Just in Time

Targeted Review of Internal Models

Focus on Credit Risk

May 2021

Marco Carminati

iason
ESSENTIAL SERVICES FOR FINANCIAL INSTITUTIONS

At a Glance

01

Introduction

Targeted Review of Internal Models (TRIM) Overview

Focus on Credit Risk

Main Deliverables

Executive Summary

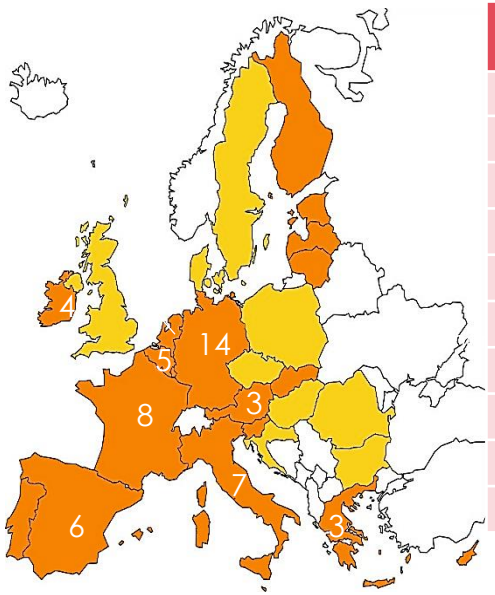
Introduction 1/4

Targeted Review of Internal Models (TRIM) Overview

The **TRIM** project was a large-scale multi-year supervisory initiative launched by the **ECB** at the beginning of 2016 in close cooperation with **NCAs**[4] that are part of European banking supervision in order to confirm the adequacy and appropriateness of approved **Pillar I internal models** used by SIs in euro area countries, ensuring their **compliance with regulatory requirements** and **harmonize supervisory practices** relating to internal models within the **SSM**.

TRIM is the **largest project** conducted so far by **ECB Banking Supervision in coordination with NCAs**. It marks an important milestone in **raising the quality standards and comparability** of outcomes of **internal models** in use at SIs within the SSM.

# On-site IMIs	200
# Institutions	65



Code	Country	Sis in scope
AT	Austria	3
BE	Belgium	5
DE	Germany	14
ES	Spain	6
FR	France	8
GR	Greece	3
IE	Ireland	4
IT	Italy	7
NL	Netherlands	4
Other	Other	11
	Total	**65**

Introduction 2/4

Focus on Credit Risk

Risk Types

The scope of **TRIM** was based on internal models following the **Pillar I** risks:

Focus on Credit Risk

Amongst the risks investigated by the TRIM exercise, Credit Risk represents by far the main focus with over 80% of the IMIs.

Risk/Exposure Type	Number of IMIs	% of Total
Credit Risk – retail and SME	85	42.5 %
Credit Risk – LDP[1]	76	38.0 %
Market Risk	31	15.5 %
CCR	8	4.0 %
Total	**200**	**100 %**

Source: *Targeted Review of Internal Models - Project report*

Introduction 3/4

Just in Time

Main Deliverables

Deliverables	Description
ECB guide to internal models	The **ECB guide** to internal models documents how the ECB understands the regulatory requirements for internal models and provides transparency on how it applies them when assessing whether institutions meet these requirements.
Inspection Techniques and Tool (ITTs)	To facilitate a consistent and comparable execution of on-site investigations, **standardised data requests and ITTs** were drawn up during the preparatory phase. The ITTs provided assessment teams with a set of **inspection methodologies and checks** for use in conducting the model investigation.
On-site model investigations and assessment reports	**On-site IMIs** applied a **common methodological approach** to assess the regulatory compliance of internal models used by SIs. For each investigation, an **assessment report** was produced by the assessment team describing the activities and results of the investigation. Each draft assessment report underwent consistency checks by ECB staff and an NCA other than the NCA involved in the on-site work.
Horizontal analysis	Each center of competence performed a **horizontal analysis** based on the assessment reports with the aim of forming a comprehensive view of the main model design features as well as typical shortcomings of existing models. This analysis also contributed to ex post checks to ensure consistency in the identification and treatment of findings.
Supervisory decisions	After each on-site investigation, a process was initiated to provide the institution with supervisory decisions listing the **findings** and the required remedial action. A first supervisory decision with obligations and corresponding deadlines was addressed, requiring the **remediation** of findings. Where severe findings and/or a material underestimation of **RWA** were identified, limitations were imposed. A second supervisory decision was only issued in cases where the relevant supervisory measures could not be included in the first and would target only selected topics.

Introduction 4/4

Executive Summary

- **General topics**: Model Use, Internal Governance, Management of changes and Interval Validation are the area where more deviations have been identified, while Internal Validation and Roll-out & PPU are the area with the highest number of findings

- **Retail and SME**: the majority of the findings related to **PD** concern shortcomings in **risk differentiation,** while the **calculation of realised LGD** was the topic that generated the most findings for **LGD** models. Many high severity shortcomings were also identified in **data management and data quality processes**.

- **Low-default portfolios**: for **PD** models, the area with most findings are **rating assignment process,** the improper use of **overrides** and the framework for **the review of estimates,** while for **LGD** models the findings are concentrated on **calculation of realised LGD** and **representativeness of the calibration sample**. **Data management and data quality processes** and the **IT infrastructure** are the areas with the highest number of shortcomings for DQ-related topics.

- The findings communicated within TRIM have been followed up with binding supervisory decisions requesting the institutions to address these shortcomings within set timelines. It is estimated that the **aggregated impact of TRIM limitations and model changes** approved as part of TRIM will lead to a **12% increase in the aggregated RWA** covered by the models in scope of TRIM and an overall **absolute increase in RWA of about €275 billion**. **More than 90%** of the increase in RWA was **due to credit risk supervisory measures**.

02

General Topics Review

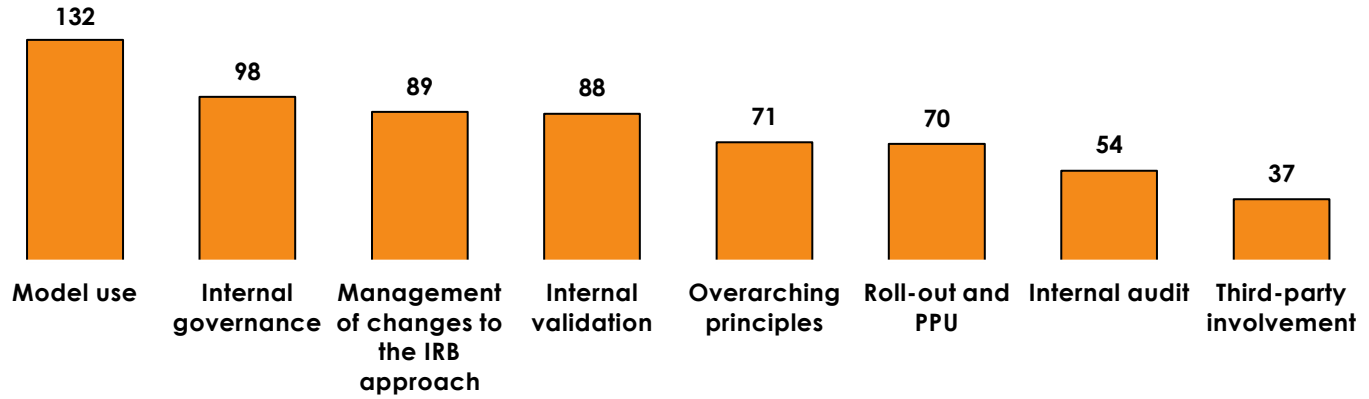
Deviations and Findings

General Topics Review 1/3

Just in Time

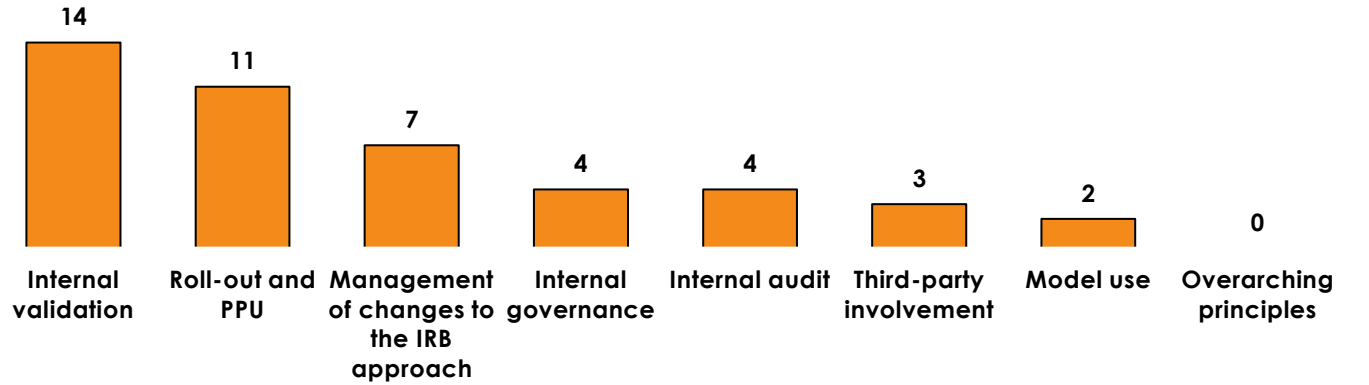
Deviations

Recommendations and feedback letters



Findings

Supervisory decisions



Most models are generally suitable for ongoing use by institutions, but there are a number of areas that still require significant improvement

General Topics Review 2/3

Just in Time

Deviations and Findings (1/2)

I Overarching principles for internal models

- **Few** institutions have a **comprehensive framework for model risk management in place**
- **Model documentation** is missing or incomplete for almost half of the institutions

II Roll-out and permanent partial use

- Most institutions need to **improve** their **PPU monitoring and management**

III Internal governance

- Institutions need to **better formalise** their **decision-making process**
- Management body's and senior management's **understanding of the rating systems** is not often supported by a dedicated process

IV Internal validation

- Institutions often did **not ensure** that all **appropriate validation analyses** and **adequate quantitative thresholds** were in place
- In some cases, the **validation function** within the institution is **not** ensured to be **independent**

General Topics Review 3/3

Just in Time

Deviations and Findings (2/2)

V Internal audit

- **Some** institutions did **not** perform an **appropriate or sufficiently frequent assessment or review of the rating systems**
- **Some** institutions **lacked sufficient resources and/or staff** with the necessary level of knowledge or skills

VI Model use

- For **two-third**s of the institutions, **IRB parameters** were **not considered in** certain **internal processes** for which institutions are encouraged to take them into account
- Several institutions did **not** present an **appropriate process** for treating **unrated exposures or outdated ratings**

VII Management of changes to the IRB approach

- The **re-rating process** after a material model change or model extension was **neither** properly **formalised nor covered** in the relevant policy on the management of changes
- **Some** institutions **lacked a formalised classification** process

VIII Third-party involvement

- In some cases, institutions did **not ensure** proper **monitoring of third-party performance** in connection with outsourced tasks and/or the use of external data

03

Models for Retail and SME Portfolios

Findings

PD Retail and SME – Model Features

PD Retail and SME – Findings

LGD Retail and SME – Model Features

LGD Retail and SME – Findings

DQ-Related Findings

Models for Retail and SME Portfolios 1/24

Just in Time

Findings (1/2)

In total, **2,000 findings** from the TRIM investigations relating to models for retail and SME portfolios were included in the horizontal analysis, which includes additional findings identified as a result of consistency checks and horizontal analyses conducted on the assessment reports delivered by the inspection teams

PD

- Many of the findings related to PD concern shortcomings in **risk differentiation**

LGD

- The **calculation of realised LGD** was the topic that generated the most findings

Data Quality

- Data quality reviews were an important part of the credit risk investigations, with enhanced focus compared to previous internal model reviews
- There were **more than 400 data quality findings** from the investigation of models for **retail and SME portfolios**
- **Many high severity shortcomings** were identified around data management and data quality processes

Models for Retail and SME Portfolios 2/24

Just in Time

Findings (2/2)

	FINDINGS	INVESTIGATIONS	TOPIC	SEVERITY F 1-2	SEVERITY F 3-4	INVESTIGATIONS WITH FINDING	INVESTIGATIONS WITH F3/F4
PD	574	85	Framework for review of estimates	54	37	75%	36%
			Margin of conservativism	57	35	80%	32%
			Long-run average default rate	61	33	71%	29%
			Calculation one year default rate	70	13	62%	15%
			Grade assignment dynamics	24	8	33%	63%
			Risk differentiation	141	41	86%	36%
LGD	1046	79	Framework for review of estimates	64	47	81%	47%
			ELBE and LGD in Default	47	33	78%	38%
			Margin of conservativism	51	28	78%	30%
			Downturn adjustment	55	24	86%	29%
			Long-run average LGD	42	29	67%	30%
			Treatment of incomplete recovery…	64	32	87%	34%
			RDS completeness	59	21	61%	23%
			Risk differentiation	73	43	87%	42%
			Calculation of realised LGD	267	67	100%	53%
CCF	163	64	Framework for review of estimates	12	14	30%	20%
			Margin of conservativism	10	2	17%	3%
			Downturn adjustment	17	4	28%	3%
			Long-run average	7	5	17%	8%
			RDS completeness	15	5	25%	8%
			Risk differentiation	32	4	44%	6%
			Realised CCF	35	1	38%	2%

Models for Retail and SME Portfolios 3/24

PD Retail and SME – Model Features (1/7)

Summary

- The **vast majority** of in-scope institutions use a **discrete rating scale**, combined in **more than half** of the cases with **calibration at grade level**
- **Most** institutions include **behavioural information**, such as past delinquency, among the risk drivers
- **Different practices** were observed regarding the **grade assignment method** for models related to **retail and SME portfolios**, and additional clarifications have been included in the ECB guide to increase awareness on this topic
- **Different practices** were used to define the **observation period for long-run average default rates**, in most cases the years 2008 and/or 2009 were included in the observation period
- **Long-run average default rates** were **not always calculated as the simple average of default rates**, and adjustments were not always well justified
- An **explicit MoC** was **not always added** to the PD estimates

Models for Retail and SME Portfolios 4/24

Just in Time

PD Retail and SME – Model Features (2/7)

General Modelling Approaches to the PD Modelling

Calibration based on	Granularity of the scale	Types of PD model
Long-run average at calibration segment level	Continuous	**Continuous direct estimates**
	Discrete	**Discrete direct estimates**
Long-run average at grade level	Discrete	**Grade-based estimation**

11% PD models based on a **continuous granularity**

89% PD models based on a **discrete scale**

- In **33%** of PD models, a similar approach **to continuous direct estimates** was used
- In **56%** of PD models, the PD used for capital requirements calculation was based on the **long-run average default rate calculated at grade level** (grade-based estimation)

Models for Retail and SME Portfolios 5/24

PD Retail and SME – Model Features (3/7)

Risk Differentiation

Selection of risk driver

Most institutions used:

- **Internal behavioural information** (including past delinquency, which over 90% of the investigated internal models used as a driver in the scoring function)
- **Financial information**
- **Contract/obligor characteristics**

Homogeneity within grades and Heterogeneity across grades

In a **majority** of cases:

- **No specific analyses** were conducted by institutions

or

- The **analyzes** were **not** considered **appropriate**

Models for Retail and SME Portfolios 6/24

Just in Time

PD Retail and SME – Model Features (4/7)

Grade Assignment Dynamics

A dispersion of practices was observed in the TRIM investigations of retail and SME models regarding the dynamics of the grade assignment methods across different combinations of the following **two extreme cases**:

I. The **grade assignment** method **focused exclusively on the short term**, resulting in an **average PD** at portfolio level that closely followed the **yearly portfolio default rate**

II. The **grade assignment** method **focused exclusively on the long term**, resulting in an **average PD** at portfolio level that was **stable at the level of the long-run average portfolio default rate**

These differences have an impact on the average PD at portfolio level as well as on the RWA of the institutions

Models for Retail and SME Portfolios 7/24

Just in Time

PD Retail and SME – Model Features (5/7)

Calculation of One-Year Default Rates

DR counting unit	Percentage of cases where PD assignment unit is consistent with default rate unit	Percentage of cases where PD assignment unit is inconsistent with default rate unit
Facility level	92.0%	8.0%
Obligor level	89.8%	10.2%
Group of economically dependent obligors	100.0%	0%

Models for Retail and SME Portfolios 8/24

Just in Time

PD Retail and SME – Model Features (6/7)

Model Features - Calculation of One-Year Default Rates

Observation period used to calculate the LRA DR

- In **86%** of cases, the period used was **at least 5 years**
- In **29%** of cases, the period used was **at least 10 years**
- In **70%** and **90%** of cases respectively the years **2008 and 2009 have been considered**
- In **66%** of cases, **only data after 2006** were used
- In **34%** of cases information from **earlier years** was used

Calculation of the LRA DR

- **50%** of the institutions used the **average of the observed default rates** in the period considered to represent the long-run average
- **50%** of them applied **adjustments** to obtain the long-run average of default rates.

Weighting approaches

- In **66%** of cases an **arithmetic average** was used in the LRA DR calculation
- **5%** used a **higher weighting for more recent periods**
- **20%** used a **weighting based on the number of observations**
- 9% used another form of weighting or calculation

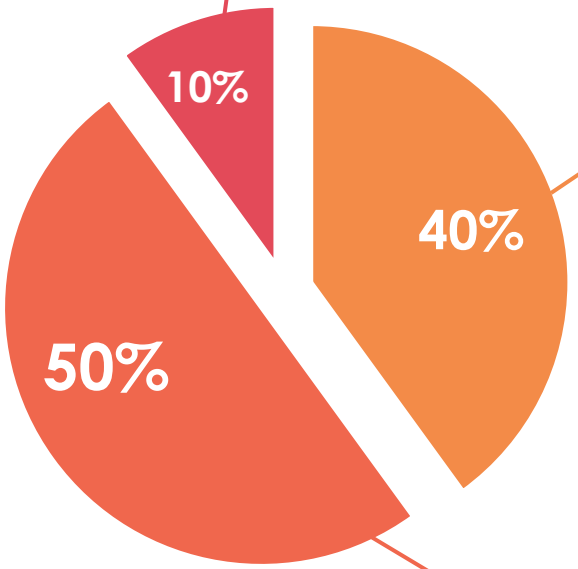
Calibration level

- In **44%** of cases calibration at **segment level**
- In **56%** of cases calibration at **grade level**

Models for Retail and SME Portfolios 9/24

PD Retail and SME – Model Features (7/7)

Model Features - Margin of Conservatism



No MoC considered

Institutions were already applying an **explicit MoC** to their PD estimates

Institutions stated that an MoC was **implicitly considered** through conservative adjustments

Models for Retail and SME Portfolios 10/24

Just in Time

PD Retail and SME – Findings (1/2)

Risk differentiation

- In **more than half** of the models reviewed, findings were raised concerning **low risk differentiation of PD models** owing to **the low discriminatory power** of the scoring/ranking functions and/or as a result of **inappropriate homogeneity/heterogeneity of the grades**.
- In a **significant number** of cases, these findings were assigned a **high severity**.
- Findings were also frequently triggered by the **inappropriate justification of modelling assumptions** and issues with **the range of application** of the models

Grade assignment dynamics

Findings were mainly related to the **lack of analysis of the grade assignment dynamics**, and its implications in terms of risk quantification and parameter estimation.

Calculation of one-year default rate

Findings were mainly related to:

- Shortcomings in the **method used to compute the default rate**;
- The **lack of representativeness of the definition of default across time**.

Models for Retail and SME Portfolios 11/24

Just in Time

PD Retail and SME – Findings (2/2)

Long-run average default rate and calibration methodology

In around **40%** of the models reviewed, findings were raised concerning the **period** used to define **the long-run average not** being properly **justified** or **appropriate**. In a significant number of cases, these findings had a **high severity**. **Similar** percentages were observed for findings regarding the **lack of, or inappropriate, justification of the calibration methodology**; for example, where the institution used weighting in the calculation of the LRA DR.

Margin of conservativism

Most of the findings concerned the **inappropriate calculation** of the level of conservatism and the **absence of a framework** for the identification of deficiencies and quantification of the respective MoC. In a significant number of cases, and for both reasons, these findings had a **high severity**.

Framework for the review of estimates

A **majority** of findings related to an **incomplete framework**.
In a significant number of cases, these findings had a **high severity**.

Models for Retail and SME Portfolios 12/24

LGD Retail and SME - Model Features (1/10)

Summary

- In a significant number of cases, the LGD was estimated through a **combination of different model components**
- In **90% of cases**, LGD estimates were **direct estimates**, using either a continuous scale (45%) or a discrete scale (45%)
- The **methods used to calculate realised LGD** were subject to intense scrutiny during the TRIM investigations as potential drivers of significant unwarranted RWA variability
- **Most** institutions use **contract characteristics** in their LGD models
- The treatment of **incomplete recovery processes** showed **wide variations**
- A majority of institutions calculated the **LRA LGD at either portfolio/calibration segment or grade/pool level**
- In a majority of cases, the **years 2008-2013** were included in the observation period to calculate the **LRA LGD**
- **Significant differences** were observed in how institutions defined a **downturn** adjustment
- As in the case of PD, LGD estimates **do not always include a MoC**
- **Various practices** were observed for calculating **LGD in-default**, including using the sum of ELBE plus an add-on, and "direct" LGD in-default approaches using dedicated models

Models for Retail and SME Portfolios 13/24

Just in Time

LGD Retail and SME - Model Features (2/10)

General Modelling Approaches to the LGD Modelling

Calibration based on	Granularity of the scale	Types of LGD model
Long-run average at calibration segment level	Continuous	**Continuous direct estimates**
	Discrete	**Discrete direct estimates**
Long-run average at grade level	Discrete	**Grade-based estimation**

80% The LGD was estimated through a **combination** of different components

45% The LGD estimates were obtained using a **continuous scale**

55% The LGD estimates were obtained using a **discrete scale**

- In **45%** of cases, the aggregation of several components resulted in a discrete scale (**LGD direct discrete**)
- In the remaining **10%** of cases, the LGD estimates resulted from the long-run average calculated at grade level (**grade-based estimation**)

Models for Retail and SME Portfolios 14/24

Just in Time

LGD Retail and SME - Model Features (3/10)

Calculation of Realised LGD

Level of calculation

- In **78%** of cases, the realised LGD was calculated at **facility level**
- In **11%** of cases, it was calculated at **obligor level**
- In **11%** of cases, a mix of different assignment levels was considered or the assignment level was represented by a group of connected obligors.

Recovery flows

Around **40%** of cases, **recovery flows** were not directly observed but calculated on the basis of the **difference between exposure values on two consecutive dates** or derived, even partially, from some other treatment

Restructurings

- In about **one-third** of cases, institutions were **not able to connect the new facility after restructuring** to the facility prior to restructuring
- In **71%** number of cases, institutions **did not consider in the definition of loss the diminished financial obligation** that can result from the restructuring owing to changes in the payment plan

Discounting of cash flows

A wide variety of practices were observed in the **discounting of cash flows**:

- The use of a **fixed rate (30%)**
- The **contractual rate (19%)**
- **Base rate with an additional risk premium (19%)**
- **Base rate without an additional risk premium (10%)**

Models for Retail and SME Portfolios 15/24

LGD Retail and SME - Model Features (4/10)

Just in Time

Treatment of Multiple Defaults

34% **No treatment** of multiple defaults

26% The "**calendar year approach**" was applied

40% A methodology in which the **time between defaults is counted from the return to normal of the first default**

For exposures that **return to non-defaulted status**, in **50% of cases** institutions did **not compute realised LGD** for cured cases but instead made assumptions regarding the realised losses

Additional drawings

- **40% of retail models** followed an **adequate** approach for the treatment of additional drawings
- **20% of retail models** additional drawings were **not possible** for the specific type of exposure
- **40% of cases**, the approach **did not ensure alignment between** the EAD considered for **CCF** purposes and the EAD considered in the denominator of realised **LGD**, leading to an inconsistent approach.

Repossessed but not yet sold collateral

- **53%** of the institutions used **repossession as a recovery** tool, of which a majority applied a **haircut** to the value of repossessed collateral (**42%** of total cases), while others (**11%** of total cases) took **the value of repossessed collateral directly**
- In **47%** of cases, **repossession was not used as a recovery tool**

Models for Retail and SME Portfolios 16/24

LGD Retail and SME - Model Features (5/10)

Risk Differentiation

Most commonly used risk drivers

Obligor characteristics — **35%**

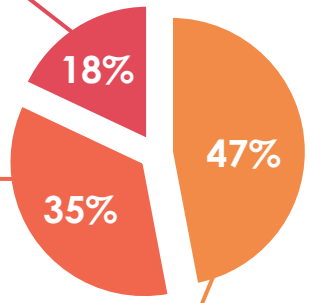
Internal behavioral information in the case of retail exposures — **25%**

LGD facility scale is used

No analysis was conducted — **18%**

Institutions relied solely on **expert judgement** — **35%**

Statistical analyses aimed at ensuring the homogeneity/heterogeneity of the grades were performed — **47%**



Regular monitoring of models

74% Of Institutions **did not have a process in place to check the homogeneity/heterogeneity of grades**

Models for Retail and SME Portfolios 17/24

LGD Retail and SME - Model Features (6/10)

Treatment of Incomplete Recovery Processes

Time-to-workout

- In **59% of cases**, Institutions already had a **definition of time-to-workout**.
- The **length** of this period **varied from 3 to 15 years**, depending on the country, the exposure class and the recovery processes.
- The definition of time-to-workout is strongly linked to the idiosyncrasies of the institution's recovery process, which can justify differences between institutions in the same country and for the same type of exposure.

Treatment of incomplete recovery processes

- **32%** of the institutions **did not** explicitly **take into consideration incomplete recovery** files,
- **68%** of the institutions already **considered incomplete files** in the LGD estimation, of which:
  - **46.5%** by **extrapolating cash flows**
  - **21.5%** by assuming **no further recoveries**

Models for Retail and SME Portfolios 18/24

LGD Retail and SME - Model Features (7/10)

Long-Run Average LGD

Level of calculation

- **40% portfolio/calibration segment**
- **24% grade/pool level**
- **36%** had an **inappropriate** approach because:
  - LRA LGD was **not calculated (14%)**
  - LRA LGD was **computed only at the level of each component (22%)**

Observation period used for the LRA LGD

In terms of the time frame considered, and although a common period was used by most institutions between 2008 and 2013 (in 78% of cases, all six of these years were included as part of the LRA period), there were still **significant differences in the observation period used across institutions**

Weighting approach

While in **a majority of cases (60%),** institutions used the **default weighted average** as required by the CRR64, the **remaining** institutions used an **inappropriate** weighting approach – around **20% used EAD weighting** and **14% did not compute an LRA**

Models for Retail and SME Portfolios 19/24

Just in Time

LGD Retail and SME - Model Features (8/10)

Downturn LGD

53% An explicit period was defined to derive an LGD that is appropriate for an economic downturn

For the institutions identifying a downturn period

- **76%** the downturn period included the years 2008 or 2009
- **26%** the period included data from before 2006

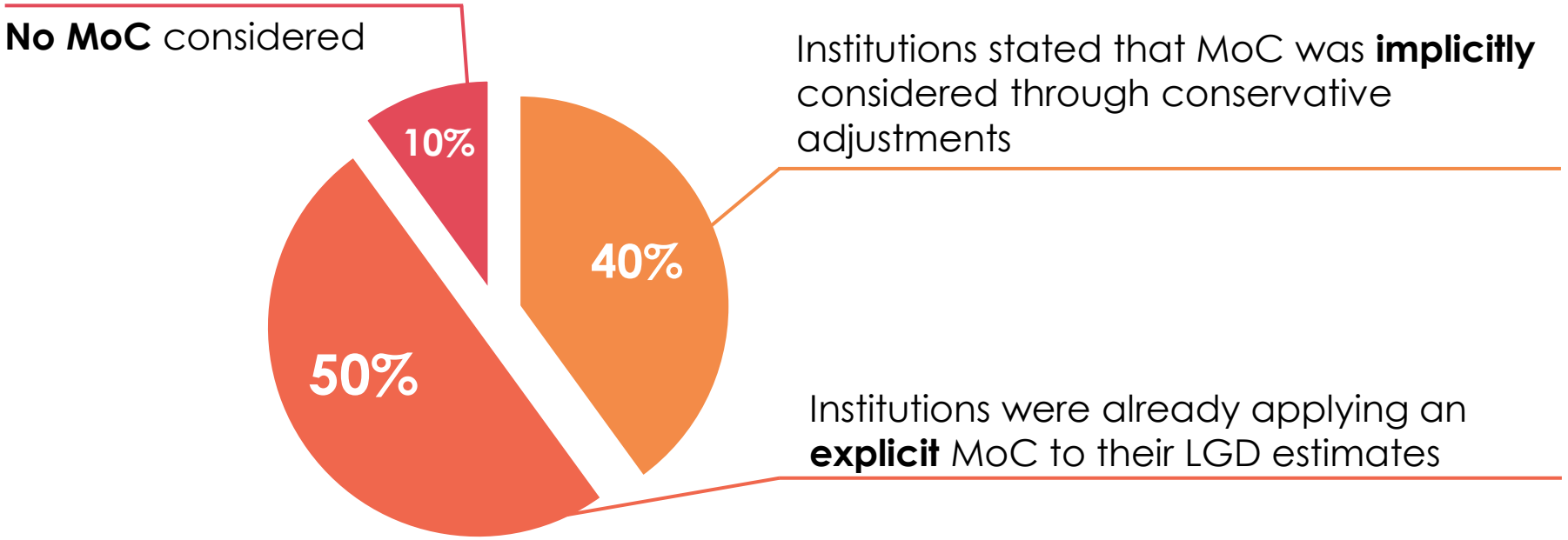
A wide variety of practices were observed in relation to the type of adjustment

- **41%** the downturn adjustment was based on observed values during the selected downturn period
- **26%** the downturn adjustment was obtained by stressing model components
- **11%** no downturn adjustment was applied

Models for Retail and SME Portfolios 20/24

LGD Retail and SME - Model Features (9/10)

Margin of Conservatism



Regarding the cases with an **explicit MoC**, the **triggers** were:

- Data and methodological deficiencies (74% of cases)
- Representativeness issues (80%)
- General estimation error (80%)

Models for Retail and SME Portfolios 21/24

LGD Retail and SME - Model Features (10/10)

Expected Loss Best Estimate and LGD in-Default

ELBE

- **21%:** there was **no specific estimation in place** (i.e. the non-defaulted (downturn) LGD continued to be used when the exposure was in default)
- **25%:** the ELBE estimate was based on or equal to the **credit risk adjustments**
- **54%:** the ELBE was instead evaluated using a **dedicated model**

LGD in-default

- **29%:** there was **no specific estimation in place** (i.e. the non-defaulted (downturn) LGD continued to be used when the exposure was in default) and the exposure status was not reflected
- **33%:** the LGD in-default was calculated as the **sum of the ELBE plus an add-on**
- **38%:** there was a **"direct" LGD in-default approach**.

Models for Retail and SME Portfolios 22/24

Just in Time

LGD Retail and SME - Findings (1/2)

Calculation of realised LGD

Issues regarding the **calculation of realised LGD** were identified in **all of the investigations**. In particular, these findings related to **the lack of the necessary information** to compute realised LGD, the **definition of economic loss** not being comprehensive enough and the **process of allocation of recoveries and costs** leading to bias in LGD estimates. In a significant number of cases, these findings were assigned a **high severity**

Risk differentiation

A majority of investigations identified deficiencies with regard to the **risk drivers for LGD models**, in particular in relation to missing or irrelevant risk drivers. Poor risk differentiation of the LGD models was an issue in almost half of the investigations, owing to **low discriminatory powe**r of the scoring/ranking functions and/or **inappropriate homogeneity/heterogeneity of the grades**

Reference dataset completeness

Most findings related to **missing information** in the reference dataset to estimate LGD and **exclusions** from the reference dataset not being properly justified. In the former case, findings were raised for around 40% of the investigations.

Treatment of incomplete recovery processes

The main findings were related to **non-consideration of incomplete cases** in the LGD estimation and the **inadequate definition of the time-to-workout**.

Models for Retail and SME Portfolios 23/24

Just in Time

LGD Retail and SME – Findings (2/2)

Long-run average LGD	The most significant findings were related to the use of a **weighting other than facility-weighted average** and to the **calibration methodology of the long-run average**, including lack of or inappropriate adjustments to ensure a representative long-run average
Downturn LGD	A **majority** of findings with regard to the downturn LGD related to the **identification of the relevant downturn conditions**, including cases where the institution did not characterise an economic downturn in terms of economic and credit indicators or where the institution did not take into account a sufficiently long historical dataset of such indicators. In around **one-third** of the models, issues with the **quantification** of the downturn adjustment were identified (including cases where no downturn adjustment was applied).
Margin of conservatism	Most of the findings on this topic concerned the **inappropriate calculation** of the level of conservatism and the **absence of a framework** for the identification of deficiencies and quantification of the respective MoC
ELBE and LGD in-default	In around **20% of cases**, findings were raised concerning the **lack of dedicated ELBE or LGD in-default models**, while in around **one-third** of cases, findings were raised owing to **weaknesses in the modelling approach**
Framework the for review of estimates	A **majority** of findings in this sub-topic related to **a lack of relevant analysis** (affecting almost half of the models); for example, the institution not performing the minimum scope of tests expected or not having an appropriate set of metrics to test model performance.

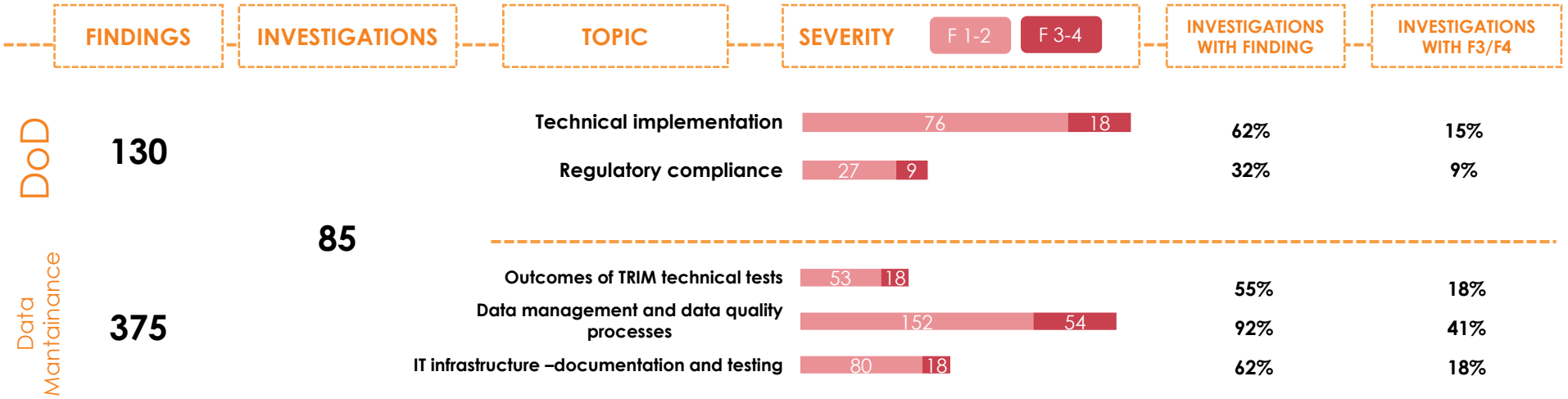
Models for Retail and SME Portfolios 24/24

Just in Time

DQ-Related Findings

445 Data quality findings

- Shortcomings around **data management and data quality** processes were identified in almost all on-site investigations (**92% of investigations**), and were **often of high severity 41%**
- Within data management and data quality processes, the most prominent shortcomings across the different on-site investigations related to the **current data quality system, procedures and processes (76%)**



04

Models for Low Default Portfolios

Findings

PD Low-Default Portfolios - Model Features

PD Low-Default Portfolios – Findings

LGD Low-Default Portfolios - Model Features

LGD Low-Default Portfolios – Findings

DQ-Related Findings

Models for Low Default Portfolios 1/25

Just in Time

Findings (1/2)

In total, there were around **1,700 findings** raised in relation to models for LDPs based on the 75 assessment reports that were considered for the horizontal analysis

PD

- Many of the findings related to PD concern shortcomings in the **rating assignment process** and the improper use of **overrides**
- Many findings were raised in relation to the framework for **the review of estimates**, including cases where relevant analyses were missing or not prescribed

LGD

- A number of findings were raised in relation to the **calculation of realised LGD**, including cases where recovery flows were not appropriately allocated
- Just under **half** of the investigations identified shortcomings in relation to the **representativeness of the calibration sample**

Data Quality

- There were **more than 300 data quality findings** from 75 on-site investigations of models for LDPs
- The most widespread issues related to **data management and data quality processes**
- Almost **three-quarters** of on-site investigations presented **issues** in the **IT infrastructure** supporting the models and the **outcomes of the TRIM technical tests**

Models for Low Default Portfolios 2/25

Findings (2/2)

	FINDINGS	INVESTIGATIONS	TOPIC	SEVERITY (F 1-2 / F 3-4)	INVESTIGATIONS WITH FINDING	INVESTIGATIONS WITH F3/F4
PD	1006	74	Other topics	53 / 23	53%	28%
			Documentation	64 / 21	65%	23%
			Framework for review of estimates	89 / 56	72%	45%
			Margin of conservativism	31 / 37	78%	46%
			Calibration methodology	50 / 51	88%	50%
			Long-run average default rate	40 / 24	61%	24%
			Calculation one year default rate	39 / 17	59%	22%
			Grade assignment dynamics	36 / 3	46%	4%
			Rating assignment process	156 / 47	85%	46%
			Risk differentiation	116 / 53	88%	51%
LGD	480	49	Other topics	4 / 17	27%	22%
			Documentation	7 / 7	22%	12%
			Framework for review of estimates	22 / 28	59%	39%
			ELBE and LGD in Default	24 / 17	71%	33%
			Margin of conservativism	15 / 15	57%	31%
			Downturn adjustment	13 / 22	69%	45%
			Long-run average LGD	24 / 44	84%	65%
			Treatment of incomplete recovery…	21 / 10	51%	20%
			RDS completeness	10 / 15	43%	24%
			Risk differentiation	36 / 24	71%	41%
			Calculation of realised LGD	68 / 37	80%	51%

Models for Low Default Portfolios 3/25

PD Low-Default Portfolios - Model Features (1/9)

Summary

- Just over **90%** of models used a **discrete scale for PD estimation** (rather than a continuous direct estimate of PD)
- **Various approaches to risk differentiation** were observed, including **shadow rating** modelling to address the problem of data scarcity
- In over **90%** of cases institutions used **third party ratings** in the rating assignment process
- The horizontal analysis of **overrides** indicated a number of areas for improvement
- A **shortage of internal data** was one of the reasons identified for using **external information** for the calculation of the long-run average default rate
- In around **23%** of cases institutions applied an **explicit MoC** to their PD estimates at grade or portfolio/calibration level, while in around **57% of cases** institutions stated that an **MoC** was **implicitly considered** through conservative assumptions. For the remaining cases, no MoC was considered.

Models for Low Default Portfolios 4/25

Just in Time

PD Low-Default Portfolios - Model Features (2/9)

General Modelling Approaches to the PD Modelling

7,5% Continuous grade scale

- The **PD estimates** result from a **transformation function** that converts the score into a direct estimate of PD
- This approach may include an additional calibration step in order to achieve a calibration target, which potentially leads to adjustments of PDs

92,5% Discrete grade scale

- In approximately **36%** of cases a **model-specific rating scale** was used (where the PD estimates are specific to the rating system)
- In **56%** a **master scale** approach was used

Models for Low Default Portfolios 5/25

PD Low-Default Portfolios - Model Features (3/9)

Risk Differentiation

Approaches

- In **27%** of cases institutions had developed a risk differentiation function that considered the **default event as the target variable**.
- A **shadow rating** modelling approach was used in **26% of cases**.
- In **23%** of cases an **internal rating** (e.g. computed by means of expert judgement) was used as the **target variable** of the risk differentiation function.
- For the **remaining** cases, there were a number of different approaches, the **most common** of which was to use risk differentiation functions based entirely on **expert judgement** (**16%** of cases).

Selection of risk drivers

The horizontal analysis showed that **qualitative and financial information** was commonly considered in the models for the three exposure classes considered in LDPs (typically in **over 80% of cases**), while **geographical information** and **external risk assessments** were **less commonly used**

Homogeneity and heterogeneity analyses

In the context of LDPs it was observed that institutions had **not performed homogeneity/heterogeneity analyses**

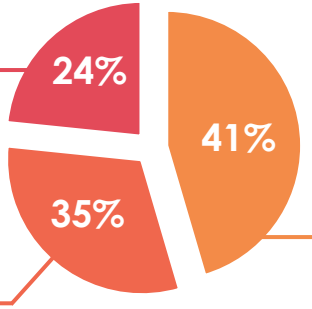
Models for Low Default Portfolios 6/25

PD Low-Default Portfolios - Model Features (4/9)

Grade Assignment Dynamics

No time horizon was specified

A time horizon **greater than one year** was used



Institutions adopted a time horizon of **one year**

39%

Institutions **validated the adequacy of the PD quantification** method by explicitly considering the underlying grade assignment dynamics

Only in a very small number of cases could a specific assessment of the impacts of the grade assignment dynamics on the actual dynamics and volatility of capital requirements be observed

Models for Low Default Portfolios 7/25

Just in Time

PD Low-Default Portfolios - Model Features (5/9)

Use of Ratings of Third Parties

In **92%** of cases institutions used the **ratings of third parties** in the rating assignment process.
Of these:

- **46%** — Used a **bottom-up** approach where a standalone rating of the obligor is determined first before the effect of the third-party's rating is introduced
- **9%** — Employed a **top-down** approach where the strength of the influence/support of the third party is considered at the beginning of the rating assignment process
- **45%** — Used a **mixed approach** where the evaluation of the strength of the relationship between the obligor and the third party can lead to the rating of the third party to being directly assigned to the obligor, without calculating the initial rating

Models for Low Default Portfolios 8/25

Just in Time

PD Low-Default Portfolios - Model Features (6/9)

Treatment of Joint Credit Obligations

The horizontal analysis highlighted **diverging practices** for situations where an institution has a **single exposure to several entities**

I. In particular, there was a **lack of clarity** about the **difference between** the treatment of **joint obligors** and the treatment of **groups of connected clients**

II. In addition, **deficiencies** were identified in the **treatment of joint obligors** in the calculation of realised **default rates**

This resulted in the **development of a common ECB understanding on this topic**

Models for Low Default Portfolios 9/25

Just in Time

PD Low-Default Portfolios - Model Features (7/9)

Overrides Analysis

97% Overrides of model outputs were applied at the **final step** of the rating assignment process to derive the final rating

- Additionally, **overrides of an intermediate rating** (e.g. financial score) were also observed in **5%** of the methodologies analysed

35% Institutions **lack** in a dedicated **framework for monitoring overrides**

- **53%** of institutions **did not define a maximum acceptable rate of overrides**, and a similar proportion had **not defined a limited scale of non-conservative overrides**
- **32%** of institutions **did not monitor the performance** of the model before and after overrides

Models for Low Default Portfolios 10/25

PD Low-Default Portfolios - Model Features (8/9)

Risk Quantification

Approaches used for risk quantification

- **31%**: **only internal data** were used for risk quantification purposes
- **29%**: **only external data** were used
- **16%**: a **combination of internal and external data** were used
- **10%**: **pooled data** were used
- **14%**: an expert-based approach was applied (without observing default rates).

In the instances where external or pooled data were used for risk quantification:

- In **57%** of cases there was either **no analysis of the representativeness** of external/pooled data **or the analyses** conducted **were incomplete or insufficient** to draw any reliable conclusions on the representativeness of the data used.

In addition, **only 50%** of institutions performed **an assessment of the consistency of the definition of default** applied to the external or pooled data with their internal definition of default.

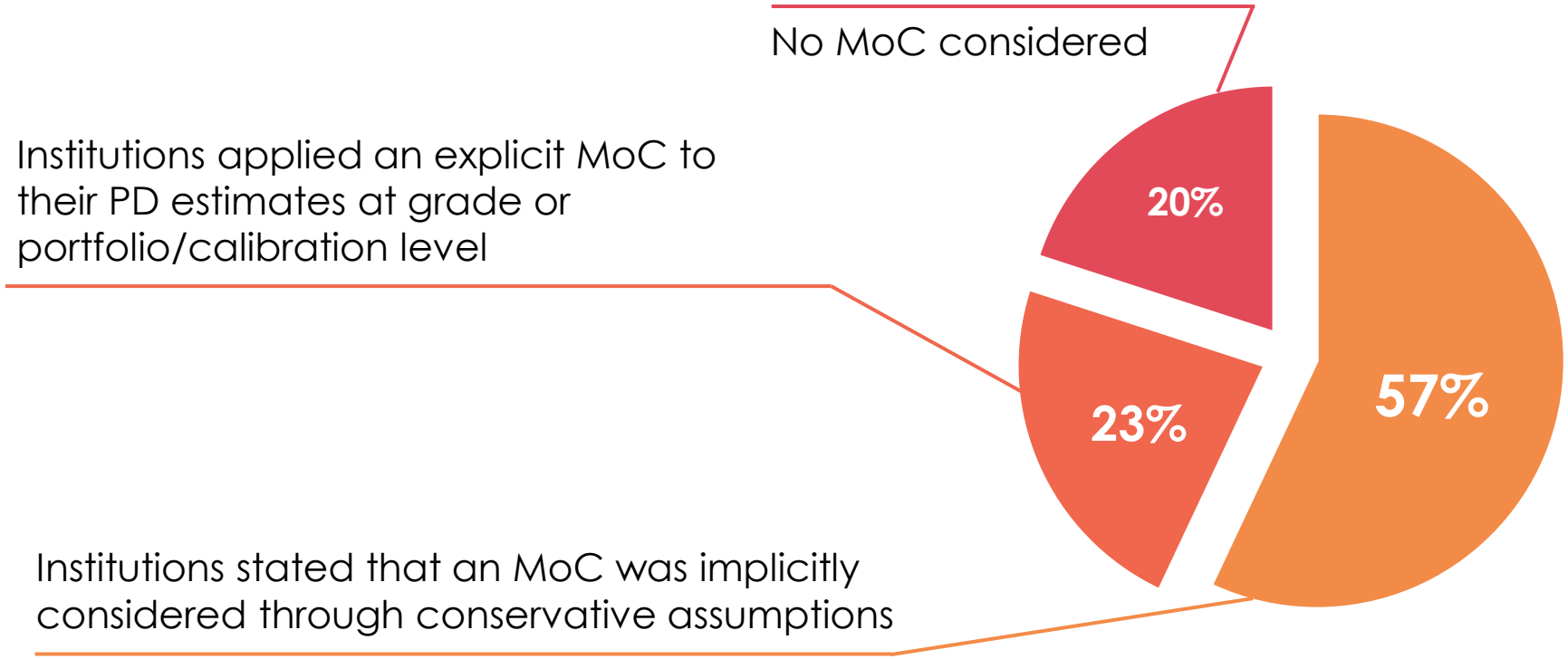
Period used for the calculation of the long-run average default rate

- Significant number of institutions were able to use **data from the mid-2000s**, likely corresponding to the beginning of data storage under the Basel II standards.
- For the models related to portfolios with **very few defaults** (typically exposures to institutions or very large corporates), **the most common** practice was to **use all available external data at the time of the calibration without conducting any further analysis**.

Models for Low Default Portfolios 11/25

PD Low-Default Portfolios - Model Features (9/9)

Margin of Conservatism



Where an explicit MoC was considered, in 82% of cases it was applied to account for data and methodological deficiencies, in 24% of cases to account for representativeness uncertainty and in 82% of cases to account for general estimation error

Models for Low Default Portfolios 12/25

Just in Time

PD Low-Default Portfolios - Findings (1/2)

Rating assignment process

Findings were raised concerning **flaws in the rating assignment process** and **inconsistent application** of the assignment process. Moreover, a significant number of findings were raised in relation to the **improper use of overrides**, including missing or inappropriate monitoring, and to **flaws in the treatment of ratings of third parties and the use of human judgement**

Risk differentiation

A significant number of findings were raised in relation to the **selection of risk drivers**. In some cases modelling assumptions were not properly justified or there were errors in the implementation of the methodology. Additionally, multiple findings were raised in relation to the **homogeneity/heterogeneity of obligors or exposures**

Grade assignment dynamics

Findings were mainly related to the **lack of analysis of the grade assignment dynamics**, and its implications in terms of risk quantification and parameter estimation

Calculation of one-year default rate

Findings were raised in relation to **the incorrect calculation of one-year default rates**, including, for example, **incorrect definition of the denominator**, **unjustified exclusions** from the one-year default rate calculation and cases where there was an **inappropriate treatment of multiple defaults**.

Models for Low Default Portfolios 13/25

Just in Time

PD Low-Default Portfolios - Findings (2/2)

Long-run average default rate and calibration methodology

Shortcomings were observed in relation to the **calculation of the long-run average default rate** and in relation to the **appropriateness of the period** covering the likely range of variability of default rates. In relation to the **calibration methodology**, the most frequent type of finding related to calibration assumptions that were not properly justified and deficiencies in the calibration analyses. In both cases **a number of high-severity findings were raised**. Moreover, there was a **broad lack of compliance with representativeness requirements**, particularly in relation to the use of external data for PD quantification purposes.

Margin of conservatism

A number of findings were raised in relation to **the lack of robust processes for identifying deficiencies** that should be accounted for in the MoC or the **lack of processes to quantify the impact** of such deficiencies. More generally, several findings were raised concerning the **absence of an appropriate MoC framework**.

Framework for the review of estimates

- The most common areas with findings included:
  - Cases where the **framework** for the review of estimates **did not prescribe** any **predictive ability/back-testing/homogeneity/heterogeneity analysis**, or were missing other relevant analyses, for example in relation to data scarcity;
  - Cases where **a regular cycle for the full** review of the rating systems had **not** been **defined or implemented**, or cases where **all the relevant tests** had **not** been **performed** within this cycle;
  - **Lack of thresholds or targets** intended to trigger appropriate remedial actions, and the framework not including processes for remediation plans, timelines and responsibilities in the event of adverse validation results

Models for Low Default Portfolios 14/25

LGD Low-Default Portfolios - Model Features (1/9)

Summary

- **74%** of the LGD models used a **component-based approach**, typically based on the **split** of the exposure **between secured and unsecured**
- Around **40%** of models used a **discrete scale for LGD estimation**
- A **wide variety of practices** were observed in relation to the **discounting of cash flows**
- Around **30%** of models did **not** have a **treatment for incomplete recovery processes**
- Approximately **70%** of LGD models had an **explicitly defined downturn period** (which typically included the year 2008 or 2009)
- In most cases **(60%), both ELBE and LGD in-default were being assigned to defaulted exposures**
- In **35%** of cases the approach used by the institution to account for uncertainty of the estimation was based on **conservative assumptions**, while in **43%** of cases an **MoC was applied explicitly** at grade or portfolio/calibration level

Models for Low Default Portfolios 15/25

LGD Low-Default Portfolios - Model Features (2/9)

General Modelling Approaches to the LGD Modelling

Continuous versus discrete approaches

- **62%**: the LGD estimates result from a **continuous scale**, either estimated directly or calculated as the aggregation of several components (**direct, continuous LGD**).
- **38%**: a **discrete scale** was used. Of which
  - **18%**: the **aggregation of several components** resulted in a discrete scale (**LGD direct discrete**),
  - **20%:** the LGD estimates resulted from the long-run average calculated at grade level (**grade-based estimation**).

Component-based models

With regard to the structure of the LGD models, **74%** of the models estimated LGD using a **component-based approach**. Of these, the majority (**70%**) used an approach based on the **split of the exposure between secured and unsecured components**.

Models for Low Default Portfolios 16/25

LGD Low-Default Portfolios - Model Features (3/9)

Calculation of Realised LGD

Recovery flows

- **65%**: institutions were able to **directly identify cash flows without a calculation/estimation step**
- **13%**: an implicit calculation was used where recovery flows were based on the **difference between exposure values at two dates**
- **22%:** employed a **mixed approach** where, for example, the recovery cash flows were directly identifiable for one component but were computed based on the difference in EAD for other components

Discounting of cash flows

A wide variety of practices were observed in the discounting of cash flows. **Only 4%** of the models considered a discount rate **in line with EBA Guidelines** on PD and LGD estimation. **Other** models used **different rate types** (e.g. contractual rate or fixed rate), other **proxies** (e.g. local cost of equity in the year of default) or featured **no discounting of cash flows**.

Treatment of multiple defaults

- In **45%** of the models there was **no treatment of multiple defaults**
- **Only 32%** applied a **methodology aligned with the EBA Guidelines** on PD and LGD estimation (where the time between defaults is counted from the return to normal of the first default).

Additional drawings

- **Only 26%** of models for which realised LGD was computed for estimation purposes took **additional drawings into account** both in the **numerator** and **denominator** of **realised LGD** and in the **calculation of realised CCF**
- A further **9%** of models included additional drawings both in the numerator and the denominator of realised LGD but **not in realised CCF**

Models for Low Default Portfolios 17/25

LGD Low-Default Portfolios - Model Features (4/9)

Risk Differentiation

>60% LGD models used **obligor characteristics**, including geography or industry sector

- **Collateral type** was commonly used as a risk driver, both in the assignment to grades or pools and as a sub-component within existing secured components, when the type of collateral determined the haircut value to be applied.
- **Other types of information**, such as internal behavioural information or financial information, were **less frequently used**

Models for Low Default Portfolios 18/25

LGD Low-Default Portfolios - Model Features (5/9)

Treatment of Incomplete Recovery Processes

Time-to-workout

- A time-to-workout was **defined only in around one-third** of the models for which an LRA for estimation purposes was calculated
- **26%** of models calculated it **based on analysis of cumulative recovery rates**
- The remaining **9%** defined it using an **expert-based approach**
- Where a time-to-workout had been defined, the most common period used was **between four and ten years**.

Treatment of incomplete recoveries

- Around **30%** of models **did not have a treatment for incomplete recovery processes**.
- **13%** of the corporate models reviewed exhibited a treatment of incompletes that **did not include the estimation of future recoveries**
- Regarding models for the **institutions** exposure class, it was observed that **no institution inferred future cash flows based on observed recoveries**

Models for Low Default Portfolios 19/25

LGD Low-Default Portfolios - Model Features (6/9)

Long-Run Average LGD

Level of calculation

- Overall, in **54%** of the models the **LRA LGD was not calculated** for calibration purposes. This included cases where an LRA LGD was calculated only for the review of estimates.
- For around **20% of models**, the LRA LGD was **calculated only at the level of each component**, without aggregation to facility level LGD estimates.
- In general, in **21%** of models related to exposures to **institutions**, a long-run average was calculated at either portfolio or grade level, compared with **29%** for **corporate models**

Observation period used for the LRA LGD

Regarding the **time period used** for the calculation of the LRA LGD, the main pattern observed was that **2008-09 was included in all but one model**. Differences could, however, be observed per exposure class, as **models for corporates tended to consider shorter time frames than models for institutions**. This appeared to be motivated by the **lower number of internal defaults for institutions portfolios**, leading to a greater reliance on data from external providers, the datasets of which often covered the early 1990s as well as more recent years.

Weighting approach

It was observed that in a large majority of cases (**82%**), institutions used the **default weighted average in the LRA LGD computation**, while the **remaining** institutions used an **inappropriate weighting approach**

Models for Low Default Portfolios 20/25

LGD Low-Default Portfolios - Model Features (7/9)

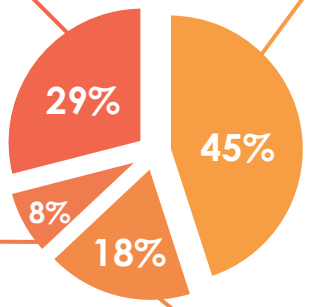
Downturn Adjustments

70% LGD models defined an explicit downturn period

- Slightly over 80% included the years 2008 or 2009 within this period. In terms of identification of the downturn period, GDP was the most commonly considered macroeconomic factor

No downturn adjustment

The downturn adjustment was based on stressed values



Institution identified a downturn period and used observed values in order to derive the downturn adjustment

The downturn adjustment was based on a statistical approach

Models for Low Default Portfolios 21/25

Just in Time

LGD Low-Default Portfolios - Model Features (8/9)

ELBE and LGD in-Default

13% Only **ELBE** was being calculated

- In **29%** of cases there was a **dedicated model** in place
- In **44%** of cases ELBE was set as **equal to the specific credit risk adjustments** for the exposure
- Of the cases where a **dedicated model** was in place **62%** based their expected loss estimation on the **LGD performing model**
- Of the cases with a **standalone model**, the majority used **empirical evidence based on internal data in the ELBE estimation**

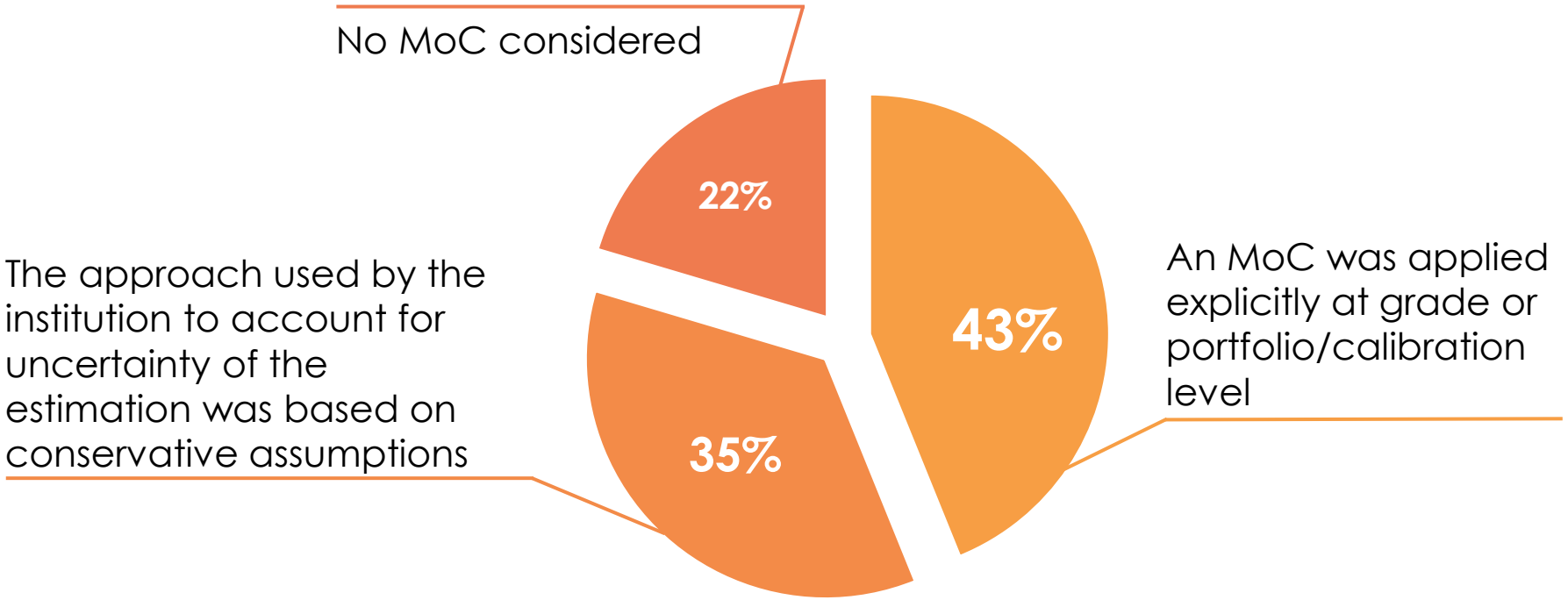
5% Only an **LGD in-default** was being calculated

- There was a **dedicated model** in place in only **20% of cases**
- A more common approach (**44%** of cases) was to **rely on a pre-existing ELBE**

Models for Low Default Portfolios 22/25

LGD Low-Default Portfolios - Model Features (9/9)

Margin of Conservatism



Of the cases where an explicit MoC was considered, in 71% a MoC was applied to account for data and methodological deficiencies, in 14% a MoC accounted for representativeness uncertainty and in 81% of cases it accounted for the general estimation error

Models for Low Default Portfolios 23/25

LGD Low-Default Portfolios - Findings (1/2)

Calculation of realised LGD

Findings were raised concerning **flaws in the rating assignment process** and **inconsistent application of the assignment process**. Moreover, a significant number of findings were raised in relation to the improper use of overrides, including Findings mainly related to:

- **Deficiencies in the treatment of recovery flows and costs**, such as the institution not developing an appropriate methodology for the allocation of recovery flows to individual defaulted exposures, or cases where the realised LGD was not based on economic loss or did not include material discounting effects;
- **Discount rates not being applied, or an inappropriate rate being used**;
- **Inappropriate treatment of multiple defaults**

Risk differentiation

Just over **half** of the investigations identified deficiencies with regard to **the risk drivers for LGD models**, such as missing or irrelevant risk drivers. Also, there were often shortcomings related to improper justification of modelling assumptions

Reference dataset completeness

Findings were raised with regard to **data exclusions** not being adequately justified and cases where the institution did not include in the reference dataset all the information needed to estimate the LGD.

Treatment of incomplete recovery processes

In **20% of investigations**, findings were raised in relation to the **non-consideration of incomplete recovery processes in the LRA calculation**. In around **60%** of investigations, a finding was raised in relation to the **estimation of future recoveries**, for example where the institution did not analyze the recovery patterns observed on both closed and incomplete recovery processes. Findings were also raised when institutions did not clearly specify a **time-to-workout** concept.

Models for Low Default Portfolios 24/25

Just in Time

LGD Low-Default Portfolios - Findings (2/2)

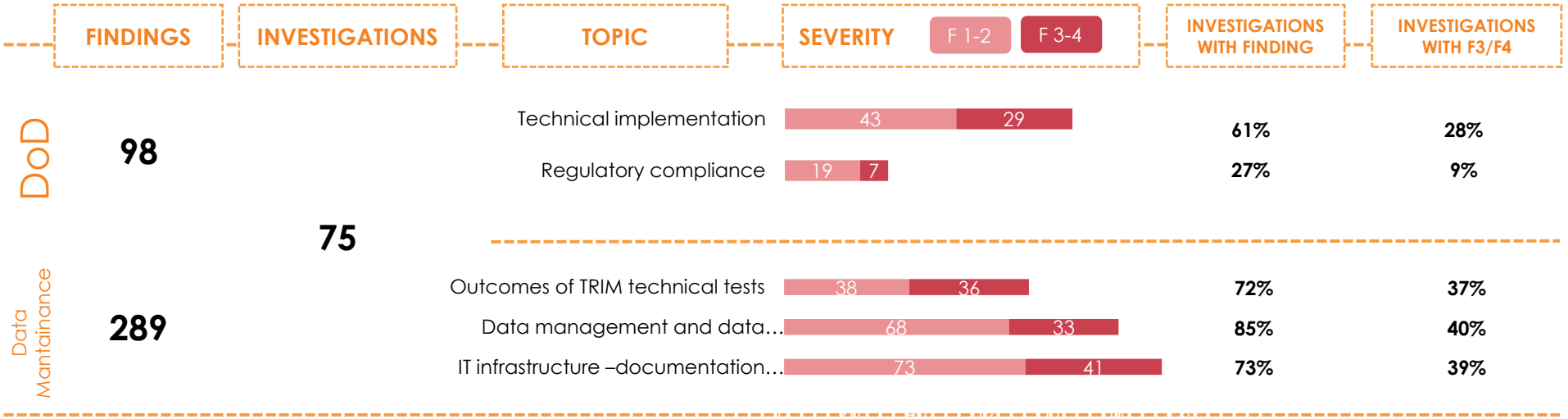
Long-run average LGD	Just under **half of the investigations** identified shortcomings in relation to **representativeness**, where the calibration sample was not representative of the application portfolio or the institution's processes did not specify any such representativeness analysis. Also **common** were issues relating to **predictive ability** and cases where the **LGD estimation was not based on realised LGD**
Downturn LGD	Findings were raised **across a number of areas**, including weaknesses in the **quantification** of the downturn impact, the **identification** of the downturn period and **insufficient consideration of macroeconomic and credit indicators**. Additionally, in some cases institutions did not characterise an economic downturn adjustment in terms of observed losses.
Margin of conservatism	Most of the findings on this topic concerned the **lack of a MoC framework** or the **absence of robust processes** for identifying and quantifying deficiencies which should be accounted for in the MoC
ELBE and LGD in-default	Issues included **institutions not having ELBE or LGD in-default estimates**, a **lack of justification** for assumptions in the estimation, and institutions **not** having **clear documentation** on the breakdown of ELBE and LGD in-default or the breakdown of the unexpected loss add-on component, when used.
Framework the for review of estimates	The areas with the **most findings** were similar to those noted above for PD, namely the framework for the review of estimates not prescribing any predictive ability/back-testing/homogeneity/heterogeneity analyses, or where a regular cycle for full review of the rating systems was not defined or implemented

Models for Low Default Portfolios 25/25

DQ-Related Findings

321 Data quality findings

- Shortcomings around **data management and data quality processes** were the most widespread issues, being raised in **85%** of on-site investigations and representing 101 shortcomings (31% of total shortcomings)
- Within data management and data quality processes, the most prominent shortcomings across the investigations related to **the control framework** (**77%** of investigations presented shortcomings in this area)
- Within **IT infrastructure**, the most prominent shortcomings across the investigations related to IT systems and databases, transformation and aggregation processes



05

Supervisory Follow-Up

Follow up in a Nutshell

Follow up for Credit Risk

Supervisory Follow-Up 1/3

Just in Time

Follow up in a Nutshell

The TRIM project reduces non-risk-based RWA variability by requiring institutions to return to compliance in the case of findings related to binding regulation, and by recommending that institutions change their approach in the case of non-alignment with non-binding or not yet binding requirements.
The supervisory decisions issued as a follow-up to TRIM investigations contain **limitations**, **obligations** or **recommendations** depending on the basis for the finding.
Obligations can be further categorised as follows:

I. To make a change

II. To make a change, unless further evidence can be provided which clarifies that no further action is required

III. To provide further analysis or justification, or to better document or report on an aspect of the institution's internal models

TRIM has contributed to a **reduction of unwarranted RWA variability** and to an **increase in the comparability** of model outcomes. These objectives have been achieved through:

- The imposition of supervisory measures during the TRIM follow-up which should be followed by institutions
- The harmonisation of supervisory practices adopted in the context of TRIM investigations

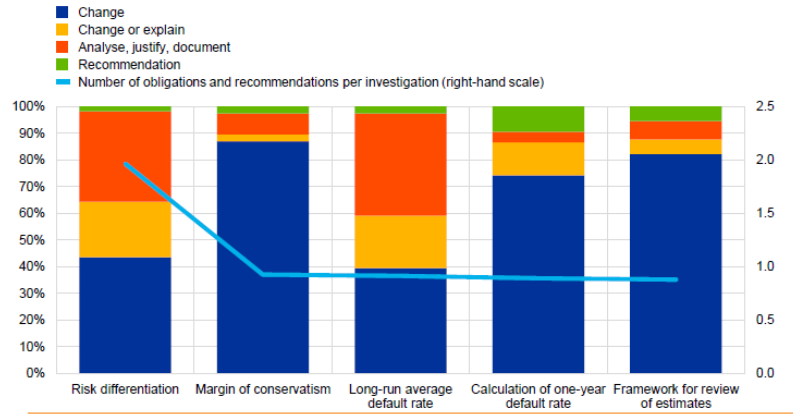
Supervisory Follow-Up 2/3

Follow up for Credit Risk 1/2

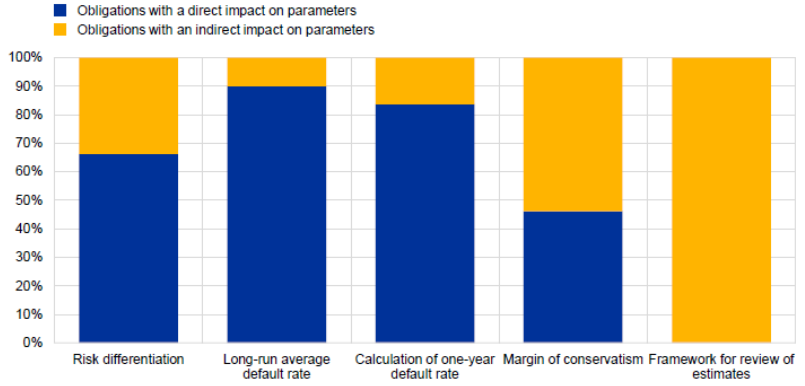
Retail and SME

Supervisory follow-up by type

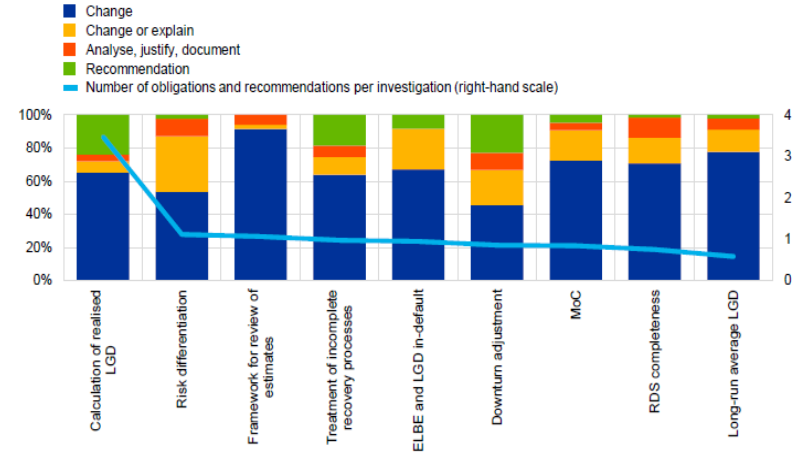
PD

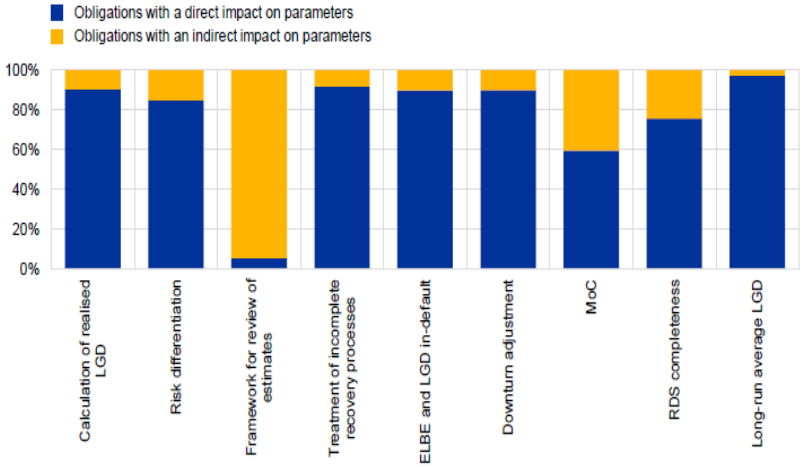


Impact of "change" obligations on risk parameters



LGD





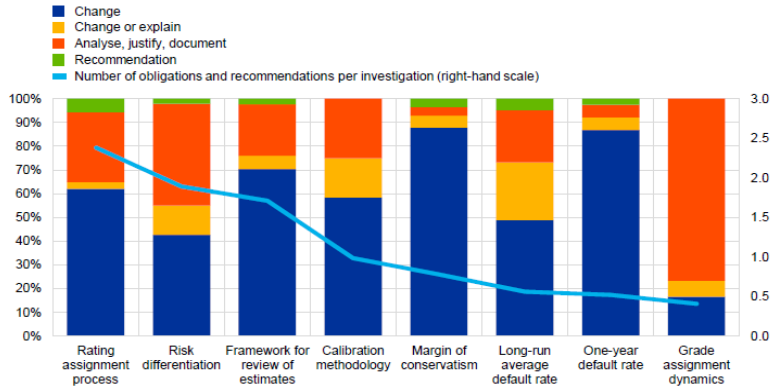
Supervisory Follow-Up 3/3

Follow up for Credit Risk 2/2

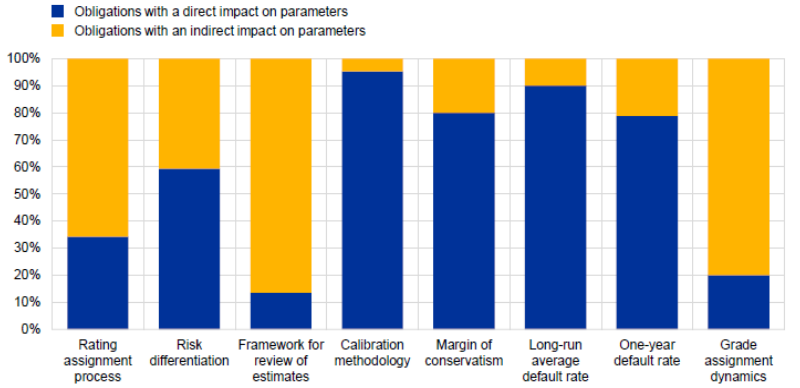
Low Default Portfolio

Supervisory follow-up by type

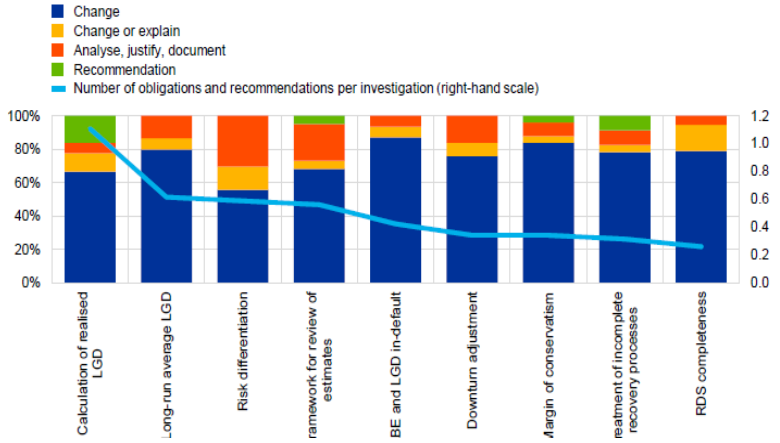
PD

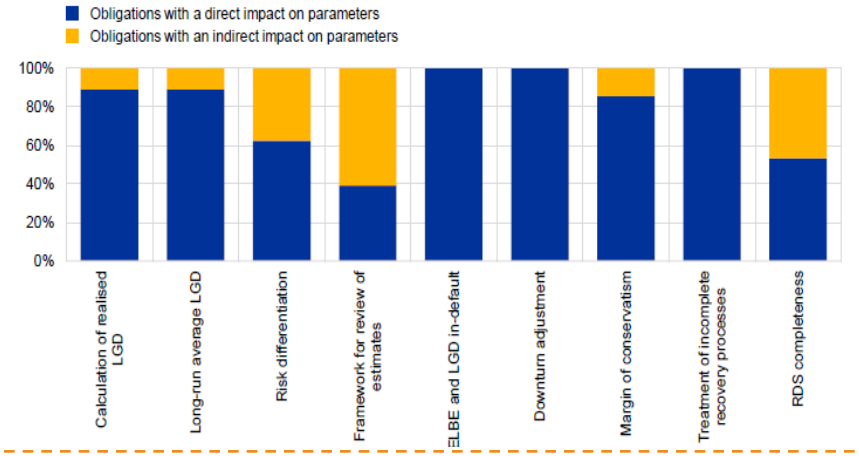


Impact of "change" obligations on risk parameters



LGD





06

Conclusions

Main Achievements

Conclusions

Conclusions 1/2

Main Achievements

The TRIM project has fully achieved its main objectives:

I To reduce non-risk-based RWA variability within the SSM

II To support future supervision of internal models within the SSM

- The **ECB guide** seeks to ensure that supervisory requirements are implemented in a harmonised and consistent manner
- **Binding supervisory measures** were imposed requiring the remediation of deficiencies
- TRIM **increased transparency** about models in use and contributed to the consistent use of supervisory requirements and assessments
- TRIM **restored the credibility** of internal models within the SSM

Conclusions 2/2

Conclusions

- Thanks to the detailed supervisory follow-up of TRIM, **existing internal models** can be considered **suitable for the calculation of Pillar 1 own funds requirements**

- Numerous deviations from regulatory requirements have been addressed through **legally binding supervisory measures** (limitations or obligations)

- Institutions need to continue to invest in the **maintenance and development** of internal models to maintain the high quality of models achieved through TRIM. In particular, in accordance with the supervisory standards applied in TRIM, the ECB expects the **independent internal validation function** to be able to ensure an **ongoing internal challenge of the performance of internal models**, and in some cases **its oversight role should be further strengthened**

- These efforts and investments are expected to support institutions in deciding on their **model strategies**. In particular, they may lead to **simplification in current model landscapes** – partially driven by the implementation of upcoming regulatory developments – or to corresponding **improvements** in some **less material or less critical models**.

- Institutions' efforts need to be complemented by continued intrusive **supervisory scrutiny**, including:
  - An adequate and proportionate multifaceted approach to **ongoing model monitoring**;
  - **Strict assessment** of **model changes or initial model approvals** in line with the supervisory methodology developed in TRIM

Sources and Literature

[01] **European Central Bank.** *ECB guide to internal Models*. European Central Bank, October 2019.

[02] **European Central Bank.** *Targeted Review of Internal Models - Project report*. European Central Bank, April 2021.

Company Profile

Iason is an international firm that consults Financial Institutions on Risk Management. Iason integrates deep industry knowledge with specialised expertise in Market, Liquidity, Funding, Credit and Counterparty Risk, in Organisational Set-Up and in Strategic Planning.

Marco Carminati
Manager

This document was prepared in collaboration with Mario Signoretti, who at the time was working for Iason Consulting.

www.iasonltd.com