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Tecnical note on the
Revised guide to internal models (EGIM)

ECB'S updates to the regulatory framework

1 Executive summary

On 28 July 2025, the ECB released the updated Guide to Internal Models, reflecting changes to the regulatory framework and drawing on the extensive experience the ECB has accumulated over the years supervising internal models

Background

- **February 2017. First version** of the Guide to internal models (TRIM guide). With this guide the ECB aimed to ensure consistent application of high supervisory standards for supervised institutions and promote a consistent understanding and application of rules related to the use of internal models**.**
- **November 2018**. Revised general topics chapter.
- **June 2019.** Revised risk-type specific chapters.
- **February 2024.** Revised ECB guide to internal models (general and risk specific chapters).
- **July 2025**. Inclusion of reviews to reflect changes in regulatory requirements and to address experiences in using the guide.

Next steps

- The new version of the Guide will be used as a reference for SREP assessments starting in **2025**.

Main changes

Overarching principles

- **Stronger core principles** for **internal model governance**, requiring consistent application, robust documentation, enhanced data governance, and clearer roles across all group entities.
- Expanding into **new subjects (climate-related and environmental risks, and machine learning),** while reinforcing implementation timelines, audit independence, and accountability in outsourcing and consolidation contexts.

Credit risk

- **CRR3-aligned** on **roll-out** and **PPU**: no coverage ratio, clear IRB/SA criteria, senior mgmt. app.
- **Validation/Audit** per **EBA IRB handbook**: 3 year cycle, CRCU independence, broader scope.
- **Senior mgmt**. to approve, oversee and review results/ changes. **Harmonised default definition** and tighter PD/LGD rules.
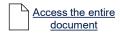
Market risk

- Split into **two chapters** covering market risk models under CRR2 (unmodified) and CRR3.
- Reflects the **two-stage delay** in implementing Basel's FRTB rules in the EU: initially to 2026, and now likely to be further delayed to **2027**, pending EU scrutiny.
- Provides **clarity** on **supervisory expectations** for both frameworks during the **transition period**.

Counterparty credit risk

- **Stricter requirements** on scope, MPoR, collateral, initial margin, and risk factor granularity.
- **Enhanced guidance** on **calibration**, **EEPE**, **alpha**, and **unmodelled risks**, with stronger expectations for use test, validation, and governance integration.

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The ECB strengthens core principles for internal model governance, requiring consistent application, robust documentation, enhanced data governance, and clearer roles across all group entities

1	**Overarching principles**	2	Credit Risk	3	Market Risk	4	Counterparty Credit Risk

Guidelines at consolidated and subsidiary levels

- Reinforced expectation for **group-wide consistency** in internal model principles, whether implemented through centralised guidance or harmonised local policies.
- Institutions are now explicitly required to carry out **gap analyses and monitoring procedures** to ensure proper local implementation and alignment with group expectations.
- **Subsidiaries must report material deviations** to the parent entity, enhancing the group's supervisory oversight and accountability.

Documentation of internal models

- Institutions must ensure that model documentation is **complete, regularly updated, and independently understandable**, supporting effective oversight and external review.
- **Controlled model register** must be created, containing essential model attributes, access controls, and versioning mechanisms. This register must be actively governed, forming part of the broader model lifecycle management and risk control framework.

Data governance

- Explicit alignment with external standards such as **DORA and BCBS 239**, reflecting a more formalised approach to data governance.
- **Structured controls required over all model inputs**, including data based on human-judgement, with clear traceability and documentation.
- Enhanced expectations cover the full data lifecycle, including **quality assurance, security, and change control** mechanisms.

Model risk management framework

- Expectation of a formalised **Model Risk Management (MRM) policy,** defining governance roles, model categorisation, and escalation criteria.
- There is an explicit requirement to ensure **linkage between the model register and group-wide oversight**, fostering integration across functions and levels.
- Institutions are expected to **embed model risk management more deeply into their enterprise risk frameworks**, beyond the scope of internal models.

Management body and senior management

- Institutions must define and document the **responsibilities, mandates, and reporting structures** of the management body and senior leadership concerning internal models.
- The guide encourages establishing oversight committees or equivalent structures to ensure independent governance and effective challenge.
- Such arrangements should be calibrated according to institution size and complexity, reinforcing the principle of proportionality.

General principles for internal validation

- The updated guide outlines more specific **organisational options to guarantee the independence of the internal validation function**, both functionally and hierarchically.
- It introduces best practices and audit expectations, including periodic reviews, sampling, and structured documentation of validation decisions.
- Validation processes are now explicitly linked to regulatory expectations and proportionality, promoting a risk-based approach.

2 Overarching principles (2/3)
Specific framework for machine learning

The ECB sets out, for the first time, comprehensive supervisory expectations for the use of machine learning (ML) in internal models, with a focus on explainability, justified complexity, and robust governance

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Making use of ML techniques

- ML techniques are defined as **highly complex, non-linear models with many parameters and large data needs**.
- The ECB applies a **proportionality principle** based on model complexity and role (e.g. modelling vs data preparation).
- ML is a **complexity and materiality driver**, implying higher validation and management expectations

Use of ML-based internal models

- Institutions must clearly define how ML models are used in decisions (e.g. risk, credit, capital) and **ensure outputs are explainable** and properly integrated—or justified when not used.
- When applying **human judgement** (e.g. overrides), they must **limit, monitor and justify** its use, especially for ML models with many inputs, ensuring proper **documentation and understanding**.

Governance

- ML-related risks must be reflected in model risk governance, including **validation**, **change management, and staff expertise**.
- The three lines of defence must have sufficient ML **knowledge**, including senior management, model developers and users.

Internal Validation

- Internal validation must **challenge**:
  - Whether model **complexity** is justified.
  - Stability and robustness of **outcomes**, hyperparameter **choices**, and **training randomness**.
- Validation must test **performance** on out-of-sample and out-of-time data.
- Institutions must use explainability techniques to detect underperformance, instability, and deviation from realised values.
- **Explainability tools** themselves must be assessed at least annually.

Internal Audit

- ML-based models generally pose higher model risk, justifying **increased audit intensity and frequency**.
- For complex or dynamic ML models, a **deep dive** should typically be included in the annual audit plan

Data governance and maintenance

- Institutions should define **data standards** aligned with best practices and academic research to assess the **adequacy of data types, amounts, and sources used in ML models**.
- These standards apply to **synthetic** (artificially generated) and **unstructured** data (e.g., texts, social media, videos).
- ML input data must undergo exploratory analysis to understand: Data formats, handling of missing values and sources of bias in the dataset

IT and 3r-party involvement in ML-based internal models

- **IT infrastructure must support ML model needs,** especially for **unstructured data** and **high computational demand**.
- **Best practice**: infrastructure should offer **traceability** (e.g. versioning) to log decisions and allow **replication and auditability** of ML model outputs.
- These IT principles also apply to **market risk** and **counterparty credit risk models**.
- ML models must be **explicitly integrated in outsourcing policies** to manage risks from delegating related tasks.
- The same outsourcing principles apply to **credit valuation adjustment (CVA)** models.

Mathematical methodology of ML-based internal models

- When it comes to **model development**, institutions must **justify the design and parameterisation** of ML models, ensuring they avoid overfitting and use independent samples for testing generalisation. They must assess bias from sample shifts and document all elements (e.g. seeds, data order) to ensure replicability.
- ML-based models should balance **complexity with explainability**. Institutions must ensure risk drivers are well justified, explanations are robust and tailored to each stakeholder, and explainability techniques and tools that are models themselves (XAI tools) are clearly documented, highlighting limitations and ensuring alignment with regulatory expectations.

Overarching principles (3/3)
Climate-related and environmental risks, and other developments

The 2025 Guide expands into new subjects, like climate risk and machine learning, while reinforcing implementation timelines, audit independence, and accountability in outsourcing and consolidation contexts

1	Overarching principles	2	Credit Risk	3	Market Risk	4	Counterparty Credit Risk

General principles on climate-related and environmental risks

- For the first time, institutions are explicitly required to **assess the materiality of climate and environmental risks** in relation to internal models.
- Where relevant, such risks must be incorporated into internal models, especially when these models are used for own funds requirement calculations, ensuring alignment with broader prudential and ESG frameworks.

General principles for internal audit

- The guide strengthens expectations on **audit independence, proportional staffing, and governance**, ensuring that internal audit has sufficient authority and resources to oversee internal model risk.
- New **best practices** are introduced for **tracking audit findings, approving corrective actions, and monitoring resolution progress** through structured tools and reporting to both management and supervisors.

General principles for the implementation of a changed or extended model

- The guide sets **a new standard timeline** of **three months for the implementation of material model changes or extensions** after ECB permission is granted, unless justified and approved otherwise.
- This deadline also applies to reversions from more sophisticated to simpler model approaches, promoting prompt and consistent implementation across institutions.

Third-party involvement

- New provisions reinforce that **outsourcing** of internal model tasks **does not exempt institutions from full responsibility**, including validation, auditability, and in-house knowledge retention.
- The guide also clarifies that **model eligibility assessments may be considered outsourcing** under the Internal Model Approach (IMA), thus subject to the same governance and control requirements.

Internal models in the context of consolidations

- Requirement for a detailed **"return to compliance plan"** in the context of mergers or consolidations, covering model integration and transitional capital calculations.
- A **separate ECB decision is now required for each consolidation case**, specifying the actions, target model architecture, and RWEA treatment timelines to restore full compliance.

The ECB strengthens its approach to IRB internal models, requiring robust governance, data quality, periodic validation, transparency, and ongoing management to ensure regulatory compliance and reliable credit risk measurement in line with EBA guidelines

1 Overarching principles	**2 Credit Risk**	3 Market Risk	4 Counterparty Credit Risk

Roll-out and permanent partial use

- The IRB **approach can be applied by exposure class**, even to specific types if approved by the PPU.
- The **coverage ratio** is eliminated, as it is not aligned with CRR3.
- The IRB **strategy must define objectives and intuitive criteria** for choosing between IRB and SA and include classes planned for the future.
- The **rollout plan requires senior management approval** and periodic updates, including classes to be applied.
- **Exposures under PPU must be monitored and reassessed on an ongoing basis to ensure compliance with CRR.**
- When internal estimates are not used, **Article 176(3) requires comparing LGDs and CCFs with regulatory values**.
- **Reversion to SA or F-IRB is only permitted if duly justified** and not intended to reduce capital requirements.

Model use

- Ratings must be used in **risk, credit, and decisions**, esp. for PD. IRB parameters may be **adjusted if justified**.
- Ratings must specially support **pricing, EWS, recovery, adjustments, delegation**.
- **Consistent use** must be reflected in policies.
- **3 years of prior use** needed before IRB approval.
- **Non-rated/outdated** must be **minimized and tracked**. **Overrides** must be **justified**.

Management of changes to the IRB approach

- Institutions must now apply the IRB approach at exposure class level, with PPU, deployment and roll-back rules assessed per class. Application to subcategories remains possible with supervisory approval.
- The **coverage ratio has been removed**, as it no longer aligns with CRR3 requirements.
- **IRB Strategy**. The guide introduces best practices for deciding between IRB and SA, promoting objective and intuitive criteria at portfolio level. It also encourages reporting of exposure classes where IRB is planned for future use.
- A **new section** clarifies that institutions not using internal estimates must collect and compare realised LGDs and CCFs against regulatory benchmarks, **in line with Article 176(3) CRR**.

Data maintenance for the IRB approach

- **Robust IT systems** must support IRB data; key specs, sources, and audit trails must be documented.
- **Register of rating systems** (past & current) must be kept, updated ≥3 years.
- For **model approval/changes**, systems must be **live-ready** and tested (UAT, COREP, own funds calc).
- **Implementation testing** includes unit, integration, system, and regression tests.
- **Clear roles & governance** over data management; ensure **traceability, accountability, and quality**.
- **Data quality framework** required, with standards (e.g. **completeness, accuracy**), controls, remediation, and regular **senior mgmt reporting**.

Internal Governance

- Material systems need **stricter controls** and **regular reviews**.
- Only **fully remediated models** can be submitted.
- Senior management must **approve and understand** models.
- Must receive **regular performance reports** on material systems.
- **CRCU must be independent** and report to senior management.
- **Annual review of risk estimates** via CRCU and validation.

Internal Validation

- Must cover **all levels** and ensure **consistency** of results.
- Policies and methods must be **documented** and **regularly reviewed**.
- Must include checks: **back-testing, discriminatory power, overrides, stability, data quality**, etc.
- **Full validation required at least every 3 years** for material systems.
- Results must be **reported to senior management** with follow-up.
- **Changes must be notified** to authorities under CRR/DR 529/2014.

Internal Audit

- Rating systems must be audited **annually** (or every 3 years if low-risk).
- Risk assessment must cover **model use, overrides, data**, and **validation independence**.
- **Audit tasks must be documented** and approved by management.
- **Pre-IRB audits** ensure compliance and completeness.
- **Material changes** in models/validation require independent audit.
- **Roles of audit, validation, and control** must be clearly defined.

The ECB clarifies and harmonizes its definition of default for IRB models, ensuring consistent application, clear criteria, and reliable data use

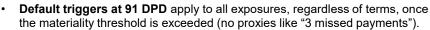| 1 | Overarching principles | 2 | **Credit Risk** | 3 | Market Risk | 4 | Counterparty Credit Risk |

Consistency of the application

- **Default must be applied at obligor level**, grouping all exposures (some implementation flexibility allowed).
- **Exceptions for common obligors** are valid only if impact is immaterial and properly monitored.
- **Thresholds may vary by jurisdiction**; consistency across SSM/non-SSM must be ensured.
- **Joint obligations require consistent default treatment**, especially between retail/non-retail.
- **Obligors ≠ guarantors**: each must be assessed separately to avoid bias in PDs.

Days past due criterion

- **Default triggers at 91 DPD** apply to all exposures, regardless of terms, once the materiality threshold is exceeded (no proxies like "3 missed payments").
- Institutions must **use exact overdue days**, and counters only reset if the past due amounts cease to be material.
- **Thresholds must be in EUR**, with daily FX conversion if needed.
- Institutions must **include fees or linked obligations**,but exclude write-offs unless UTP signs are present.
- **Disputes or moratoriums may pause counting** only if properly justified and aligned with EBA rules.
- **Specific treatments (e.g., public sector, factoring)** must be clearly defined.
- **Additional triggers** (e.g., lower thresholds) are allowed but must be tracked in parallel.

Consistency of external data

- Use of **external/pooled data with different DoD** is allowed only if impact is negligible.
- If not, institutions must apply **adjustments to granular or aggregated data**.
- External data increases **uncertainty**, often needing **Category A MoC**.
- Different DoD in RDS is valid if **justified** and **no adverse impact** shown.

Return to non-defaulted status

- **Reclassification** is allowed only when all obligor/facility conditions are met.
- **A probation period** starts after a material payment (for distressed restructuring).
- Return allowed with minor or **<90-day past due**, if no restructuring and other criteria are met.
- With restructuring, **no past due is** allowed; requiring alignment with **forborne rules**.
- **New default triggers reset probation**, min. **3 months** (1 year if restructured).

Unlikeness to pay criterion

- For **sales or restructurings**, institutions must assess loss materiality using **sale price without adjustments** and **discounted cash flows**.
- **Late fees and penalties must be excluded if forgiven, but** included if part of **new contractual terms**.
- Only **future cash flows** should be considered when estimating the **diminished obligation**.
- **Major write-offs** require reassessment, and **new post-default facilities** a full review.
- Institutions must define **UTP indicators by exposure type** for **timely detection**.

Adjustments to risk estimates in the case of changes of DoD

- **Any change** to DoD (e.g. DPD count, UTP indicators, return criteria) qualifies as a **definition change** under Art. 178 CRR.
- **IRB changes need prior approval**; institutions and timeline alignment across IRB and SA.
- If **risk differentiation weakens**, models must be **reviewed and adjusted**.
- When risk data no longer reflect the new default definition, apply **adjustments to RDS** (either granular or aggregated) or **simulate results** under a new default scope.
- ECB recommends **definition-related MoC** if uncertainty rises.
- **Old or misaligned data** requires **recalibration** or **parallel simulations**.

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3 | Credit risk (3/3)
Estimation of credit risk parameters

The updated Guide requires high-quality data, validated models, and consistent review of credit risk parameters in IRB models—emphasizing transparency, representativeness, and robustness in loss estimates, default probabilities, and conversion factors

Use of data

- Institutions must ensure **high data quality**, with sound internal and external data processes.
- Use of **external/pooled data** requires proof of **representativeness**, avoiding **bias/double-counting**, and applying **MoC** where needed.
- If using **external scores**, they must be **understood, updated, validated**, and not dominate the rating without **internal input**.
- **Pool models** need consistent application across institutions and must include **internal data**; each firm is **fully responsible**.
- **Human judgment** should be limited and controlled; low data = apply **higher MoC**.
- In **mergers**, acquirers must use both banks' data or justify gaps with **adjustments**.

Loss given default

- For retail exposures, **it is no longer permissible to weight historical data** if more recent data are better predictors of loss rates.
- Quantification of LGD Downturn Risk (much more extensive):
  - LGD downturn should not be calibrated at a more aggregated level than the long-term average LGD.
  - A "Reference Value (RV)" calculation is required. Indications of what to do if the reference value > downturn LGD and what justifications could be accepted for deviations.

Review of estimates

- The ECB will use the EBA Supervisory Manual on IRB rating system validation (published in August 2023) as a supplementary basis for interpretation.
- **Full validations are expected at least every three years for material rating systems**.

Probability of default

- **Retail exposures**: Historical data **can't be weighted** if **more recent data** better predict losses (per CRR3 Art. 180(2)(e)).
- **LRoV (Likely Range of Variability)**:
  - Use at least **5 years** of data that reflect the **range of 1Y default rate variability**.
  - Assess **correlation** between default rates and **economic indicators**.
  - If **no correlation**, include **min/max** default rates.
  - If **correlation exists**, define **"bad"/"good" years** and ensure **bad years' share** is not below that in a longer period (e.g. last 20 years).
  - Compare calculated **LRA PD** to a **benchmark PD** (e.g. 2008–2018); this is a **reference**, not a floor.

Conversion factors & Model-related MoC

- Institutions must use IRB-CCFs for retail exposures and, with permission, for non-retail exposures. The scope of IRB-CCF modeling is generally limited to undrawn revolving commitments that would not be subject to a 100% SA-CCF. Adds explicit reference to the **mandatory input floor** (Art. 166(8c)).
- The reference date for calculating the realized CCF should be **12 months prior to the default date**, and risk drivers should be considered at this date.
- **Negative CCFs** should be treated in accordance with Article 182(1)(a) of the CRR.
- For retail exposures, **it is no longer permitted to weight historical data** if more recent data are better predictors of loss rates.

Calculation of maturity for non-retail exposures

- **Maturity (M)** must reflect the **maximum remaining time (in years)** the obligor is allowed to fully meet contractual obligations.
- This includes **principal, interest, and fees**, not just the repayment of drawn amounts.
- **M should be calculated using the facility's expiry date**, not the repayment date of any current drawdown.
- Institutions must **justify and document** any **exemptions** from the **one-year maturity floor**.

Market risk (1/2)
CRR II

Market risk under CRR II remains unchanged in the 2025 update. The expectations on IRC models, including trading book delimitation and default risk assumptions, are maintained for institutions still under the CRR II framework

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Scope of the market risk chapter

- The chapter defines the **perimeter of market risk** by clarifying the types of positions and instruments eligible for the trading book, in line with the CRR framework. Institutions must ensure that the **classification of positions** as trading or banking is **consistently** applied across internal systems and aligned with the business model.
- Supervisors expect a **clear and well-documented approach** to the delineation of scope, with adequate controls and governance in place.

Regulatory back-testing of VaR models

- **Back-testing** must be performed **daily** on both **actual** and **hypothetical P&L**, and institutions must be able to explain and escalate all exceptions.
- The ECB expects a **structured process** for monitoring model performance and investigating back-testing breaches.
- Persistent **underperformance** may lead to supervisory actions, including the application of multipliers or model restrictions.

Methodology for VaR and stressed VaR

- **Internal models** must **capture** all **relevant risk factors** and be based on a reliable, representative historical data set. Institutions must ensure that the model appropriately reflects the portfolio's sensitivity to market changes.
- The **stressed VaR (sVaR)** must be calibrated using a period of significant financial stress relevant to the institution's positions, and the choice of stress period must be justified with portfolio-specific analysis.
- **Modelling assumptions**, such as confidence level, time horizon, look-back window and data filtering, must be transparent, regularly reviewed and governed by internal approval processes.

Risks-not-in-the-model engines (RNIME)

- **Institutions** must **identify** any **material risk not covered by internal models**, including basis risk, model risk, market liquidity risk, concentration risk, and residual risks arising from simplifications or exclusions.
- These risks must be assessed through **robust internal processes** and, where quantification is not feasible, addressed through conservative capital buffers, overlays, or scenario-based adjustments.

RNIME (cont.)

- The **RNIME framework** must be subject to validation and governance oversight, with clear roles for internal audit, model risk management and senior management in ensuring transparency, justification and supervisory readiness.

Scope of the internal model approach

- Institutions are expected to **include** in the internal model **all instruments** and **risk factors** for which **reliable modelling** is possible and **supported** by **sufficient data** and **risk management usage**.
- Where **instruments** are **excluded** from the **IMA**, the ECB requires clear justification based on data limitations, model weaknesses, or risk management usage.
- Any **material changes to the scope**—either qualitative or quantitative—must be documented and, where required, notified to supervisors.

Aspects of internal validation of market risk models

- **Internal validation** must be **independent** from **model development** and encompass data quality, assumptions, methodology and system implementation.
- Institutions are expected to **validate all components** of the market risk framework (e.g., VaR, stressed VaR, IRC), using both qualitative assessments and quantitative testing.
- Full **traceability**, **documentation** and **governance** oversight are required to support the credibility of validation results.

Methodology for IRC models focusing on default risk

- The **Incremental Risk Charge (IRC) model** must reflect both credit migration and default risk for trading book positions exposed to credit risk, including issuer-specific sensitivities and sectoral concentrations.
- **Probabilities of default (PDs)**, **loss-given default (LGD)**, **credit rating transition matrices** and correlation assumptions must be derived from robust empirical data and be conservative in nature.
- The **model structure** and **calibration** must be validated through stress testing, benchmarking and sensitivity analysis, and the IRC output must be actively used in internal risk and capital processes—not limited to regulatory purposes.

CRR III strengthens the ECB's expectations for market risk internal models by introducing enhanced requirements on scope, validation, modelling methodologies and the treatment of risks beyond standard model engines

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Scope on market risk

- Outlines the **ECB's supervisory expectations** for institutions using internal models to calculate market risk own funds requirements under CRR3.
- It focuses on the **key methodological**, **validation** and **governance aspects** but does not cover every technical detail, leaving room for supervisory discretion.
- The guidance aims to ensure **consistent supervisory practices** while preserving flexibility for institution-specific modelling choices.

Scope of the internal model approach

- The **IMA** must include all **trading book instruments** with eligible and modellable risk factors.
- The **use of IMA is subject to desk-level approval**.
- Any **exclusions** must be **justified** based on data availability, modellability, or internal risk practices.
- The **scope** must **align** with **trading intent** and accurately **reflect positions** held for trading purposes.
- **Material changes** to the scope must be documented and, where required, notified to supervisors.

Regulatory backtesting and P&L attribution

- **Regulatory back-testing compares** hypothetical P&L (**HPL**) with actual P&L (**APL**) to validate the accuracy of market risk models.
- The **P&L attribution** (PLA) test **compares** risk-theoretical P&L (**RTPL**) with **HPL** to ensure the model correctly captures the drivers of trading outcomes.
- Desks consistently failing PLA or back-testing may **lose approval for internal model use** (non-modellable status), requiring a fallback to standardised approach.
- Institutions must maintain **robust documentation** of the test population, exceptions and escalation processes. Additionally, **ECB's supervisory expectations** for institutions to have an internal back-testing for ES/VaR model.

Internal validation of market risk models

- Institutions must implement a **comprehensive** and **independent validation function**, covering conceptual soundness, empirical accuracy, and risk coverage.
- Validation must occur at least **annually**, and also in response to model changes, failures or supervisory requests.
- The ECB expects involvement from **senior management** and **internal audit**, with **validation results** forming part of **governance decision-making**. Validation must include quantitative testing (e.g. benchmarking, back-testing) and qualitative review of modelling assumptions.

Methodology for ES and SSRM

- The **Expected Shortfall (ES) models** must reflect tail risks through robust calibration, historical data, sufficient granular risk factor modelling, and simulation techniques, ensuring stability and relevance under stressed conditions.
- **SSRM** must use the same risk factors as ES, but recalibrated to severe but plausible scenarios; justification of scenario selection is expected.

Methodology for DRC

- The **DRC model** must capture **incremental default** and **migration risk** under Article 325bw CRR, using appropriate PDs, LGDs, and transition matrices.
- **PDs** must not default to zero in absence of observed defaults; **transition matrices** must be granular and rating-sensitive, and LGDs economically grounded.

Risks not in the model engines (RNIME)

- Institutions must **identify** and **quantify RNIME** through conservative methodologies or add-ons, covering residual basis, event or model risks.
- Any significant **updates** in **RNIME treatment** may require model change classification and prior supervisory notification.

Risk management, governance and audit

- Internal models must be embedded in **risk management processes** and used in **decision-making**, **limit frameworks**, and **reporting**.
- **Governance** must ensure transparency, documentation, change control, and independent review by internal audit and senior committees.

5 Counterparty credit risk (1/2)
Exposure modelling and input assumptions

The 2025 Guide reinforces supervisory expectations on CCR modelling, with stricter requirements on MPoR, collateral, initial margin and risk factor granularity

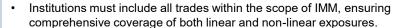| 1	Overarching principles	2	Credit Risk	3	Market Risk	**4**	**Counterparty Credit Risk**

Scope of the counterparty credit risk

- The chapter clarifies supervisory expectations applicable to institutions using internal models for counterparty credit risk, particularly under the IMM framework.
- The 2025 update **refines the scope** by clearly distinguishing requirements depending on whether IMM, SA-CCR or OEM approaches are used, ensuring institutions apply only the relevant expectations.

Margin period of risk and cash flows

- The MPoR must be based on realistic assumptions that reflect delays in collateral exchanges and liquidation processes under stressed conditions.
- The updated guide introduces e**nhanced expectations** on the definition of the "**most recent exchange of collateral**," treatment of interpolation within simulation paths, and the capture of illiquid collateral or concentrations.
- Institutions are also expected to **capture all cash flows—contractual**, optional, or contingent—within the MPoR horizon, and document assumptions with greater precision.

Modelling of initial margin

- Initial margin must be incorporated in exposure modelling where it affects future exposure.
- The new guidance reinforces that **modelling** of **IM** should **reflect contractual terms**, re-use limitations, and stress calibration. IM must not be treated as a static buffer but as a dynamic element in exposure projections.

Granularity, number of time steps and scenarios

- Numerical methods used in the model must be sufficiently granular and statistically representative to capture the underlying exposure .
- The updated guide introduces stronger **requirements** to **validate** the **level of convergence** of the numerical methods, focusing on time-grid density and number of simulated scenarios.

Trade coverage

- Institutions must include all trades within the scope of IMM, ensuring comprehensive coverage of both linear and non-linear exposures.
- The 2025 version explicitly clarifies that **trades excluded** from benchmarking portfolios do **not count** towards the **IMM** minimum **coverage** threshold, reinforcing the need for proper justification of exclusions.

Collateral modelling

- Institutions must ensure collateral is modelled consistently with the exposure profile and risk management practices, including proper alignment with OTC derivatives and SFTs.
- The 2025 version strengthens requirements around **modelling** the **interaction** between **collateral** and **exposures** during **MPoR**, and clarifies when volatility adjustments may be used for simplification.

Maturity

- Effective maturity must be calculated to appropriately reflect the economic horizon of exposures, especially for open-ended or callable trades.
- The 2025 version reinforces that **maturity assumptions** should be **supported** by **empirical analysis** and that effective maturity cannot be shortened without robust justification.

5 | Counterparty credit risk (2/2)
Calibration, EEPE treatment and expectations on use and validation

The ECB clarifies and strengthens expectations on the use, validation and calibration of CCR models, while introducing stricter requirements for the treatment of EEPE, alpha and unmodelled risks

| 1 | Overarching principles | 2 | Credit Risk | 3 | Market Risk | **4** | **Counterparty Credit Risk** |

Calibration, frequency and stress calibration

- Institutions must **calibrate model parameters** using recent, relevant and sufficient **data**.
- The 2025 guide clarifies that **stress calibration** must **reflect severe but plausible market conditions**, with documentation of assumptions and reproducibility.
- The **frequency of calibration** must be justified and aligned with risk management; material changes require governance oversight.

Effective expected positive exposure (EEPE)

- **EEPE models** must be **calibrated** using full **trade-level data** and must reflect netting and collateral agreements.
- The 2025 guide clarifies that all **relevant risk factors** must be **incorporated**, and modelling assumptions must be justified and back-tested.
- Institutions must monitor and explain **material deviations** between EEPE and actual exposure profiles.

Alpha parameter

- Institutions must estimate and justify the **alpha multiplier** used to scale **EEPE to EAD**.
- The 2025 edition introduces **clearer expectations** on **empirical calibration**, **conservatism** and **documentation**.
- **Supervisors** may **challenge alpha values** that are not robust, conservative or grounded in observed performance.

Risks not in effective expected positive exposure

- All **material risks** not captured in EEPE must be **identified**, **assessed** and conservatively **addressed**.
- The 2025 guide stresses the need to **quantify these risks** where possible, or apply appropriate capital add-ons or adjustments.
- Institutions must **document** their **treatment** and **integrate** it into the **validation** and **governance framework**.

Use test

- **CCR models** must be fully **embedded** in the institution's **risk management**, used consistently for internal purposes (e.g. limit setting, pricing, capital allocation).
- The 2025 version strengthens the ECB's expectations around documentation, traceability and the use of model outputs in actual decision-making processes.
- Institutions must demonstrate management understanding and active **use of model results**.

Validation

- **Validation** must cover **all aspects** of the **CCR model**: data quality, methodology, implementation and performance.
- The 2025 guide further emphasizes the **independence** of the **validation function** and requires **testing** under both normal and stressed conditions.
- Any **expert judgement** or **manual adjustments** must be critically reviewed and validated.

Why Management Solutions?

MS has extensive experience in risk and capital management, particularly in the processes of compliance with the associated regulation (CRR/CRD)

MS differential strengths in risk and capital management

1. **Proven credibility with supervisors:** Recognised by European and US regulators as a top-tier provider for internal capital models, with 7 ECB framework agreements and the highest rating in the capital area.

2. **Deep regulatory modelling expertise:** Comprehensive modelling experience across **i)** Credit risk (IRB, IFRS 9, CECL, stress testing), **ii)** Market risk, CCR, IRRBB (VaR, pensions, xVA), **iii)** ALM and liquidity, **iv)** Residual value and ESG risk. **v)** Economic capital. Delivering compliant, robust, and high-performing models.

3. **Independent model validation:** Trusted partner to verify compliance with CRR/CRD and EBA/ECB guidelines, supporting regulator approval (ECB, DNB, Bundesbank) and mitigating supervisory risk.

4. **Capital engine design & implementation:** Proven track record in building and deploying capital calculation/reporting solutions (MIR, SIRO) and running impact analyses that streamline processes and ensure precision.

5. **Specialised, multidisciplinary teams:** Experts in modelling, regulation, impact assessment, and reporting, blending quantitative strength with regulatory insight to deliver pragmatic, actionable solutions.

6. **End-to-end IRB model assessment:** Leadership in designing, validating, and developing IRB models, IFRS9 frameworks, and TRIM/SREP readiness, while addressing supervisory findings and strengthening risk governance.

7. **Advanced analytics & ML innovation:** Application of machine learning to optimise model accuracy, automate validation, and enhance decision-making in credit scoring, fraud detection, capital forecasting, and in the development of internal models, in line with emerging supervisory expectations..

A Abbreviations

CCR	Counterparty Credit Risk		**LGD**	Loss Given Default
CRCU	Credit risk control unit		**LRA**	Long-Run Average
CRR	Capital Requirements Regulation		**MoC**	Margin of Conservatism
DMP	Default Management Process		**MPoR**	Margin Period of Risk
DoD	Definition of Default		**OTC**	Over the Counter
DR	Default Rates		**PD**	Probability of Default
ECB	European Central Bank		**PPU**	Permanent partial use
EEPE	Effective Expected Positive Exposure		**RNIEPE**	Risks Not In Effective Expected Positive Exposure
F-IRB	Foundation Internal Ratings-based		**RWA**	Risk-Weighted Asset
FRTB	Fundamental review of the trading book		**SFT**	Securities Financing Transactions
IM	Internal Model		**sVAR**	Value at Risk in stress situations
IMM	Internal Model Method		**TRIM**	Targeted Review of Internal Models
IRB	Internal Ratings-Based		**VAR**	Value at Risk
IT	Information Technology		**XAI**	Explainable artificial intelligence

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