● Whitepaper

Regulatory Technical Standards on Initial Margin Model Validation under European Markets Infrastructure Regulation – Evalueserve's View
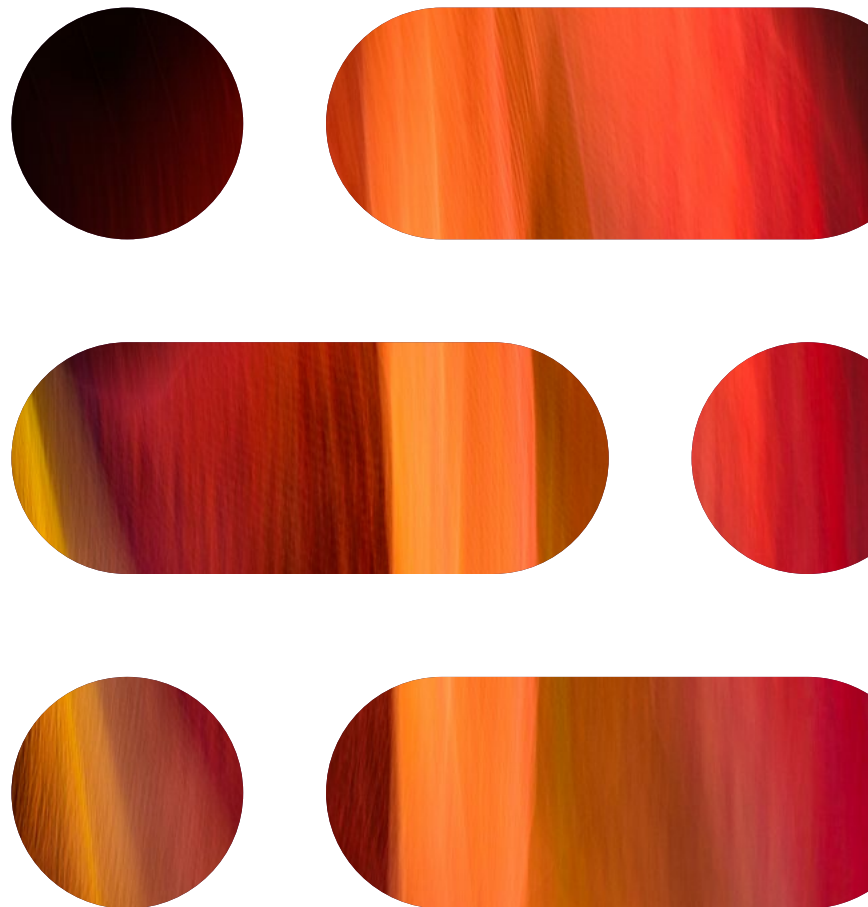
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Preface

As regulatory norms evolve, financial institutions (FIs) need to be on a constant vigil and keep themselves familiar with the latest market practices to speed up the adoption of new guidelines. Failure to comply is not an option. FIs must build and use optimal solutions that let them adapt without disrupting their regular business.

The reforms initiated after the Global Financial Crisis of 2008-09 are maturing, and regulators have gained a more robust understanding of underlying risk drivers. They are constantly monitoring firms' compliance with regulations to avert unanticipated risks. COVID-19 did lead to disruptions, and multiple regulations were postponed or delayed, helping market participants to absorb their impact. However, with the impact of COVID-19 receding, regulatory bodies have once again started focusing on pending guidelines that FIs need to comply with. Among the multiple guidelines, the one that will impact the largest number of FIs, especially small FIs, is Initial Margin Model Validation (IMMV). FIs have to now strengthen their internal model governance practices to better comply with the new requirements. Building a full-scale model governance framework is often a daunting task for firms, as they do not always have enough resources and the expertise needed to conduct related exercises. It also requires the full involvement of senior management in the decision-making process. Compliance with the IMMV will require a thorough understanding of market risks; stress testing; backtesting exercises; and investigation, reporting, and remediation of deviations.

At Evalueserve, we work on a range of solutions related to market risk, credit risk, counterparty credit risk, exotic pricing models, etc., that help FIs to comply with various regulatory norms and enable them to gauge their underlying risks. We have presence across multiple financial firms and provide services across divisions. Evalueserve's solutions include model validation, model development, model monitoring, etc., and we support firms in building their systems for regulatory requirements (such as VaR, FRTB, SIMM, Risk not in SIMM, Risk not in VaR etc.) and have considerable experience in dealing with exotic derivatives pricing and their risk analytics.

Our expertise can also be used by FIs working towards IMMV compliance, as they are related to risk sensitivities and VaR calculations. Our industry leading solutions include an SA-CCR engine for EAD calculation, Interest Rate Risk in Banking Book (IRRBB), Credit Risk Modeling (PD/LGD modeling), etc. We have considerable expertise and resources to provide custom-built solutions for the IMMV. We also support firms in building solutions that cover their complete Credit and Counterparty Credit Risk Analytics requirements.
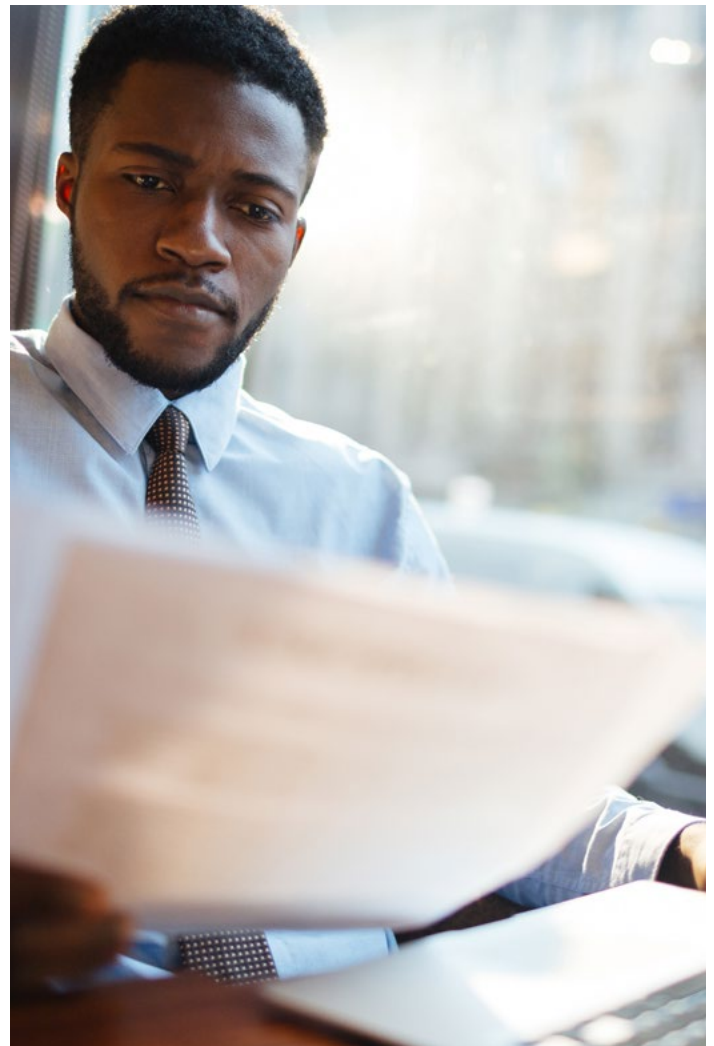
IMMV– Overview of Regulatory Technical Standards

Since 2016, global banks and FIs including EU banks and FIs have been through six phases of Uncleared Margin Rules (UMR), with each phase making a new set of firms eligible for Initial Margin (IM) calculation. This cycle of implementation comes to an end with UMR Phase 6, which went live in September 2022. The European Banking Authority (EBA) has now shifted its focus on validating and governing the process of initial margin calculation at a firm level.
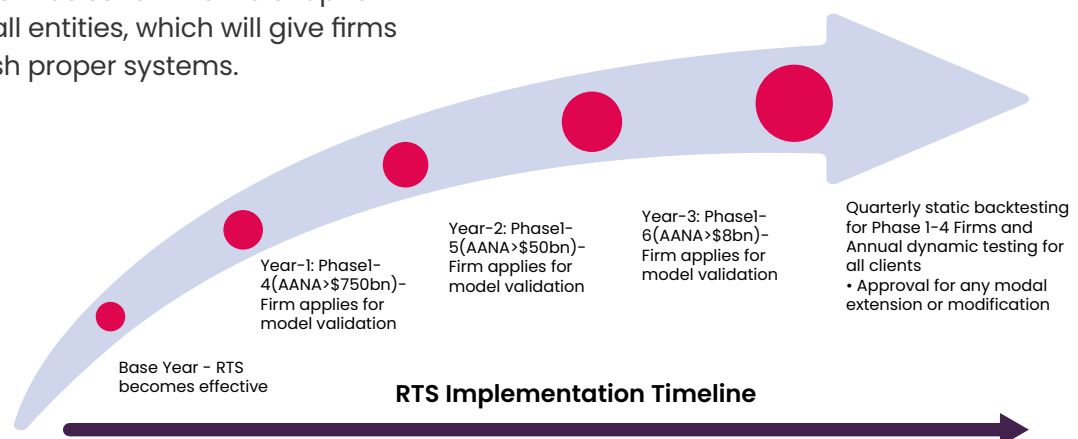
On November 4, 2021, the EBA came up with a new set of guidelines and issued the draft Regulatory Technical Standards (RTS) on the IMMV under the European Market Infrastructure Regulation (EMIR) and invited stakeholders to provide their suggestions on it by February 4, 2022.

Until now, EU firms were only required to notify the regulator about their model governance and compliance processes. However, if the proposed RTS come into effect, they will have to obtain the regulator's approval as well. Globally, only the US currently has such rules, but those are applicable only to major swap participants (MSPs) and swap dealers. The EU's draft RTS have no such limitations and will apply to all firms. The rules outline several requirements regarding model governance, implementation, validation, documentation, etc. The draft RTS bifurcate firms into small and big – the smaller firms are required to follow much simpler rules than the bigger firms. Once the draft RTS are enforced, the regulator has set a timeline of up to three years to cover all entities, which will give firms some time to establish proper systems.

Evalueserve View

Most firms that fall in the Phase 1-4 Aggregate Average Notional Amount (AANA) bucket are much larger than those in the Phase 5-6 AANA bucket, and have a proper model governance structure in place. Since several of the bigger firms already perform backtesting exercises to validate their IM models, they will just need to meet some additional documentation and approval requirements.

Although the rules have been toned down a little for Phase 5-6 firms, they will still need a lot of expertise to conduct these testing and validation exercises. Most firms that will be covered in these phases may not have adequate resources to perform IM calculations, but will need to be in full compliance with the backtesting and model governance requirements. Some of these firms may opt for external vendors who can provide them with a complete suite of solutions or help them meet a partial set of requirements. Even those that hire external vendors will need to keep track of the complete implementation process and ensure that necessary steps are taken in compliance with the RTS framework.

Quarterly static backtesting for Phase 1-4 Firms and Annual dynamic testing for all clients
• Approval for any modal extension or modification

Year-3: Phase1-6(AANA>$8bn)-Firm applies for model validation

Year-2: Phase1-5(AANA>$50bn)-Firm applies for model validation

Year-1: Phase1-4(AANA>$750bn)-Firm applies for model validation

Base Year - RTS becomes effective

RTS Implementation Timeline

Overview of Uncleared Margin Rules

The UMR are a subset of several global reforms proposed in response to past financial crises by the Basel Committee on Banking Supervision (BCBS) and the International Organization of Securities Commissions (IOSCO), which are governing bodies for global banking and financial institutions mandated by G20 member countries. These rules govern the trading of uncleared over-the-counter (OTC) bilateral trades. In the past, there was no mandatory requirement to exchange IM for uncleared OTC derivates, unlike cleared products where firms needed to post IM beforehand. Since no collateral is posted to cover loss by uncleared OTC portfolios, defaulting by any counterparty led to systemic risks that could spill over to other counterparties, affecting the entire value chain. Posting IM is likely to prevent such spillover of counterparty credit risks.
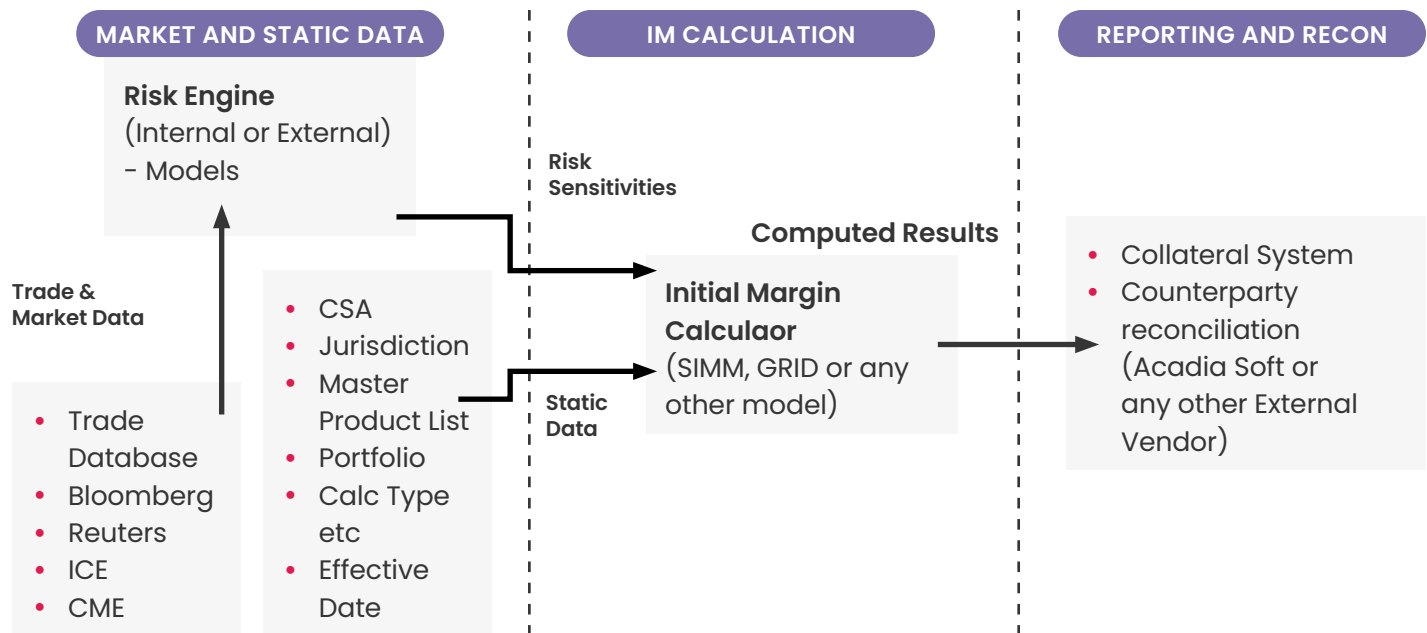
The rules came into effect on September 1, 2016. It was decided that they will be implemented in five phases, with each consecutive phase coming into effect after one year. However, the implementation for smaller firms was delayed due to several requests from them. Finally, it was decided that the rules will be implemented in six phases for smaller entities, with Phase 6 going live in September 2022. A new set of firms become eligible with each phase, depending on their AANA. The process started with firms having AANA > $3 trillion (Phase 1) and culminated with firms having AANA > $8 billion (Phase 6). It is estimated that nearly 800 firms are covered by UMR after Phase 6 has gone live.

As per these rules, firms that deal in the trading of uncleared OTC derivatives must exchange IM bilaterally and post it with a third-party custodian, to be held in segregated accounts, such that these IM amounts are unavailable for re-hypothecation. The IM amount is calculated such that it should be sufficient to cover any loss that might occur before a non-defaulting party is able to close all existing transactions with a defaulting counterparty and replace them with some other counterparty.

Globally, FIs covered by UMR mainly follow two sets of IM models:

- The first model has been designed by the International Swaps and Derivatives Association (ISDA) and licensed to different banks as a Standard Initial Margin Model (SIMM) for IM calculation. It is a risk-based parametric VaR calculation for which full re-calibration of risk weights, correlations, and thresholds is carried out annually by the ISDA, based on backtesting of the SIMM on a 1-year stress period and the 3-year recent period. The input for the model is risk sensitivities, which are calculated at the trade level and then aggregated at the asset class and eventually at the netting set level. The resultant IM is calculated by applying different sets of correlations among different risk factors at asset class levels and then aggregated for different asset classes to arrive at a final IM value. Risk sensitivities are calculated at the bank level; banks may rely on internal risk engines or external vendors' applications to produce these sensitivities.

- The second model, also known as Grid IM, is much simpler and less sensitive to portfolio risk. It is calculated using trade notional, product type, and portfolio net-to-gross ratio. It is calculated at the trade level and then added for all the trades to arrive at a portfolio-level IM.

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IM Calculation Process

MARKET AND STATIC DATA

Risk Engine
(Internal or External)
- Models

Trade & Market Data

- Trade Database
- Bloomberg
- Reuters
- ICE
- CME

- CSA
- Jurisdiction
- Master Product List
- Portfolio
- Calc Type etc
- Effective Date

IM CALCULATION

Risk Sensitivities

Computed Results

Initial Margin Calculaor
(SIMM, GRID or any other model)

Static Data

REPORTING AND RECON

- Collateral System
- Counterparty reconciliation (Acadia Soft or any other External Vendor)

EVS View

Adopting SIMM ensures homogeneity in the reporting of IM and requires a lot less effort than designing a completely new model for approval from competent authorities. SIMM adoption also eases documentation requirements, as most of the firms have the same common structure, and competent authorities might not seek additional clarification from all the firms once it gets approved for one firm (as it will only result in a repetition of tasks). Most small firms find it difficult to implement their own IM model and will most likely go with a vendor-based SIMM. However, some firm-level calibrations will still need to be done for specific products. For such modifications, firms will need to seek approval from their competent authorities. It is possible that firms may opt for a simple standardized GRID model to avoid the complexity of SIMM, but that can be quite punitive as GRID IM is a lot more conservative than SIMM IM.

Overview of Draft RTS on IMMV

The RTS on IMMV are applicable to all banks and FIs that come under the purview of the EMIR. They lay down the guidelines and requirements of the process for validation of IM models implemented at the firm level, and their continuous monitoring and calibration. The RTS also outline how new changes are to be documented and under what circumstances the changes need approval from competent authorities.

The draft RTS outline two processes for the implementation of IMMV guidelines – a **'standard process'** for banks having AANA above **€750 billion** and a **'simplified process'** for banks and institutions with AANA between **€8 billion and €750 billion.** Going by the phase-wise implementation of UMR, all the counterparties from Phase 1 to Phase 4 will be covered by the standard process, while the remaining firms will be covered by a simplified process. As per the EBA's estimate, approximately 20 banks will need to follow the standard process and the remaining institutions will need to follow the simplified process.

Standard Process

This process is applicable for banks having AANA above €750 billion, i.e., Phase 1-4 firms. Since these banks already have IM models and set processes in place, they will need to get their models approved by competent authorities. All banks that follow the Standard process will need to submit their model validation documentation within one year of the RTS becoming effective. Firms will be required to conduct quarterly static and dynamic backtesting as part of their internal model validation process to ensure the relevance of the incorporated IM model. These backtesting methodologies have been designed in accordance with the Basel Traffic-Light Approach (TLA), which classifies the number of exceptions (based on confidence interval) into three categories – Red, Amber, and Green. Based on this classification, it

must be ascertained whether the IM is enough to cover bank losses in a margin period of risk (MPoR) with a one-tailed 99% confidence interval. The result of these testing exercises will determine the need for any changes.

The draft RTS have also described circumstances under which firms will need to seek approval from a supervisory authority before applying any new extension or modification to their IM calculation model. Supervisory approval is mandatory before implementation if the resulting change in IM is greater than 5% and the competent authorities assess that change as material or in case the change is greater than 10%. All changes that do not seem material are to be notified to the supervisory authority at least on an annual basis. The exception is changes that will need to be made due to the inclusion of new product classes, thereby requiring other modeling techniques; these will need to be notified at least two months before implementation.
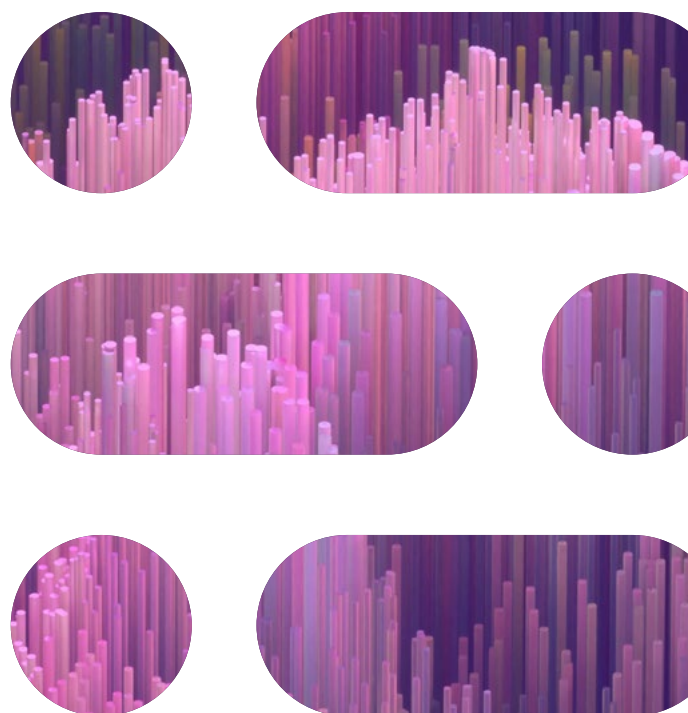
Simplified Process

This process is applicable to banks having AANA between €8 billion and €750 billion, i.e., Phase 5-6 firms. Phase 5 firms that have already implemented an IM model and have a set process in place must get initial validation and approval from competent authorities to continue using their existing model. These firms will have up to two years to submit their validation documents for approval. Meanwhile, Phase 6 firms, which are covered by UMR after September 2022, will have three years to submit validation reports on the IM model they select for deployment. Since these firms are a lot smaller and less resource-intensive, it will be difficult for them to follow such stringent testing as static backtesting. Therefore, it was decided to let these firms perform quarterly dynamic backtesting and report the results on an annual basis. The testing requirement and the level of documentation have also been toned down under the Simplified approach. Supervisory approval is mandatory before the implementation of any extensions or modifications if the resulting change in IM is greater than 10% and the competent authorities assess that change as material or in case the changes are greater than 20%.

EVS View

The Standard process is much more stringent and involves more testing and validation than the simplified process. It has been framed in view of the capabilities of smaller firms and the excessive burden they will come under if they follow the standard process, hindrance to their business activities, and demand for more resources than they can afford. In addition to the reduced threshold for modification validation and backtesting, the documentation required under the simplified process is also much simpler and less tedious. In the standard approach, in addition to general details such as scope documents and self-confirmation of adequate testing, firms will need to submit technical and process documents and independent validation reports.

PRINCIPLE 4

Static Backtesting

Static backtesting must be performed on a quarterly basis, using Basel TLA to identify exceptions. The term static is used as the composition of the portfolio is held static for the period determined for testing. It is also called '3+1 backtesting' because historical market data pertaining to the past three years and one-year data of extreme stress (usually the years that a bank has used to calibrate its model) are used for the testing process. Using this period, the portfolio is held constant, and a hypothetical Portfolio P&L is calculated by applying rolling 10-day risk factor market movements on a counterparty portfolio. The hypothetical P&L time series data is compared with the calculated IM time series data and their difference is used to calculate the overshooting data. Comparison of the IM with changes in market value can help infer whether the IM is sufficient to cover losses in an MPoR with a one-tailed 99% confidence interval.

Banks need to document the results and report them to competent authorities through their quarterly validation reports. They also need to calculate the sum of total exceptions (difference between hypothetical P&L and IM) in the Red category on a particular day (above 99 percentile) and check whether the sum is lower than 1% of the total IM for the netting sets defined as Green (below 95 percentile). This is aimed at ensuring that the total exceedance is not too high, even in the case of exceptions. Any breach of the 1% level must be reported to competent authorities and is classified as an event triggering a model change, recalibration, or other remediation action.

Challenges related to static backtesting

- Non-availability of historical data for risk factors in the portfolio selected for testing

- Limitations to applying the pricing method, valuation adjustment, and model parametrization historically applied on the sample dates

- Tedious process of capturing the reasons behind exceptions and categorizing them under modeling issues, market risk, missing risk, process failure, etc.

Dynamic Backtesting

Dynamic backtesting is somewhat similar to static testing but a lot less complex. It has to be performed over a one-year period, and its portfolio composition does not remain as constant as in static testing and represents actual portfolio trades on the testing sample calculation date.

Steps to be followed while performing dynamic testing

- P&L recalculation: The portfolio should only include trades that will remain on the next business day. Firms must recalculate P&Ls based on overnight positions that remain in the portfolio; the IM calculation is performed only on those positions.

- IM Calculation: Depending on the portfolio MPoR of the IM calculation, firms must scale back the IM value to one day MPoR. Normally, the SIMM IM is calculated for a 10-day MPoR but may vary as per the modeling used by a firm.

- Post above two steps , there will be two-time series data — one for P&L and another for IM — for the selected time period for which Basel Traffic Light test is conducted to determine the number of exceptions; the rest of the steps are the same as in static backtesting.

EVS View

Dynamic backtesting is much simpler than static backtesting, as there is no need to store historical market data or undertake scenario generation to determine the stress period. Dynamic backtesting can be done on a daily basis as it is a simple comparison of daily IM and daily P&L.
Both large and small firms must ensure that they have enough resources to investigate breaches and the capability to rectify them.
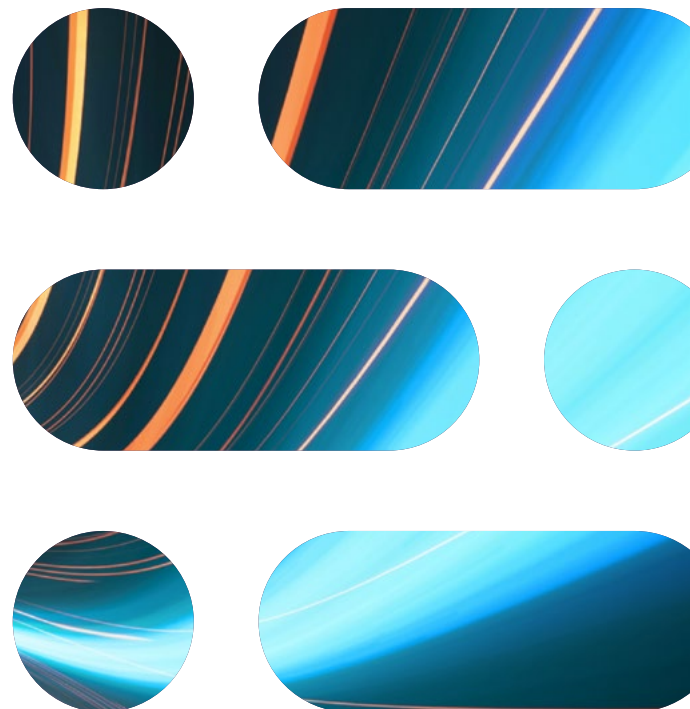
IM Model Governance Structure

The draft RTS outline the organizational and senior management's role in the implementation of IM calculation processes. The below image outlines the layers of a modern governance structure needed to effectively manage IM calculation and validation.

Modern Governance Structure

Senior Management
- Approves all relevant policies and procedures related to model implementation and changes
- Has good understanding of model assumptions, limitations etc.
- Ensure corrective actions whenever weaknesses are identified
- Keep track of backtesting results, regular follow up with model implementation, audit and internal validation teams

Model Implementation Unit
- Responsible for quantitative outcome of Initial Margin models, ensuring model integrity and output analysis
- Independent from trading unit, well equipped and have representation in decision making

Model Validation
- Conduct model monitoring on regular basis, validation of results due to changes in model, model backtesting
- Ensures proper due diligence is taken in model assumptions, calibration and appropriateness to business
- Reporting findings in comprehensive manner and ensure corrective action are taken in timely manner
- Should be independent from model developing unit and trading desk

Audit
- Provide detail report to senior management with respect to model compliance and identifies areas where more efforts and corrective actions are required
- Exercise to be done at least once annually and reported to senior management with clear conclusions
- Should have adequate independence and adequate representation for carrying out the exercise

EVS View

The draft RTS clearly outline how the complete IM framework should be implemented, starting from IM model approval and model development to model validation and periodic model performance review. Any change has to go through the complete validation exercise, supported with reasons and evidence. The above model governance structure highlights the big changes that firms coming under the EMIR UMR framework may need to incorporate. Most Phase 5-6 firms are unaware of backtesting and do not have robust model governance platforms. These small firms will look for packaged solution providers that can deliver IM calculation models as well as assist in model governance. In some cases, they can adopt different vendors for different applications, based on expertise available in the market. Even when outsourcing their requirements, firms' senior management have to be knowledgeable and understand the implications of any change or extensions applied, as well as reasons for overshooting and their proper remediation action.

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Evalueserve's IMMV Solutions

Evalueserve provides a complete suite of services and applications, covering model development, model risk management, model validation, model performance review, and model documentation. It has expertise in providing solutions in the counterparty credit risk and market risk domains and helps clients to successfully overcome challenges related to various aspects of model governance. Evalueserve has multiple in-built platforms that can be deployed quickly, as well as significant resources with the capability to build customized solutions for clients' specific needs. Below are some of Evalueserve's capabilities, and an overview of how it can assist clients in the implementation of their model governance framework:

Model Development

Evalueserve deploys an **Agile Delivery Model for Full Stack Analytical Applications** and can implement models from scratch, supported by its proper project planning and strong documentation standards. Implementation of SIMM modeling includes:

- Mapping transaction data to ISDA CRIF format
- Mapping raw risk factors to standard risk factors
- Deploying a correlation matrix and risk weights for risk factors
- Risk reporting and data management
- UAT testing, performance testing, and model deployment

Model Validation

- In-depth exposure and risk analysis at the portfolio level
- Scrutiny of adverse scenarios and breakdown of findings by status, magnitude, risk components, etc.

Model Performance Review

- Static backtesting
  • Maintaining a database of historical market risk factors
  • Maintaining a database of stress period market risk factors
  • Performing revaluation and analysis of overshooting cases

- Dynamic backtesting
  • Computation of IM for 1-day MPoR and P&L for overnight positions
  • Performing revaluation and analysis of overshooting cases

Documentation

- Model development documentation incorporating detailed activities and calculations
- Periodic performance review reports, model modifications, and extensions
- Executive summaries for reference by senior management
- **MRM Raptor** – Evalueserve's MRM report automation tool that enables model risk management teams to stay agile, quickly create new reports, and meet regulatory demands by
  • Eliminating manual repetition
  • Auto-interpreting test results
  • Standardizing the reporting template

Abbreviations

BCBS	The Basel Committee on Banking Supervision
FI	Financial Institution
VaR	Value at Risk
IRRBB	Interest Rate Risk in Banking Book
FRTB	Fundamental Review of the Trading Book
IOSCO	The International Organization of Securities Commissions
ISDA	International Swaps and Derivatives Association
RTS	Regulatory Technical Standards
IMMV	Initial Margin Model Validation
IM	Initial Margin
UMR	Uncleared Margin Rules
EBA	European Banking Authority
EMIR	European Market Infrastructure Regulation
AANA	Average Aggregate Notional Amount
SIMM	Standard Initial Margin Model
MPoR	Margin Period of Risk
CRIF	Common Risk Interchange Format
MRM	Model Risk Management

References

- Draft Regulatory Technical Standards on Initial Margin Model Validation (IMMV) under article Art. 11 – Paragraph 15 – point (aa) of Regulation (EU) No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories (EMIR)

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Amit has 18 years of experience in risk management, regulatory advisory, and big data analytics in the banking and insurance sector. He has worked on numerous assignments, including model development and validation in the areas of pricing and regulatory risk models.

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