRB) models. In particular, the topics assessed in the review are the following: overarching principles for internal models, roll-out and permanent partial use,

[6] Information on TRIM investigations on credit risk models for low-default portfolios and counterparty credit risk models will be communicated at a later stage, since the corresponding on-site investigations and follow-up analyses are still ongoing.

internal governance, internal validation, internal audit, model use, management of changes to the IRB approach, and third-party involvement.

The review of these topics started in the summer of 2016, with a comprehensive standardised request for information and documentation addressed to in-scope institutions. The off-site analysis of the information received was complemented and refined by means of short supervisory visits to the institutions' premises ahead of the start of the execution phase of TRIM. On that basis, further horizontal analyses to ensure a consistent follow-up on potential issues detected were conducted.

The supervisory follow-up to the general topics review was two-fold. On the one hand, cases of outright non-compliance with the applicable regulation were addressed through supervisory decisions that imposed obligations on the affected institutions to remediate the shortcomings within certain deadlines (see Table 1 for examples). On the other hand, additional potential misalignments with further aspects of the regulatory framework (as presented in the general topics chapter of the ECB guide) were communicated to the institutions via follow-up letters. Institutions were asked to respond to these letters by providing the Joint Supervisory Teams (JSTs) with written feedback on the current status of each issue (see Table 2 for examples).

Table 1

General topics review: examples of non-compliance cases (non-exhaustive)

#	Description of shortcomings	Share of institutions with obligations[7]
1	Absence of a model change policy at the institution or absence of notification of material model changes to the competent authority	29%
2	Lack of evidence of annual back-testing for some rating systems	24%
3	Use of the standardised approach without formal authorisation of a permanent partial use (PPU)	19%
4	No strict separation of staff performing validation activities and staff involved in tasks of the credit risk control function (e.g. model development and monitoring)	19%
5	Current resources allocated to the internal validation function preventing a robust validation process	14%

[7] Out of the 21 institutions that received a dedicated supervisory decision on general topics.

Table 2

General topics review: examples of issues communicated in the follow-up letters (non-exhaustive)

#	Description of issues	Share of institutions affected[8]
1	**Implementation of a model risk management framework**	
	• Despite some measurement of model risk and partial controls in place, practices not formalised/documented	31%
	• Absence of model risk management (steering and mitigation)	27%
	• Model risk not identified as a material risk by the institution (lack of awareness)	13%
2	**Application of the IRB approach and monitoring of permanent partial use (PPU) provisions**	
	• Absence of monitoring of the PPU conditions	58%
	• Absence of clear criteria for the decision on the application of the IRB approach (selection done on a case-by-case basis)	31%
3	**Decision-making responsibilities and internal reporting**	
	• Level of detail in the reporting is not appropriate	36%
	• Management body (or a designated committee thereof) does not approve all risk management policies	25%
4	**Organisation of the internal validation function**	
	• Deficiencies in the validation policy and procedures	7%
5	**Scope and frequency of the audit review of the rating systems**	36%
	• Lack of resources to allow a relevant assessment of the IRB requirements	31%
	• Some of the rating systems not reviewed by internal audit	22%
	• Certain aspects of the rating systems not reviewed regularly	
6	**Non-rated exposures and outdated ratings**	
	• Non-rated exposures or exposures with outdated ratings not monitored by the institution	25%
	• No specific prudential treatment for non-rated exposures, or exposures with outdated ratings, or such exposures treated under the standardised approach	20%
7	**Change policy and re-rating process**	
	• Process for the re-rating and implementation of the new model not formalised	62%
	• Model change policy missing key elements such as responsibilities, impact assessment procedures or process for the classification of the changes	15%

[8] Out of the 55 institutions that received a follow-up letter on general topics.

2.2 Credit risk

2.2.1 Common or critical shortcomings – credit risk models

(Extract from the "Interim update on the outcome of credit risk investigations" section of the June 2018 letter)

The TRIM credit risk review consistently assessed the institutions' modelling practices with respect to a number of predefined methodological aspects for the relevant risk parameters (i.e. probability of default (PD), loss given default (LGD) and credit conversion factor (CCF)) that had been identified in the preparatory phase of TRIM as potential drivers of RWA variability.

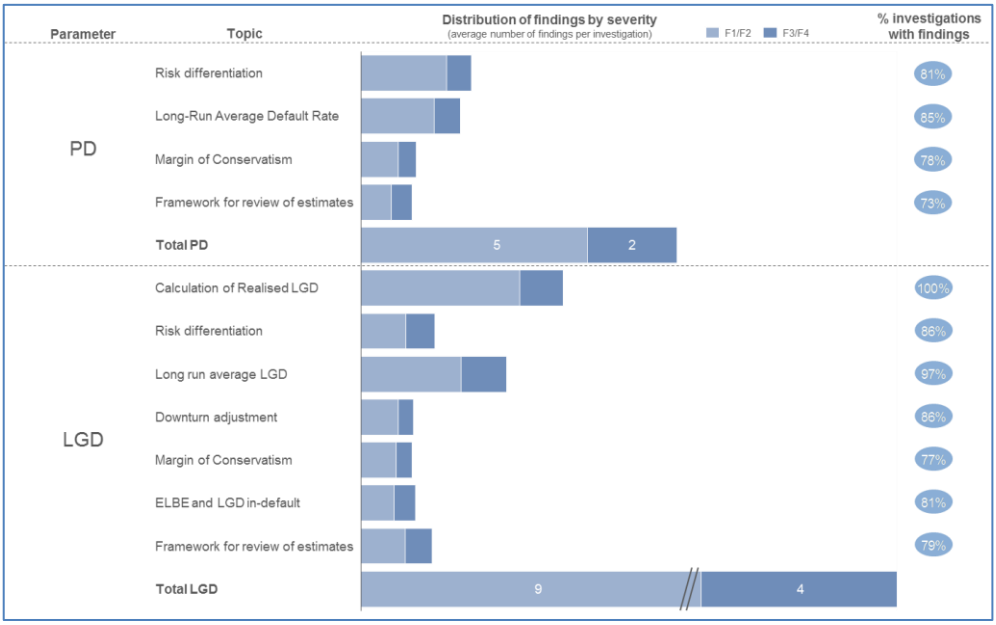
TRIM investigations first focused on credit risk models related to the exposure classes Retail and Corporate – SME ("retail and SME models"). Investigations on those models were mostly completed by end-June 2018. After the completion of the on-site phase, each TRIM draft assessment report underwent consistency checks to ensure a harmonised approach across investigations and a consistent application of the methodology and techniques.

Cases of non-compliance with the Capital Requirements Regulation identified in each investigation have been (or will be) addressed via dedicated supervisory decisions, and institutions have been asked to address these findings. Furthermore, the ECB also provided recommendations with a view to supporting future compliance with upcoming legal requirements and further specifications added to existing requirements.

This section presents an overview of the results that have emerged in the TRIM investigations on retail and SME models (around 80 investigations).[9] Chart 1 provides an overview of the findings identified for PD and LGD in those investigations. For presentational purposes, the overview categorises the findings according to the relevant risk parameter and related sub-topics. The chart provides an indication of the number of findings raised per topic, with a breakdown by severity, as well as the percentage of investigations for which at least one finding on the respective topic has been raised.

[9] Compared with the June 2018 letter, the figures have been updated to cover all credit risk investigations for retail and SME portfolios. The distribution of findings anticipated in June 2018 has been generally confirmed.

Chart 1[10]



Regarding the PD parameter, a significant number of findings are related to the long-run average. The shortcomings triggering findings on this topic are typically related to the calculation of default rates and to the definition of the period representative of the long-run average.

A comparable number of findings still concerning PD are also related to risk differentiation. This was one of the areas in which the assessment teams performed extensive analyses challenging the PD models in place at the institutions. The shortcomings in this area are typically related to a lack of consideration of relevant risk drivers or to the lack of an appropriate definition of the grades.

Regarding the LGD parameter, the highest number of findings relate to the calculation of realised LGD. Shortcomings in this area typically involve one or more of the following potential issues: on the one hand, the use of an inappropriate discount rate (e.g. risk-free rate, or contractual interest rate) and the treatment of multiple defaults (e.g. lack of an appropriate treatment to account for possible dependency among multiple defaults), which should in the future benefit from the detailed guidance provided by the EBA guidelines[11] and the ECB guide; on the other hand, a significant number of findings are related to specific aspects of the calculation (e.g. lack of an appropriate treatment of restructuring cases, or insufficient consideration of indirect costs) that were identified during the intensive walk-throughs performed by the assessment teams during the on-site investigations.

In addition to the calculation of realised LGD, a significant share of findings are related to the estimation of long-run average LGD, in particular the treatment of incomplete work-outs, the downturn adjustment and the treatment of defaulted assets (i.e. models for expected loss best estimate (ELBE)

[10] Figures updated as indicated in the previous footnote.

[11] EBA Guidelines on PD estimation, LGD estimation and the treatment of defaulted exposures (EBA/GL/2017/16).

and LGD in default). These topics have previously been identified as sources of non-risk-based RWA variability and were addressed in detail in both the EBA guidelines and the ECB guide.

Finally, common to both PD and LGD, a significant number of findings relate to the frameworks for determining margins of conservatism and for the review of estimates.

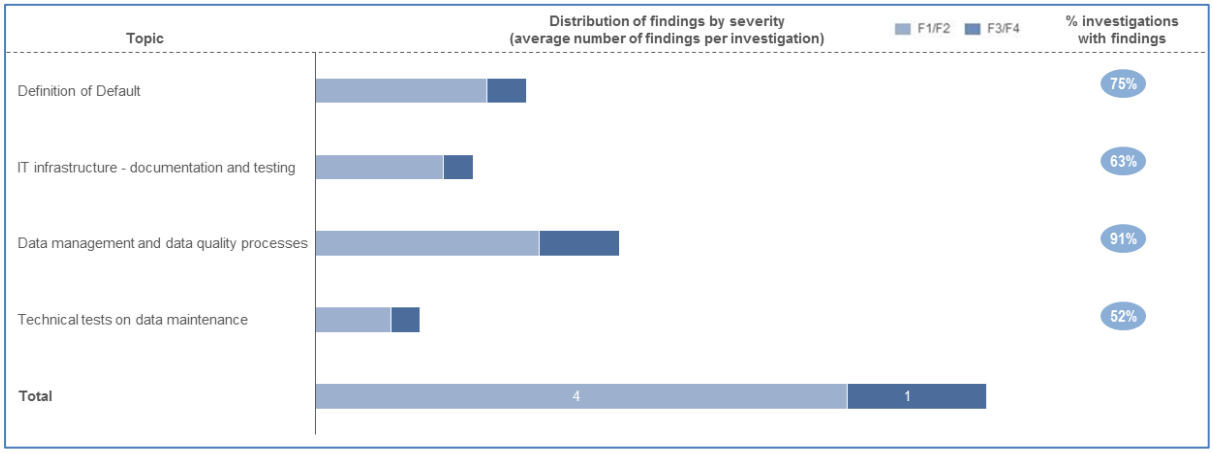
2.2.2 Common or critical shortcomings – data quality

The TRIM exercise also includes the review of data management practices applied by the institutions to the specific credit risk models under review, as well as the review and assessment of the quality of PD and LGD historical data used for IRB modelling purposes.

The review of these topics started in 2017 within the TRIM investigations on retail and SME models and will continue in the context of the low-default portfolio investigations. Where appropriate, findings related to data quality have been (or will be) addressed in the context of the supervisory decision issued as a follow-up to each TRIM investigation.

Through the horizontal analysis of shortcomings related to data quality, it was possible to identify areas characterised by non-compliance with the relevant regulatory framework, or by a divergence from the best practices highlighted in the ECB guide which caused data quality issues. These shortcomings are clustered along the areas of analysis in Chart 2, which shows their number and distribution.

Chart 2



Overall, it can be concluded that data quality-related findings are present in all institutions investigated. More specifically, nearly all on-site investigations revealed issues relating to the data management and data quality processes in place, in many instances affecting several sub-topics such as: (i) the data quality framework's governing principles and scope of application; (ii) policies on data quality management and processes; (iii) the allocation of roles, responsibilities and ownership in relation to the management of data quality; (iv) the current metric approach for monitoring data quality; and (v) processes for data quality incident remediation and the reporting on data quality. The

topic of data management and data quality processes presented the greatest share of findings with higher severity (F3/F4).

Shortcomings related to the IT infrastructure were identified in close to two-thirds of the on-site investigations and related to a lack of documentation of the IT infrastructure and data processes in place and/or issues impairing the overall soundness, robustness and consistency of the IT set-up.

The on-site investigations also revealed a significant number of findings on the more technical data quality aspects affecting the majority of on-site investigations, including the technical implementation of the Definition of Default (DoD) and technical tests on the data maintenance. The findings on DoD were mainly related to the technical implementation of the DoD, but also included findings related to the regulatory compliance with DoD even though this aspect has not been a main focus of TRIM.

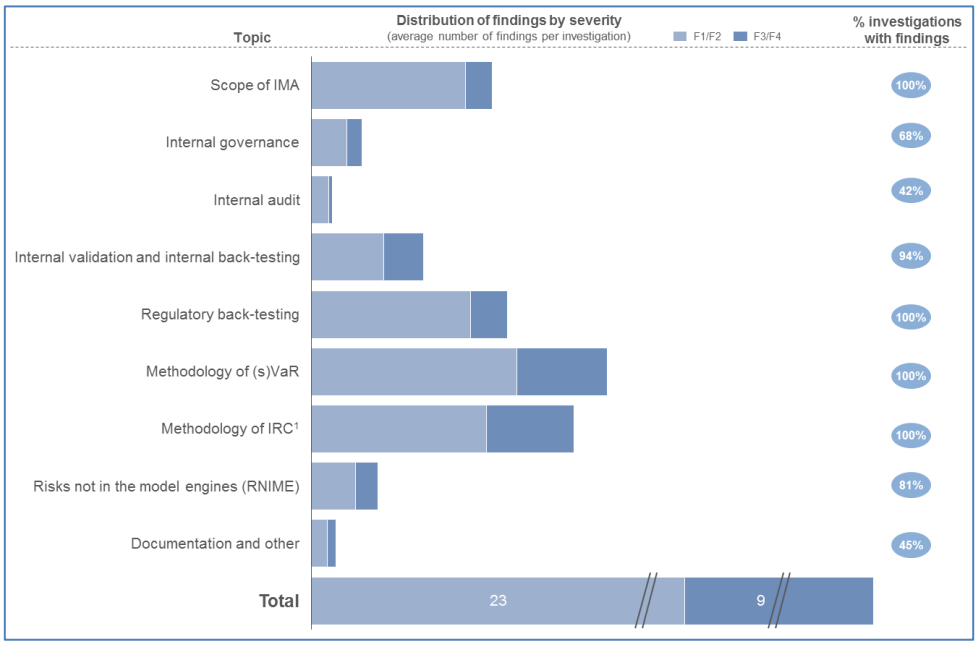
2.3 Market risk

In line with the credit risk and data quality reviews, the purpose of TRIM market risk investigations has been to consistently assess the institutions' modelling practices in areas identified in the preparatory phase of TRIM as potential sources of RWA variability.

The on-site phase of market risk investigations was completed by end-June 2018. Similarly to credit risk investigations, after the completion of this phase, each TRIM draft assessment report underwent consistency checks and cases of non-compliance with regulation have been (or will be) addressed via dedicated supervisory decisions requiring the institutions to address these findings.

Within the horizontal analysis on the results of market risk investigations, it was possible to compare significant institutions with their peers in terms of modelling practices and shortcomings identified with respect to applicable regulation. This section presents an overview of the results that have emerged in the TRIM investigations on market risk (about 30). Chart 3 provides an overview of the findings identified in those investigations, broken down by relevant topics for market risk models. Similarly to credit risk, the chart provides an indication of the average number of findings raised per topic, with a breakdown by severity, as well as the percentage of investigations for which at least one finding on the respective topic has been raised.

Chart 3



[1] This topic has been investigated in a lower number of investigations as not all the institutions in the scope of the market risk review have an approved IRC model.

The majority of findings concern the value-at-risk (VaR) and stressed VaR (sVaR) methodology, regulatory back-testing, the scope of the internal model approach (IMA) and the incremental risk charge (IRC) methodology. Regarding the number of high-severity findings, findings for VaR and sVaR methodology are the most severe, followed by findings on the IRC methodology, internal validation and internal back-testing, as well as regulatory back-testing. Shortcomings for VaR and sVaR are mostly related to the following aspects: (i) general model issues and documentation weaknesses; (ii) data quality issues; (iii) inadequate or not fully validated coverage of risk factors in the VaR or sVaR models; and (iv) issues regarding the pricing methods in the model.

In many areas in which an elevated number of findings were detected, the ECB guide has already provided detailed guidance that will contribute to reducing unwarranted RWA variability driven by heterogeneous practices. For instance, the guide provides for the first time a clear definition of proxies, contributing to forming a common understanding, to enhancing alignment of practices, and to ensuring appropriate market risk measurement. Another example relates to regulatory back-testing, which is recognised in the market risk regulation as a key element to monitor the quality of VaR models. It requires the comparison of the losses predicted by the VaR model with those actually realised (actual P&L) and with hypothetical losses by assuming that positions remain unchanged (hypothetical P&L). The TRIM review showed that the elements recognised for actual and hypothetical P&Ls were not always in line with regulatory requirements, nor aligned across institutions. The ECB guide provides detailed guidance on relevant aspects for those P&Ls by specifying the ECB's understanding of several key elements of the back-testing framework. Similarly, TRIM on-site investigations showed that not all institutions employ well-justified PD values in IRC

models and that PDs assigned to the same or similar issuers can vary materially across institutions. In this regard, the ECB guide clarifies that PDs used in IRC models should be risk-sensitive and strictly greater than zero for all obligors.

3 Next steps

In the course of 2019 the TRIM project will approach finalisation.

First of all, the ECB guide to internal models is currently being revised to take into account the feedback received during the public consultation process for the risk type-specific chapters (for credit, market and counterparty credit risk). The consolidated version of the guide is expected to be published in the first half of 2019. Afterwards, it will be further updated over time when necessary, e.g. to reflect developments in the regulatory environment.

At the same time, TRIM on-site investigations will continue throughout the year. They are planned to be completed in the second half of 2019, with the finalisation of the investigations on models for low-default portfolios. The results of these investigations will be progressively incorporated into horizontal analysis activities similar to those presented in this note for retail and SME models, which inform the supervisory follow-up, ensuring a consistent approach across institutions. TRIM will then be concluded in early 2020, upon finalisation of these analyses and of the relevant project documentation.

Finally, looking forward after the end of TRIM, the outcomes of the project will continue to play a key role in improving the standards and quality of significant institutions' Pillar 1 internal models and the related environment for using and maintaining them.

In fact, intense follow-up work by the institutions is expected in the short term to remediate the shortcomings identified in the relevant decisions. In this regard, given the intense period ahead for internal model resources, institutions are encouraged to proactively plan and engage with JSTs as early as possible.

Furthermore, the structured investigation framework developed for TRIM and the in-depth knowledge gained in the context of the project will continue supporting the enhancement of future supervision of internal models within the SSM, contributing to the use of high and consistent supervisory standards for all significant institutions.