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Targeted Review of Internal Models (TRIM)

Review of observations and findings for Traded Risk

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Targeted Review of Internal Models

A brief summary

The EBA has recently published the findings and observations from their TRIM on-site inspections. A significant number of deficiencies were identified and are required to be remediated by institutions in a timely fashion.

TRIM overview

Since the Global Financial Crisis 2007-09, concerns have been raised regarding the complexity and variability of the models used by institutions to calculate their regulatory capital requirements. The lack of transparency behind the modelling approaches made it increasingly difficult for regulators to assess whether all risks had been captured appropriately and consistently.

The TRIM project was a large-scale multi-year supervisory initiative launched by the ECB at the beginning of 2016. The project aimed to confirm the adequacy and appropriateness of approved Pillar I internal models used by Significant Institutions (SIs) in euro area countries. This ensured their compliance with regulatory requirements and aimed to harmonise supervisory practices relating to internal models.

Summary and findings

TRIM executed 200 on-site internal model investigations across 65 SIs from over 10 different countries. Over 5,800 deficiencies were identified.

Findings were defined as deficiencies which required immediate supervisory attention. They were categorised depending on the actual or potential impact on the institution's financial situation, the levels of own funds and own funds requirements, internal governance, risk control, and management.

The findings have been followed up with 253 binding supervisory decisions which request that the SIs mitigate these shortcomings within a timely fashion. Immediate action was required for findings that were deemed to take a significant time to address.

Fintegral review

The following slides provide a detailed overview of the EBA's key observations and findings from the TRIM on-site inspections. This presentation covers the traded risk models shown opposite.

Traded Risk

1. Market Risk – VaR and sVaR
2. Market Risk – Incremental Risk Charge
3. Counterparty Credit Risk

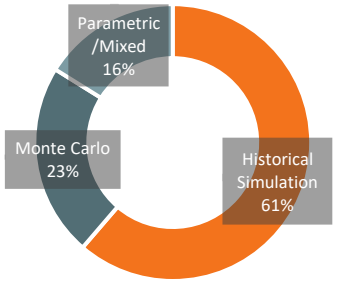
Market Risk

VaR / sVaR

TRIM assessed the VaR/sVaR models of 31 institutions. The majority of severe findings concerned the general features of the VaR and sVaR modelling methodology, such as data quality and risk-factor modelling.

Overview of modelling approaches

- 19 out of 31 institutions used historical simulation, seven used Monte Carlo, and the remainder used either a parametric or mixed approach.
- 17 of the historical simulation institutions, and five using Monte Carlo, used full revaluation for most instruments. Most other institutions used a sensitivities-based pricing approach.



Key findings

VaR/sVaR Methodology

- **Data:** Issues with data cleansing, processing and validation were seen in many institutions and, on many occasions, data processes were poorly documented.
- **Risk Factors**: In many cases, risk factors were missing or inadequately modelled. There was also insufficient justification or assessment of assumptions related to risk factor modelling.
- **Pricing**: Institutions frequently had inadequate pricing methods for particular products, leading to a failure for the internal model to adequately capture all material price risks. In several cases, validation activities regarding the adequacy of pricing methods in the VaR model were insufficient or missing.
- **RNIME**: Approximately two-thirds of the institutions had an identification process for risks not in model engines (RNIMEs). For ten of these institutions, this directly led to an RNIME add-on to the VaR or to the capital requirements.

Regulatory Backtesting

- **Period and Business Days**: There was a lack of clear definitions of business and non-business days at most institutions. In many cases, this meant that institutions were trading on local holidays without adequate risk monitoring, and without considering those days in the P&L and/or the VaR.
- **APL**: Many institutions had no clear definition of fees, commissions or net interest income, which must be excluded from the actual P&L (APL). Several institutions had issues with the treatment of fair value or other adjustments, which were either not documented, not determined correctly, or were not properly considered in the APL. Incorrect treatment of CVAs and DVAs and inconsistent treatment of the passage of time (theta) effect were also seen.
- **HPL**: An insufficient alignment of pricing functions, market data, and parametrisation between the economic P&L (EPL) and the hypothetical P&L (HPL), as well as the inconsistent treatment of the theta effect in the HPL and the VaR, was seen in many institutions.

Internal Validation and Internal Backtesting

- **Methodology**: In several cases, the internal backtesting methodology was considered inadequate or the levels of backtesting were not sufficient.
- **Hypothetical Backtesting**: The required backtesting on hypothetical portfolios was either not carried or was only carried out to a very limited extent.

Market Risk

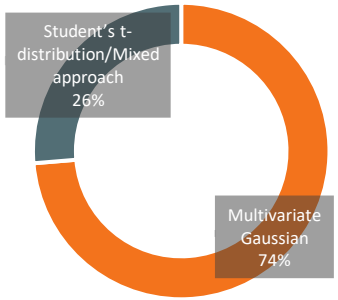
Incremental Risk Charge (IRC)

TRIM assessed the IRC models of 17 institutions, reviewing a total of 19 IRC models. A total of 120 findings were identified and over 80% of institutions that used IRC models received at least one high-severity finding in relation to their IRC model.

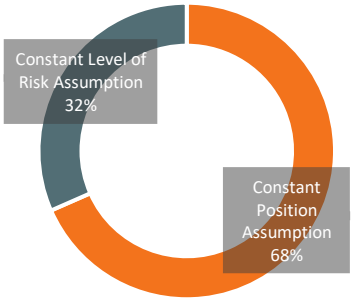
Summary of institution statistics

- **Methodology:** All institutions used a Monte Carlo simulation method, with 82% applying a weekly calculation.
- **Recovery rates:** Most institutions obtained rates from external rating agency data. Others estimated rates from IRB models or directly from their front office function.
- **Modelling assumptions:** As IRC lacks a prescriptive approach, the choice of modelling approaches between institutes exhibited a variety of modelling assumptions, as illustrated opposite.

Copula assumption for the modelling of asset processes



Portfolio assumptions



Key findings

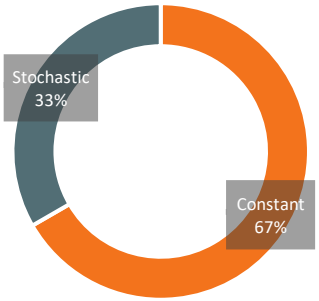
Recovery rates

- The use of unjustified or inaccurate Recovery Rates (RR) and Probability of Defaults (PD) values were the cause of most findings.
- PDs close to or equal to zero without justification was a common issue, which typically arose for the modelling of sovereign obligors with high credit quality.
- 58% of models assumed PDs lower than one basis point, typically for sovereigns with very good ratings but sometimes also for corporates.
- The inconsistent assignment of PDs and RRs, or cases of manual assignment without a fully documented process, also contributed to common findings.

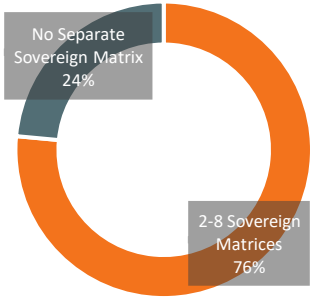
Modelling approach

- The lack of adequate modelling justifications presented many findings, including copula assumptions, risk factor choice, and correlation assumptions.
- Poor quality data and the lack of sufficient validation raised many findings for the correlation calibration.

Recovery rate modelling assumption



Transition matrices



Counterparty Credit Risk

Overview of inspections

Eight banks faced on-site inspections under TRIM for counterparty credit risk. Whilst the majority of investigations resulted in findings of low materiality, there were severe weaknesses identified within validation units and overall governance frameworks.

Topic	TRIM Details and Findings	Severity
Scope and Trade Coverage	• Most institutions had approval for all asset classes, although 25% did not have approval for inflation. • Findings showed an insufficient coverage with respect to the proportion of RWA covered by IMM. • The inspection also uncovered cases of large persistent pricing differences which had not been remediated promptly.	●●
MPOR and Cashflows	• Findings were mainly concerned with the lengths of the Margin Period of Risk (MPOR) being too short. More than half of respondents used an MPOR which was at least as long as the regulatory floor, whilst some used one less than the floor. • Another issue uncovered was related with the treatment of trade-related cashflows. This included inconsistencies in the default management process and the consequences of extrapolation methods from coarser time grids.	●●●
Collateral Modelling	• Findings were mostly related to the overestimation of the actual collateral, divergences between actual and modelled collateral, and assumptions on the future composition. • Half of the respondents assumed that the collateral composition would remain constant over time, whereas two assumed the collateral would be posted in cash of the simulation currency.	●●
Initial Margin	• There was a limited use of dynamic modelling amongst banks, as most assumed a flat approach. • The inspection revealed issues which mostly came from the divergences between actual and modelled initial margin.	●●
Time Steps and Scenarios	• The majority of institutions used a static set of grid points, while a few used a mixed approach of static and dynamic grids. Issues were uncovered with lack of granularity as three respondent used less than 100 grid points during the simulation. • Half of institutions used over 3,000 scenarios for their simulations, however there were some concerns on the accuracy of exposures for those that used fewer than this.	●
Risk Factor Modelling and Calibration	• Findings were related to weaknesses in the assumptions of the stochastic processes, the length of the stress period, and the corresponding stress calibration. • Four institutions calibrated their data monthly or more frequently. The majority of respondents used a single period, which was defined at group level, for their stressed calibration.	●●
Validation and Governance	• Half of the validation teams did not provide a sufficient challenge to the model developers as weaknesses were observed in the scope and depth of the validations. • There were severe cases of inadequate or missing documentation and processes, insufficient staffing, and unclear responsibilities.	●●●●●

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