

OutRank Model Validation Toolkit

We empower decision-making

Generation of economic scenarios is critical to numerous asset and liability management (ALM) or risk management activities underpinning banking and insurance businesses throughout the world. In this context, establishing a meticulous validation framework that would adequately assess the scenarios driving automated risk management and operational processes is essential. Today it is an important element of an extra layer of assurance in robustness and compliance of operational processes in the modern financial sector.

Kidbrooke's OutRank Scenario Validation Toolkit is a software as a service (SaaS) solution that enables financial institutions to conduct in-depth independent reviews of their scenario engines. The solution supports a wide range of validation methods, including a comparative analysis of simulation results, driven by Kidbrooke's Outrank Economic Scenario Generator.

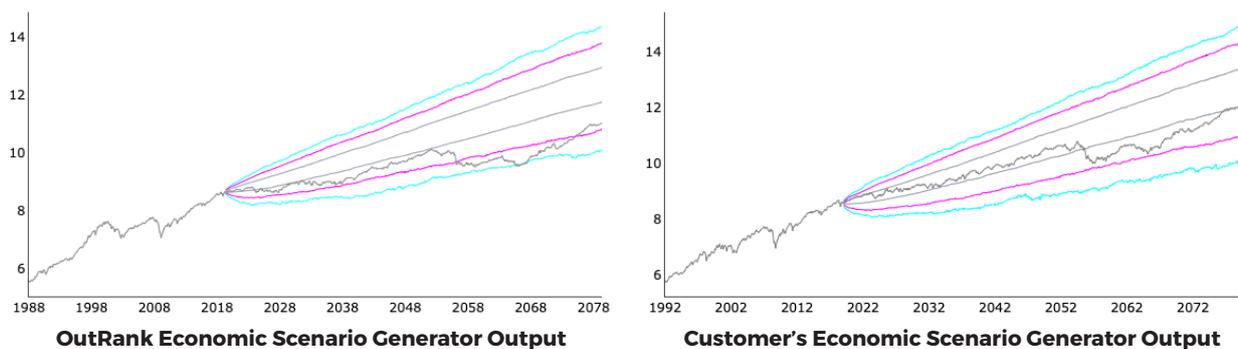


Exhibit 1. The plotted lines in the graphs represent **the time series of historical data** to which the models have been calibrated as well as **the simulated scenarios**. Each point on the graph corresponds to a date and a value. Specifically, starting from left to right, the historical data is plotted as a single line and thereafter the graph shows the percentiles of the simulated probability distributions as well as one specific simulated scenario. The **x axis** shows the years from right to left starting with the first historical observation and ending with the year of the last simulated value. The **y axis** represents the values of the historical and simulated time series. In this specific graph the y axis shows the log scale of historical as well as simulated large-cap US equities.

Kidbrooke is a tech company specialising in building applications dedicated to improving decision-making processes in the financial services industry and beyond. Our roots as both investment/risk and technology consultants enabled us to recognise the value of applying modern risk assessment methods in driving transformative change to business models within finance. Our experience of validating internal models under Solvency II for two leading Swedish insurers inspired us to build software empowering the global industry to complement evaluation of the crucial financial decisions with an appropriate quality assurance of their key automated components.

Features and Capabilities

We design and perform an annual revision of your models' statistical properties, aimed at monitoring and minimising the risk for model deficiencies. The toolbox includes the following validation components:

Benchmarking of:

- Marginal distributions
- Dependency structure
- House views

Tests can be applied on

- ESG Scenarios
- Model portfolios
- Actual portfolios



Validation framework tried and tested by the industry

Our solution offers a variety of modelling tools which ensure that statistical methods driving risk management activities in a number of leading financial institutions in Sweden are reliable and sound.



Enhanced benchmarking through access to the OutRank Scenario Engine

The OutRank Economic Scenario Generator enhances benchmarking analysis by delivering one to one comparison of generated scenarios.



Cutting-edge solution at a reasonable price point

Our background as a quantitative risk management consultancy has provided us the insights necessary to ensure the world class quality of our solution.

Key Features of the OutRank Scenario Engine

The OutRank Economic Scenario Generator delivers the following features:

- term structure dependence between volatility and returns;
- gain loss asymmetry;
- market views per time horizon enabling more consistent benchmarking;
- tail dependence, allowing for more granular approach to financial modelling;
- correlation term structure;
- volatility clustering.

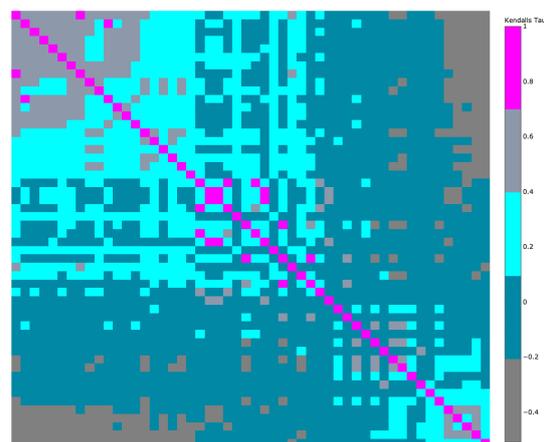


Exhibit 2. The heatmap shows the **excess tail dependence of the model** as defined by the difference in Conditional Quantile Exceedance (CQE) of the model as compared to a Gaussian copula with the same linear correlation. Specifically each colour as given by the colour bar on the right corresponds to an interval to which each estimated difference in CQE belong.

Both the **x axis** and the **y axis** correspond to all simulated risk factors grouped according to the magnitude of the dependence relative to all other risk factors.

Implementation

OutRank Economic Scenario Generator Kidbrooke's model validation toolkit ships with Kidbrooke's Economic Scenario Generator, enabling the customers to regularly check whether the scenarios driving their offerings are in line with our independent benchmarks.

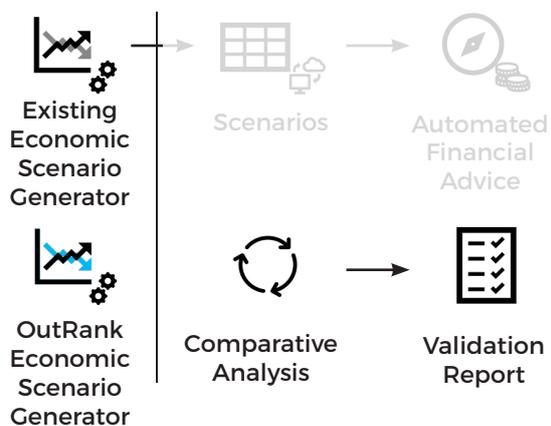
Easy integration The OutRank Model Validation Toolkit can be easily integrated into our customers' systems via our API. Alternatively, customers may access the generated reports and supporting analytics through Kidbrooke's Software as a Service solution.

Customisation and Calibration of Risk Factors Kidbrooke provides an opportunity to calibrate risk factors to customer-specific data and an ability to adjust the standard calibration of our economic scenario generator to align it with your respective house views. This can be delivered by us, through Kidbrooke's managed services or by yourself, through a customer self-service toolkit.

24/7 Technical Support We monitor and support our solution around the clock ensuring that our solutions always meets our standards of quality, efficiency and reliability.

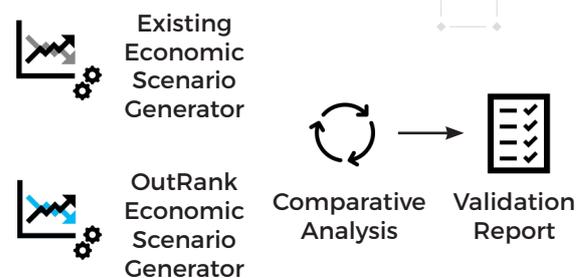
Use Cases

Empowering Reliability of Automated Financial Advice



We originally developed the OutRank Model Validation Toolkit to support financial planning applications higher up in the tech vertical, for instance, automated financial advice. Currently, our Model Validation Toolkit is driving automated investment advice services within one of the largest banks in Sweden. The incumbent bank automated a part of their wealth management operations, which created a requirement for reliable independent examination of economic scenarios provided by a third party. We provide a thorough monthly examination of the statistical properties of the scenario engine, ensuring that the algorithms improving financial stability for thousands of customers are reliable and sustainable.

Driving Financial Stability: Validation of Solvency II Internal Models



The accurate analysis of economic scenarios underpins decision-making which impacts prosperity and security for thousands of consumers, and the consequences of missteps could be severe. Accordingly, the validation of scenarios driving such decisions is now a regulatory requirement. Previously, Kidbrooke delivered the projects supporting the integrity of the Solvency II internal capital requirements models of the two largest Swedish insurers by supplying our regular validation services. Given our extensive experience within this space, we are confident that our solution delivers reliable and comprehensive assessment of the capital requirements models required under regulations such as Solvency II.

Contact us

“ We empower decision-making |



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