SAS® Capital Requirements for Market Risk

Achieve compliance with Basel III regulations for fundamental review of the trading book (FRTB)

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What does SAS® Capital Requirements for Market Risk do?

This comprehensive solution for fundamental review of the trading book (FRTB) includes a scalable, high-performance analytics engine along with data management, workflows and reporting. It delivers standard approach (SA) and internal model approach (IMA) calculations and covers the full range of analytics needed to comply with FRTB. This solution integrates with industry trading platforms, analytics libraries, business processes and data sources, as well as in-house, vendor and open source models.

Why is SAS® Capital Requirements for Market Risk important?

It enables financial institutions to comply with FRTB mandates. Also known as minimum capital requirements for market risk, or BCBS 352, this regulation will directly affect a bank's balance sheet, capital, business model, market data and analytics software. Your FRTB software must support the demands of both IMA and SA calculations, integrating the approaches for on-demand analysis. Financial institutions will be able to plan for capital impact and any potential retrenchment for affected lines of business.

For whom is SAS® Capital Requirements for Market Risk designed?

The solution will be used by the chief risk officer, head of market risk, regulatory compliance managers, risk analysts and front-office power users.

The Basel Committee on Banking Supervision regulation FRTB is part of a regulatory strategy to address systemic risk. It provides new approaches for calculating market risk. By BCBS estimates, banks will see a 28 percent median increase in their required capital buffer using the internal model approach and as much as an 80 percent increase using the standardized approach[1].

Plans are in place to increase spot checks and ensure firms can assess market risk intraday. Moving from the overnight batch processes that most banks use today for enterprise market risk analysis to intraday reporting means big changes in the way data, analytics and reporting are managed. The computational burden can be huge. With up to 16,000 simulated valuations per trade, IMA may not be possible with your institution's current infrastructure. Therefore, it is critical for financial institutions to conduct pilots and what-if analysis to evaluate and mitigate the potential impact of the changes on their business and infrastructure.

Benefits

- **Gain a comprehensive view of market risk in prescribed categories.** By applying required analytical approaches, SAS Capital Requirements for Market Risk provides an enhanced view of each category of risk – across legal entities, trading desks and risk classes. It goes beyond the regulatory requirements to support multiple what-if analyses, including book and desk structure, IMA versus SA by desk and portfolio scenarios. This solution offers banks an opportunity to modernize aging market risk systems to improve their overall market risk infrastructure in the future.

- **Adapt to changing business needs with customized parameters, analyses and reports.** SAS Capital Requirements for Market Risk uses a modular architecture so you can modify the analytics at any point in the workflow. Customizable views help you understand staging and

results on an ongoing basis. This solution can tackle the various potential interpretations by regulators of BCBS 352.

- **Get up and running quickly with preconfigured calculations and reports.** Prebuilt modules with embedded quality controls, workflow and prescribed standard calculations, and reports make it easy to get started on the path to improved market risk management. Intellectual property derived from completed projects is used to continuously add to the SAS library of preconfigured templates.

- **Lower your total cost of ownership.** From data management to risk analysis and reporting, a high level of BCBS 352 functionality is covered right out of the box. This enables you to avoid the costly requirement of designing SA models and reports or integrating multiple components to achieve a full solution.

[1] Basel Committee on Banking Supervision, Explanatory Note on the Revised Minimum Capital Requirements for Market Risk, January 2016

Capabilities

Market risk analytics

SAS Capital Requirements for Market Risk provides prebuilt models to calculate SAS as required by BCBS 352. It processes sensitivities, including delta, vega and curvature, as well as high-medium-low correlations for each prescribed category of risk. The solution computes the SA sensitivity-based capital charge, a default risk charge and a residual risk add-on for each desk separately and for all desks of the legal entity (with and without interdesk diversification). It combines these capital charges for the SA desks with the internal model approach (IMA) capital charges of the eligible desks.

The solution uses the SAS High-Performance Risk engine, which has been designed to scale for large portfolios and large simulations. This distributed, in-memory engine aggregates and computes risk with low latency, enabling intraday risk analysis and assessment of capital impact.

The power of the high-performance risk engine addresses the computational burden delivered by the additional calculations required for IMA.

Integration of pricing models into SAS Capital Requirements for Market Risk is enabled by writing the models in SAS or by calling in-house or third-party pricing libraries. Using these pricing models, the SAS solution supports computation of risk factor sensitivities as input into the standardized approach. This also provides the ability to run the stress testing needed for risk factors that cannot be modeled. A library of sample pricing models for many common instrument types is available from SAS.

Intraday trading risk analysis

In addition to meeting regulatory requirements, intraday trading risk analysis provides banks with new strategic capabilities, including the optimization of assets for competitive advantage and near-real time risk analysis. The speed of the SAS High-Performance Risk engine is fast enough for predeal risk assessments and to see the hypothetical impact on capital. The ability to run intraday simulations is critical for decisions that affect risk, asset mix, capital and regulatory compliance.

Visual workflow management and monitoring

You can easily visualize analytics operations, process flows and management reporting for strategic decisions, including risk capital at various levels of portfolio aggregation. All standardized calculation steps are documented, including code and documentation available from the workflow. User-defined documentation can be provided for internal models and accessed the same way. The system is fully transparent and traceable.

Integrated data management

SAS Capital Requirements for Market Risk provides an input data model, which allows you to aggregate enterprisewide, external and third-party data. It lets you extract, integrate and validate data from almost any
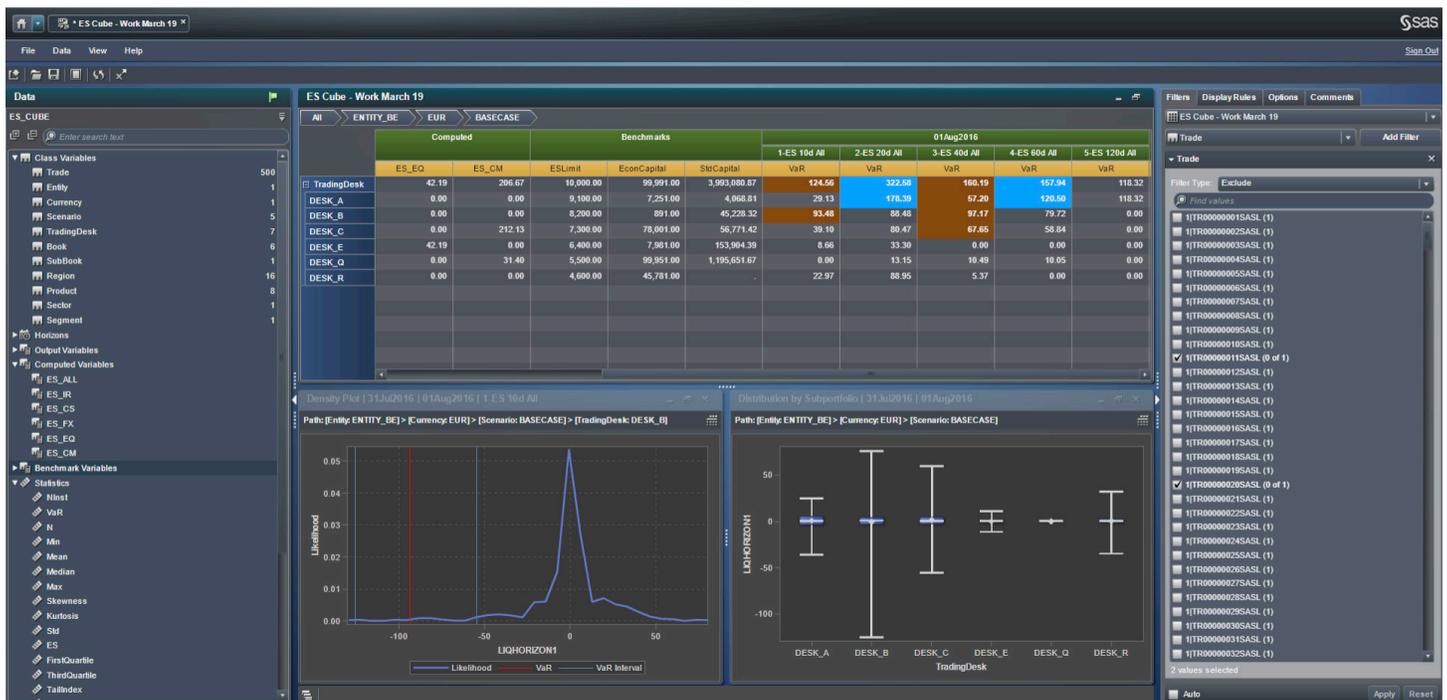

Figure 1: IMA results may be interactively viewed and analyzed with the SAS High-Performance cube viewer.

source, from market data providers to trade capture systems, clearing systems and more. It also accommodates industry-standard APIs, including support for the ISDA-SIMM Common Risk Interchange Format (CRIF). This enables the solution to acquire and consolidate historical data from both internal and external sources for risk analysis and reporting.

Embedded data quality controls aligned with BCBS 239 guidelines

Embedded and out-of-the-box data quality controls, such as rules for handling bad data, unclassified data or data not fitting the model, are preconfigured and can be extended by business users to meet their individual needs. These rules ensure that the generated analytics are reliable and robust. Visual reports surface the data quality failures so they can be monitored and acted on. In addition to the business requirements for correct results, finding errors before they are caught by the regulators is critical.

Risk reporting

A wide variety of preconfigured production reports provides users with the ability to monitor the evolution of capital requirements across multiple dimensions, including intraday, end of day, and regulatory reporting date. Intraday insights at the desk level and portfolio level provide an enhanced, timely view of market risk as well as the ability to optimize the reallocation of capital as required by events.

In addition, through a process of continuous enhancement based on completed projects, SAS Capital Requirements for Market Risk provides a growing library of reporting templates and related content, helping you get answers faster.

TO LEARN MORE »

Learn more about SAS regulatory risk software and services at sas.com/risk.

Key Features

Market risk analytics
- Compute risk capital at various hierarchical levels to identify capital-intensive operations.
- Explore the regulatory capital impact of business decisions such as:
  - Trading desk structure.
  - Investment portfolio composition.
- Identify potential regulatory capital savings with an internal model approach vs. the standardized approach.

Manage workflow, monitoring and extension
- Modular approach allows IT to fulfill the needs of multiple business divisions on a single platform.
- Integrate multiple systems and third-party tools.
- Monitor job execution status with dashboards.
- Access historical data and provide data management and auditability.
- Visualize analytical operations via easy-to-understand process flows, and analyze input and output of each step.

Data management
- Monitor and assess data quality in alignment with BCBS 239.
- Enable secure access, authentication and authorization.
- Access historical data and audit trails.

Risk reporting
- Interactive capital impact analysis, including intraday changes.
- Intraday updates of risk results and capital measures in response to newly confirmed or hypothetical trades and positions.
- P&L attribution and backtesting breaches with drill-down capabilities.
- Workflow status dashboard.
- Basel d400 regulatory reports for SA and IMA.

MR2: Market risk IMA per risk type

Level 1	Level 2	Most recent measure	Average measure	High measure	Low measure	Backtesting 0.99
02.ES for the regulatory risk classes	General interest rate risk	25,773.05	25,676.75	26,027.32	25,259.41	
03.ES for the regulatory risk classes	Equity risk	4,907.51	4,904.16	4,962.36	4,827.96	
04.ES for the regulatory risk classes	Commodity risk	9,656.93	9,843.43	10,084.41	9,636.17	
05.ES for the regulatory risk classes	Foreign exchange risk	5,623.89	5,534.87	5,623.89	5,447.47	
06.ES for the regulatory risk classes	Credit spread risk	12,885.71	12,818.70	12,923.50	12,724.72	
07.Constrained expected shortfall (IMCC)(Rho*Unconstrained ES+(1-Rho)*aggregated risk class ES)	-	60,588.13	60,745.46			
08.Capital charge for non-modellable risk factors	-	19,854.14	22,130.71			
10.Sub-total: a=7+8+9, b=multiplier*7+8+9	-	1,636,997.27	2,292,892.39			
11.Total capital charge	-	2,292,892.39				
12.Standardised approach capital charge for the entire trading book (ie all trading desks, including those subject to IMA)	-	5,961,469.19				

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Figure 2: Shown here, an IMA regulatory report addressing Basel d400 requirements.