Alpha Quantum Risk Management

Alpha Quantum

Quantitative. Innovative. Robust. Researched. Alpha.

The Alpha Quantum Way.

Our solutions

Portfolio Optimiser, Risk Management, Security Analyser, News Analytics

Alpha Quantum Risk Management

- Alpha Quantum Risk Management is a risk management solution for a wide variety of companies in financial services industry:
  - mutual funds,
  - hedge funds,
  - wealth managers,
  - insurance companies,
  - pension funds.

- Our solution allows clients to conduct risk analysis through different Value at Risk methods, construction of stress test scenarios, support for derivative positions, pre-trade risk management and risk attribution.

- The features also include limits monitoring, performance measurement, regulatory compliance and powerful reporting capabilities for credit risk, market risk and portfolio analysis.

Features

Value at Risk

- Value at Risk (VaR), CVaR, Maximum Drawdown, CDaR
- Normal distribution, non-normal distribution (t-Student and Cornish Fisher expansion)
- Historical, variance-covariance and Monte Carlo simulation
- RMT (Random matrix theory) construction of correlation matrix

Stress testing

- Historical and custom scenarios
- Stress test with changed correlations
- Support for majority of financial variables
- Reverse stress testing
- Identification of specific risk drivers for extreme losses

Risk attribution

- Marginal, component VaR
- Contribution to total VaR of portfolio: individual securities, asset classes, currencies, countries, sectors, credit risk and liquidity
- Time dependency, analysis and coupling to performance attribution
- Monitoring of active bets against benchmark

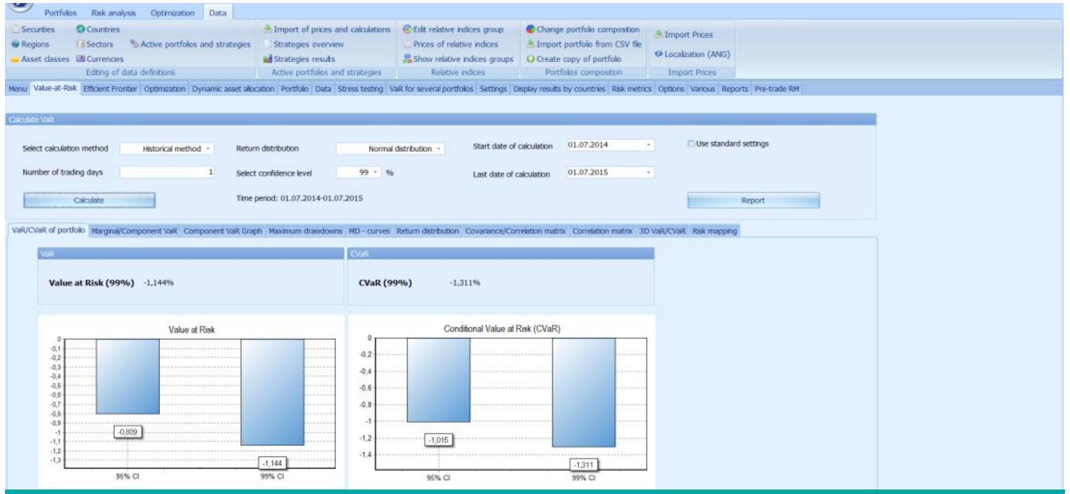
Pre-trade

- Internal compliance function
- Analysis of risk impact of trades prior to their execution
- Limits monitoring for total VaR of portfolio as well as individual categories like sectors and countries

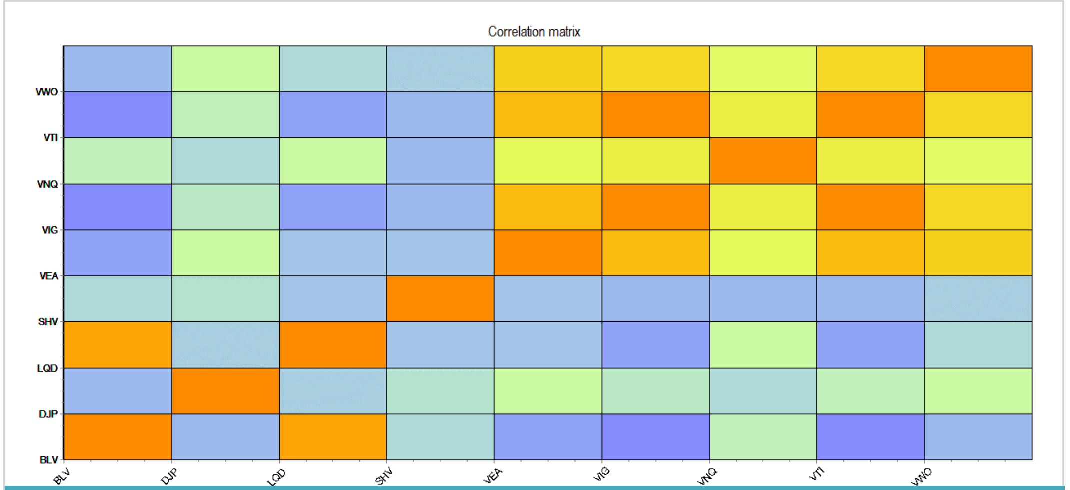
Performance

- Performance and risk measurement with various indicators
- Absolute risk: standard deviation, downside deviation, Maximum Drawdown, VaR, etc.
- Systematical risk: beta, tracking error
- Performance indicators: Sharpe ratio, Treynor ratio, information ratio, Jensen's alpha, etc.

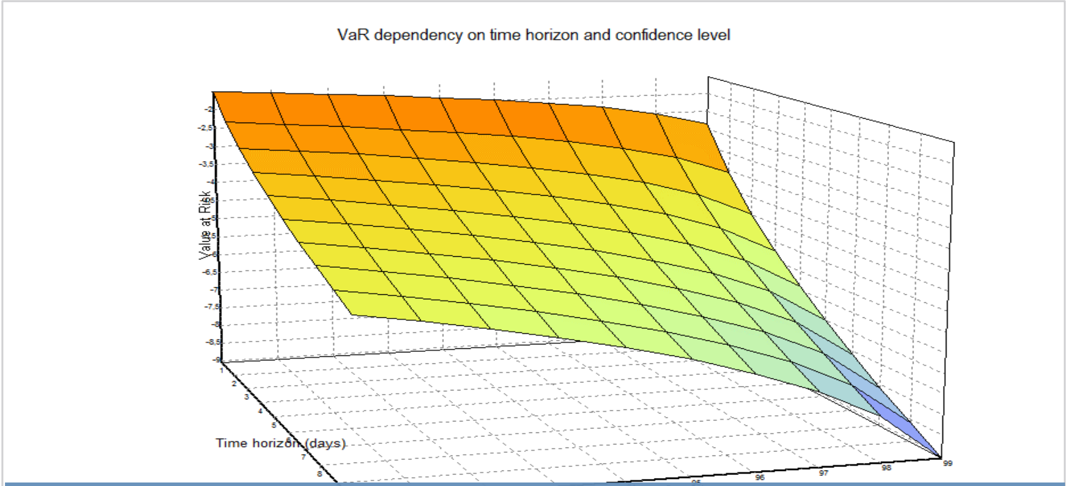
Value at Risk



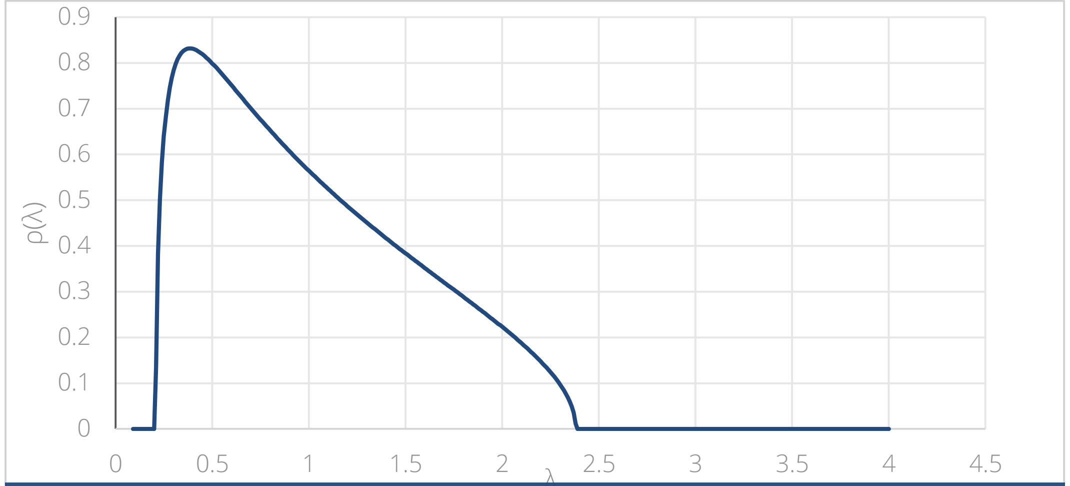
Value at Risk, Conditional Value at Risk



Correlation matrix



Dependence of Value at Risk on time horizon and confidence level



RMT construction of correlation matrix – MarčenkoPastur distribution

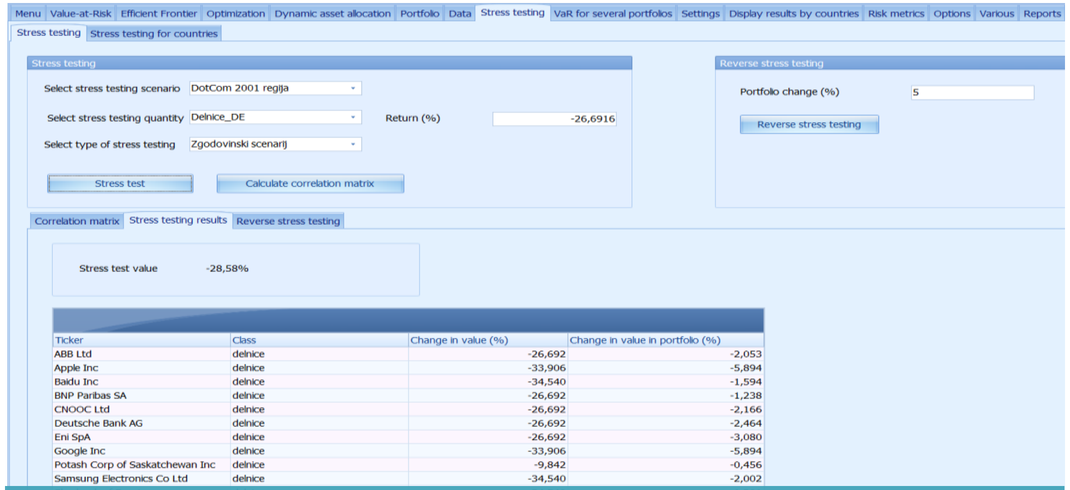
Stress testing

- Historical scenarios:
  - Lehman default (2008),
  - Dot Com collapse (2000),
  - etc.
- Custom scenarios:

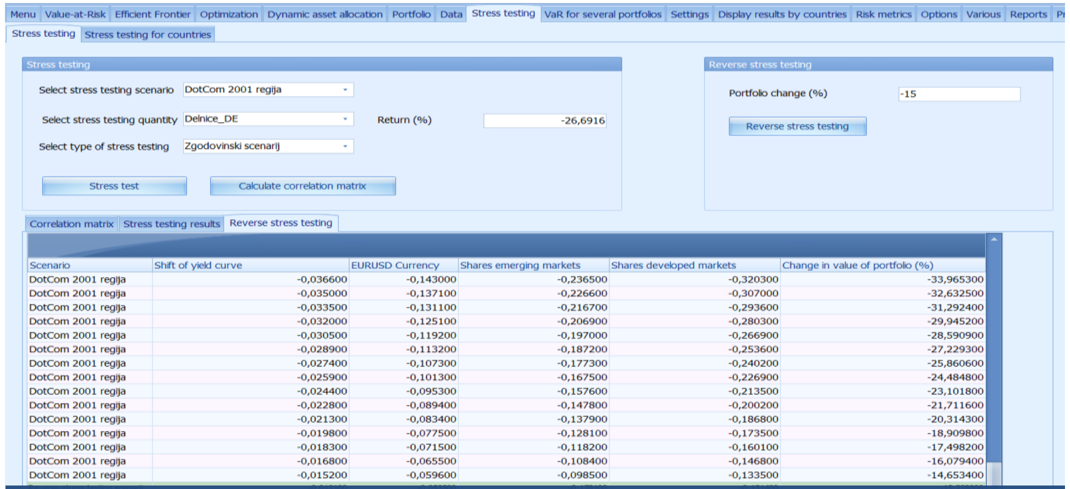
$$E(Y|S) = E(Y) + \Sigma_{SY}^{T}\Sigma_{SS}^{-1}[S - E(S)]$$

S- shock vector, Y- vector of changes in return

- Stress testing correlation matrix
- Reverse stress testing

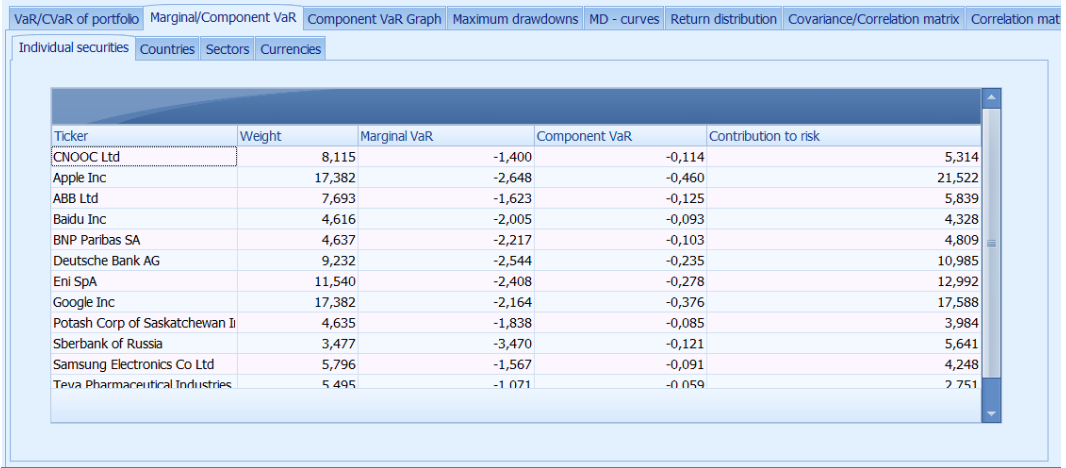


Example of stress testing



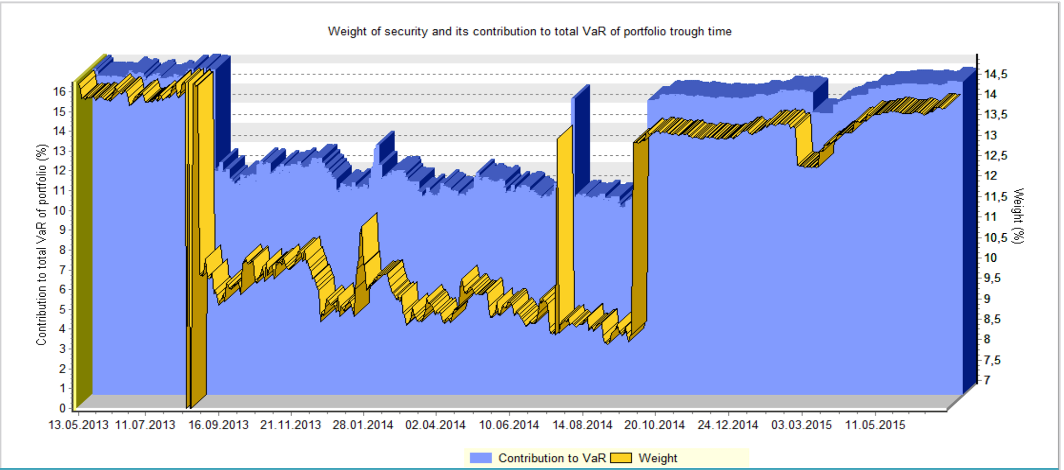
Example of reverse stress testing

Risk attribution

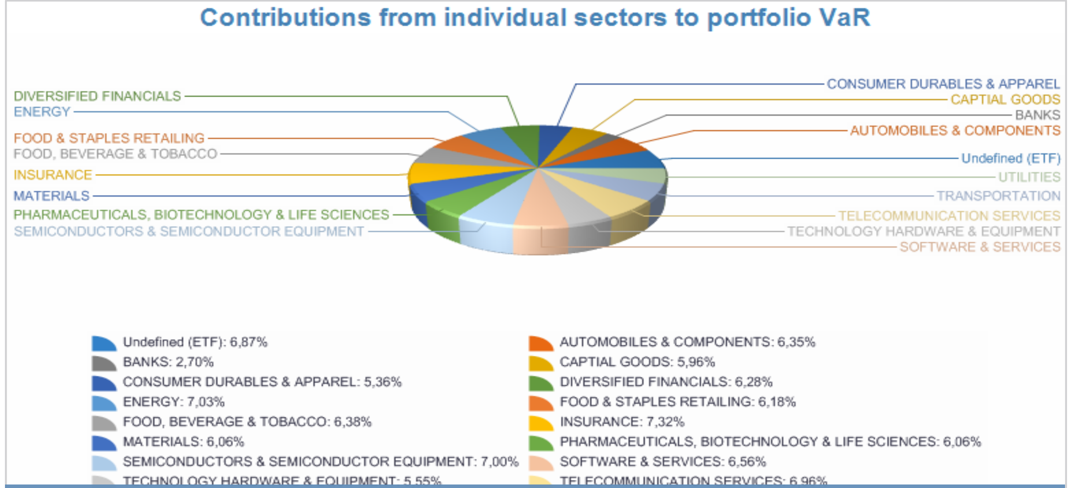


Ticker	Weight	Marginal VaR	Component VaR	Contribution to risk
CNOOC Ltd	8,115	-1,400	-0,114	5,314
Apple Inc	17,382	-2,648	-0,460	21,522
ABB Ltd	7,693	-1,623	-0,125	5,839
Baidu Inc	4,616	-2,005	-0,093	4,328
BNP Paribas SA	4,637	-2,217	-0,103	4,809
Deutsche Bank AG	9,232	-2,544	-0,235	10,985
Eni SpA	11,540	-2,408	-0,278	12,992
Google Inc	17,382	-2,164	-0,376	17,588
Potash Corp of Saskatchewan I	4,635	-1,838	-0,085	3,984
Sberbank of Russia	3,477	-3,470	-0,121	5,641
Samsung Electronics Co Ltd	5,796	-1,567	-0,091	4,248
Teva Pharmaceutical Industries	5,495	-1,071	-0,059	2,751

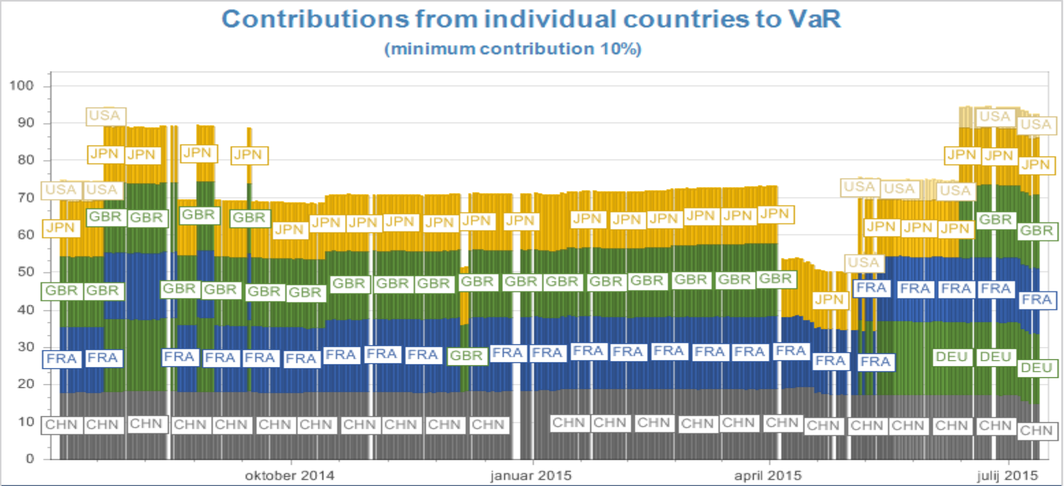
Marginal, Component VaR and contribution of securities to total VaR



Attribution of Individual securities to VaR of portfolio over time



Sector attribution to VaR of portfolio



Countries attribution to VaR of portfolio

Pre-trade

Parameters

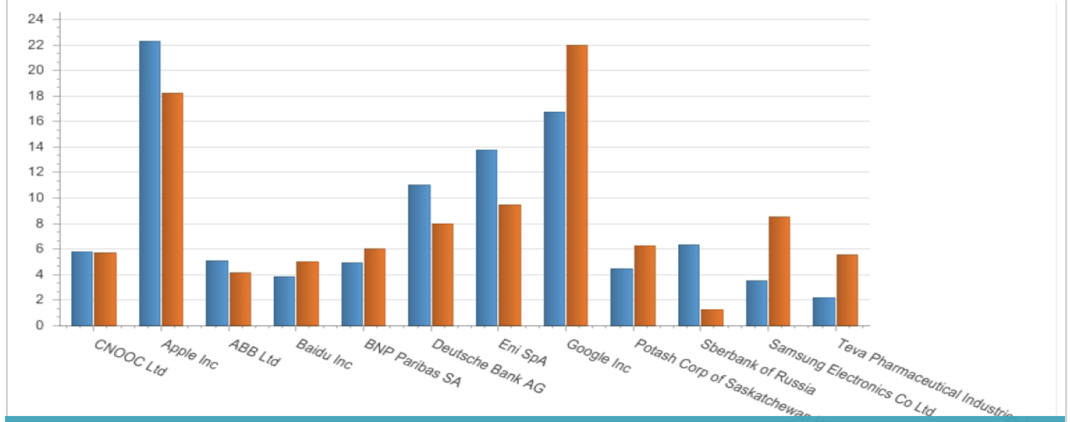
Calculation method	Historical method
Time unit (days)	10
Return distribution	Normal distribution
Confidence level	95

Approved.

	Start portfolio	Target portfolio	Change
Value at Risk	-4,97 %	-4,53 %	0,44 %
CVaR	-6,28 %	-5,72 %	0,56 %
Average maximum drawdown	-5,17 %	-4,75 %	0,43 %
Maximum drawdown at risk	-9,26 %	-8,56 %	0,70 %
CDAR	-10,67 %	-9,98 %	0,69 %

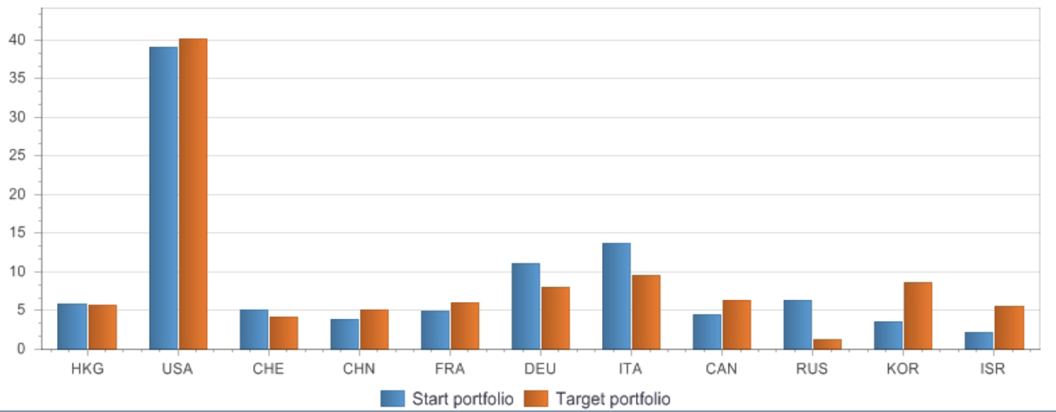
VaR compliance

Comparison of securities contribution to VaR



Comparison of securities contribution to VaR

Comparison of countries contribution to VaR



Comparison of countries contribution to VaR

	Portfolio share		Contribution to VaR		
Ticker	Start portfolio	Target portfolio	Start portfolio	Target portfolio	Change
CNOOC Ltd	8,12 %	8,75 %	5,81 %	5,68 %	-0,13 %
Apple Inc	17,38 %	14,58 %	22,31 %	18,19 %	-4,12 %
ABB Ltd	7,69 %	5,83 %	5,08 %	4,13 %	-0,95 %
Baidu Inc	4,62 %	4,86 %	3,84 %	5,01 %	1,17 %
BNP Paribas SA	4,64 %	5,83 %	4,95 %	6,01 %	1,07 %
Deutsche Bank AG	9,23 %	6,80 %	11,06 %	7,96 %	-3,09 %
Eni SpA	11,54 %	8,75 %	13,74 %	9,46 %	-4,27 %
Google Inc	17,38 %	19,44 %	16,75 %	21,92 %	5,18 %
Potash Corp of Saskatchewan Inc	4,64 %	6,80 %	4,42 %	6,27 %	1,85 %
Sberbank of Russia	3,48 %	0,97 %	6,31 %	1,28 %	-5,03 %
Samsung Electronics Co Ltd	5,80 %	8,75 %	3,55 %	8,55 %	5,00 %
Teva Pharmaceutical Industries Ltd	5,50 %	8,65 %	2,21 %	5,53 %	3,32 %

Contributions to portfolio VaR of individual securities

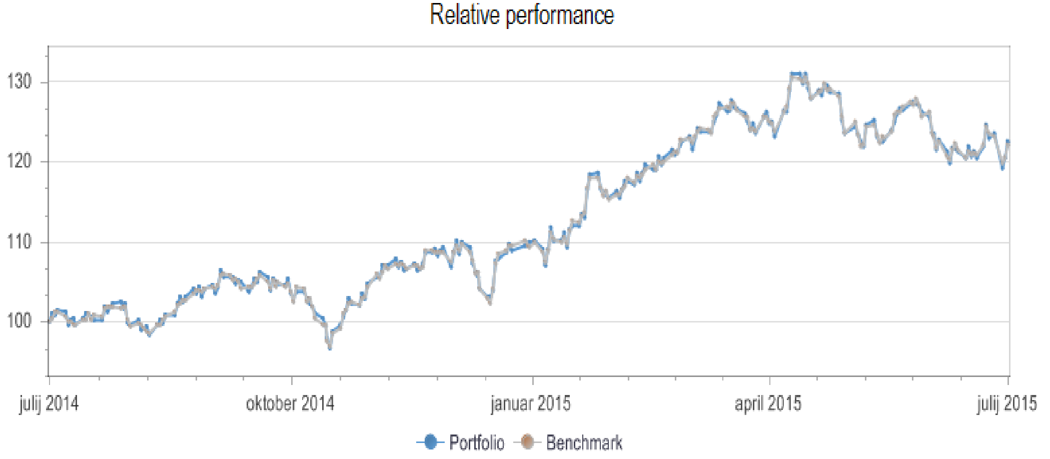
Performance measurement

Portfolio: Moderate Risk Equity Fund   **Portfolio type:** Equity Fund
Benchmark: MSCI AC World

Performance	Portfolio	Benchmark
3-m return	-1,76%	-2,34%
12-m return	22,53%	22,11%
36-m return	56,48%	57,47%
3-m excess return	0,58%	/
12-m excess return	0,42%	/
36-m excess return	-0,99%	/

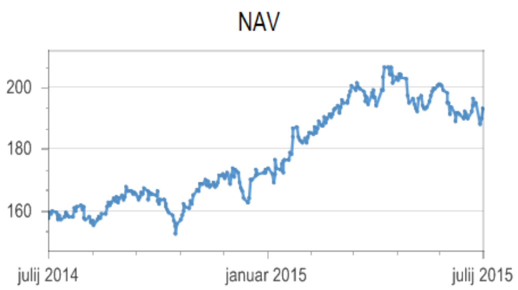
Performance	Portfolio	Benchmark
Information ratio	0,08	/
Sharpe ratio	1,32	1,55
Treynor ratio	21,78 %	21,01 %
Sortino	1,08	/
Jensen's alpha	0,09%	/

Performance indicators of portfolio management



Relative performance

Total risk	Portfolio	Benchmark
Annual standard deviation	16,53%	13,56%
Maximum drawdown	-9,12%	-8,42%
Downside deviation	16,24%	13,53%
Relative risk	1,22	/
VaR	-5,42%	-4,44%
Beta	1,001	1



Risk indicators

Performance indicators:

- Information ratio
- Sharpe ratio
- Treynor ratio
- Sortino
- Jensen's Alpha

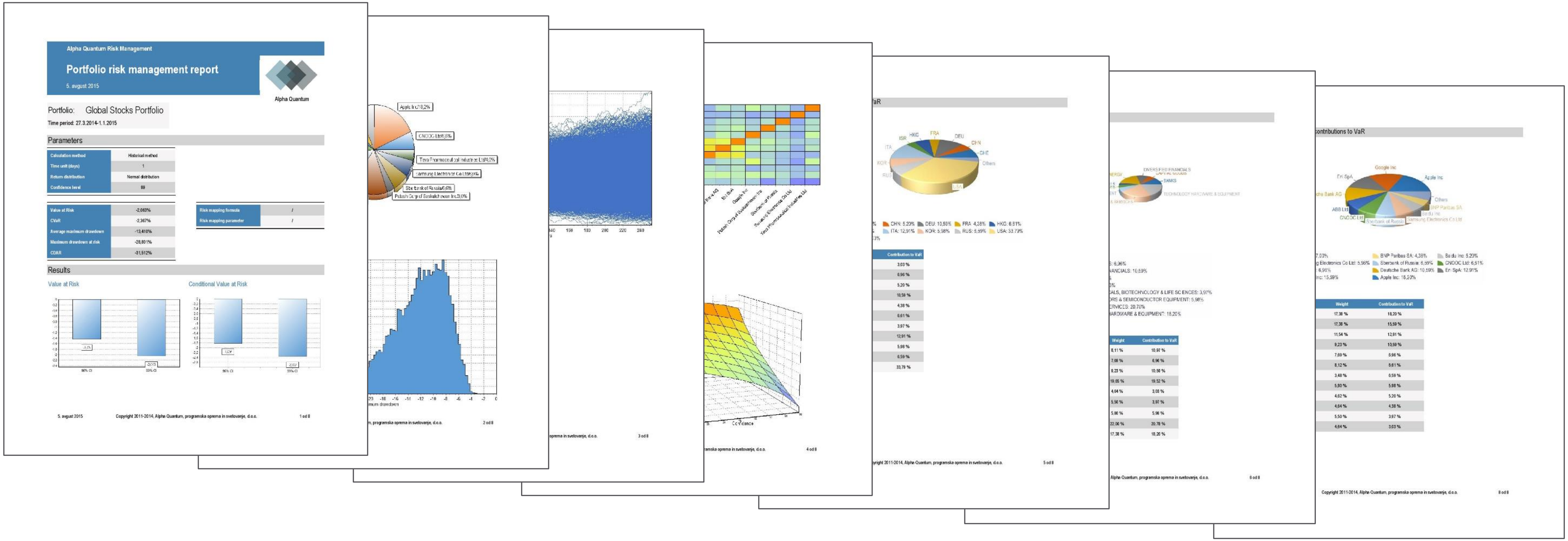
Risk indicators:

- Standard deviation
- Maximum drawdown
- Downside deviation
- Relative risk
- Beta

Selection of supported indicators

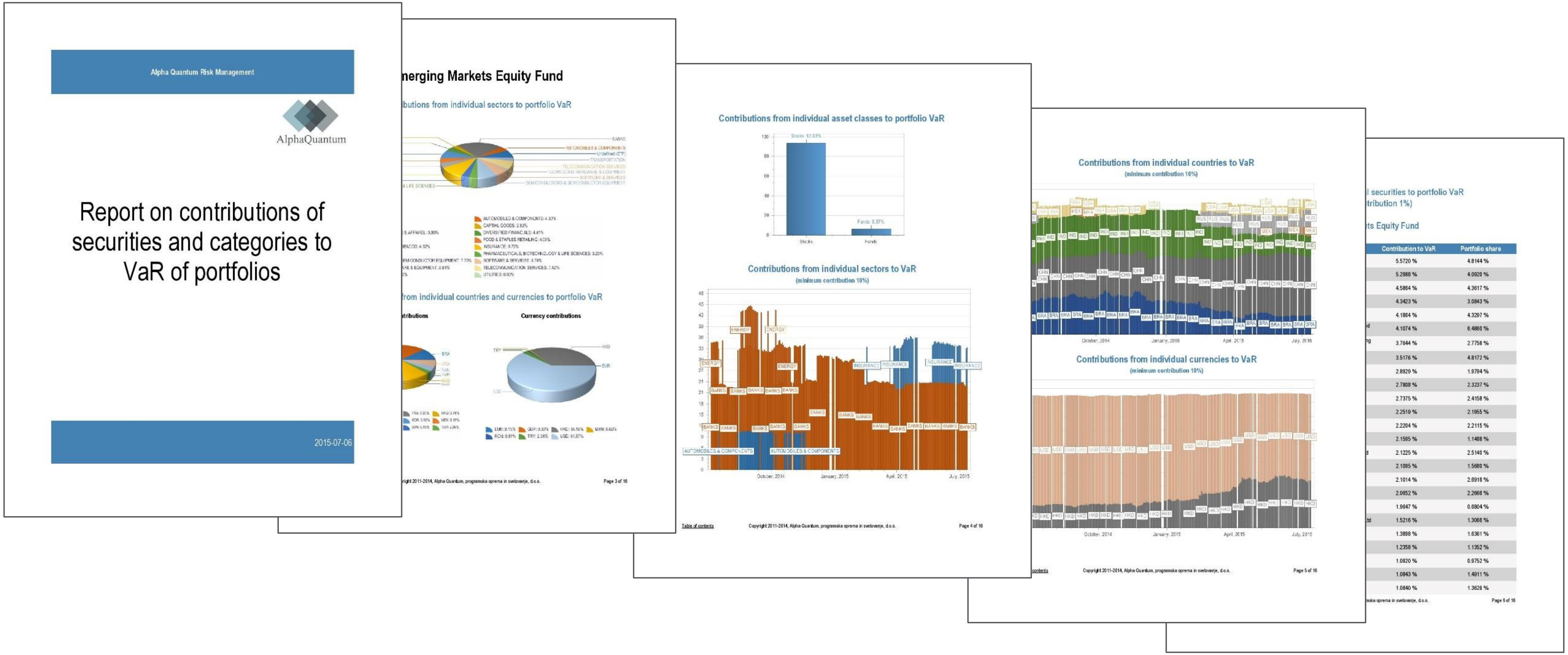
Powerful reporting capabilities

Example report 1



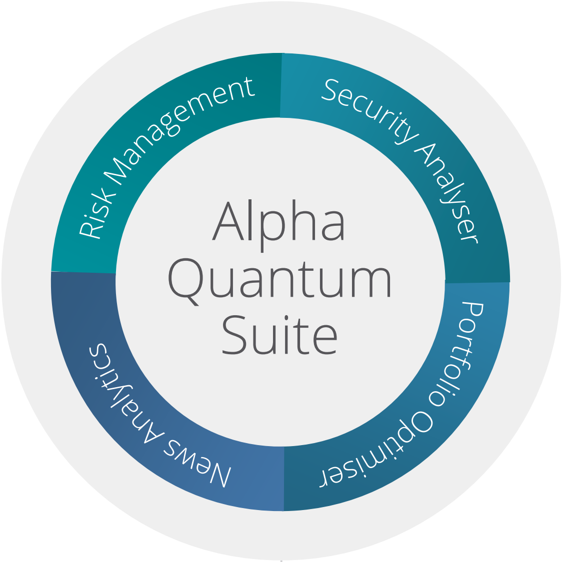
Powerful reporting capabilities

Example report 2



Powerful reporting capabilities

Example report 3



Vision

We offer a complete and integrated platform for asset management, ranging from risk management, analysis, valuation and ranking of companies, portfolio optimisation, asset allocation, versatile backtesting of strategies and analysis of news.

The Alpha Quantum Way

Quantitative.
The core of our philosophy.

Innovative.
The main source of alpha returns.

Robust. Researched.
The cornerstone of our solutions is stability.

Alpha.
The consequence.

Alpha Quantum Risk Management

Main features of risk management solution are VaR methods, stress testing, pre-trade risk management, risk attribution, performance measurement. They also include limits monitoring, regulatory compliance and powerful reporting capabilities.

Alpha Quantum Security Analyser

Innovative solution for financial analysis, valuation and ranking of companies. Comprehensive and versatile platform for researching, backtesting and using quantitative strategies based on fundamental, pricing, news analytics and other data.

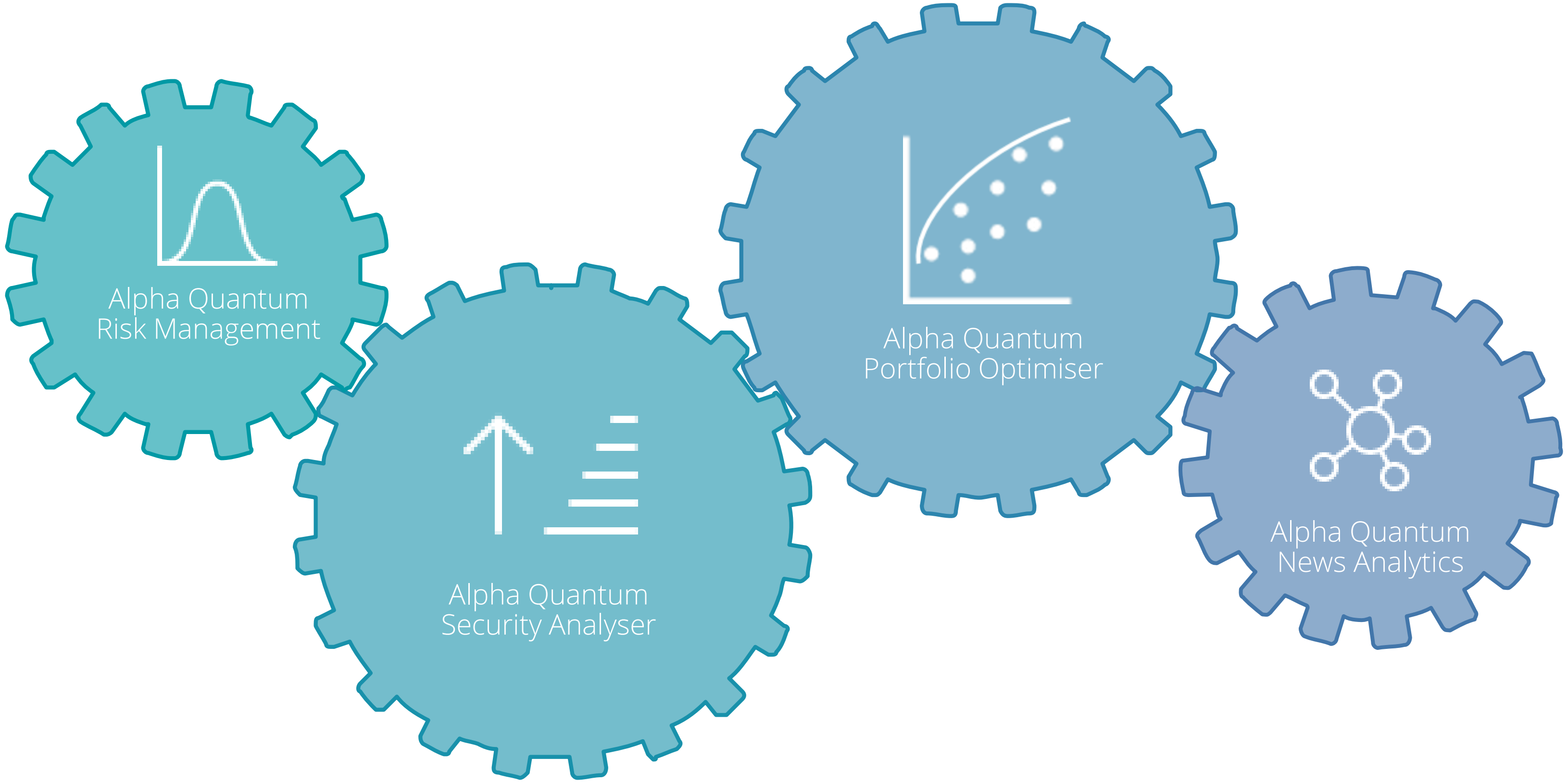
Alpha Quantum Portfolio Optimiser

Sophisticated solution for portfolio optimization and asset allocation offering a wide array of features which support many different applications, investment products and can form a platform for automated asset management services.

Alpha Quantum News Analytics

Platform for scanning, annotating, storing and analysing in real time data from news, blogs, social media and other sources. Tools for identifying and analysing macro and sector trends. Sentiment scoring methodology. News analytics signals for quantitative trading strategies.

High integration and interconnectedness of solutions in Alpha Quantum Suite



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The Alpha Quantum Way.

Our solutions

Portfolio Optimiser, Risk Management, Security Analyser, News Analytics

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