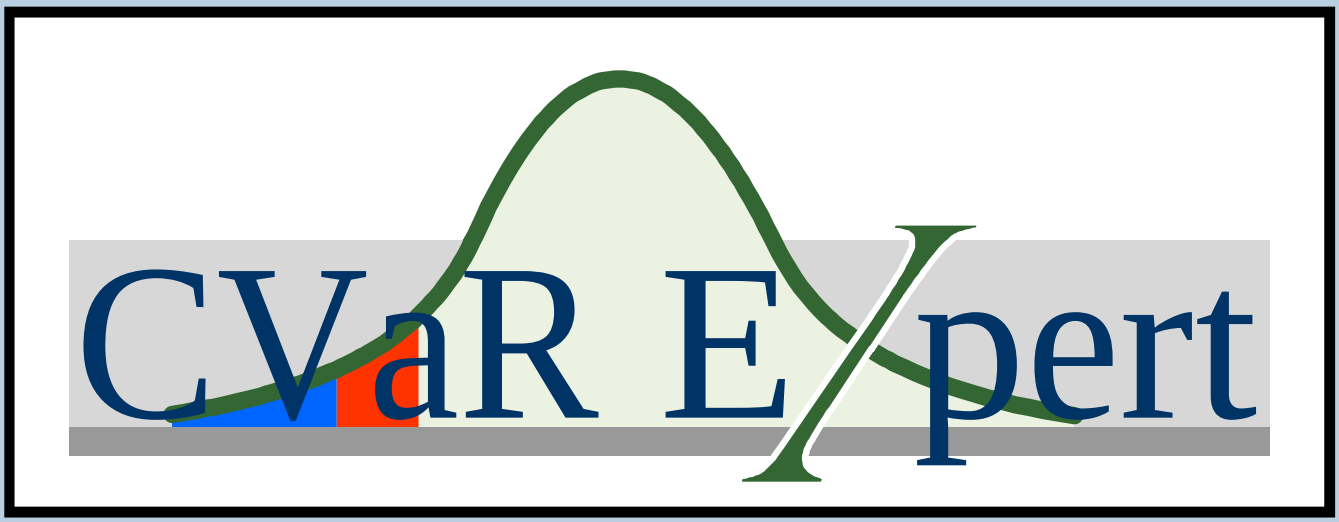
Rho-Works

Advanced Analytical Systems



Product information

CVaR Expert

Presentation

Value-at-Risk (VaR) is the most widely used measure of market risk for individual assets and portfolios. **Conditional Value-at-Risk** (CVaR, also called Expected Shortfall) has been recently proposed as a better alternative to VaR (Delbaen [2000], Uryasev [2000, 2002 and 2003], Rockafellar y Uryasev [2002], Acerbi et al. [2001], Embrechts et al. [2001], Acerbi y Tasche [2002]).

While VaR estimates an expected maximum loss for a portfolio given a time horizon and a level of statistical significance, CVaR measures the maximum expected loss for a portfolio, considering only the cases in which the loss is greater than the VaR. Therefore, CVaR is able to quantify dangers beyond VaR.

As a measure of risk, CVaR offers significant advantages over VaR, especially when the market data show discreet, discontinuous or non-normal return distributions (a particularly common situation if there are «holes» on the information matrix for low-liquidity assets). One remedy to solve the discreetness problem is to use parametric models (that assume continuous loss distributions). Nevertheless, in most cases this assumption is too far from reality to give meaningful results.

Being a topologically «coherent» risk measure (Artzner [1999]), CVaR provides answers to portfolio optimization problems that VaR alone would not be able to handle. Combined with appropriate programming techniques, CVaR can help to solve many real-life large-scale calculations that could otherwise be out of reach. Several case studies show the numerical efficiency and stability of such calculations and the convexity property of CVaR, which ensures the existence and uniqueness of a global minimum on the risk surface, even in the optimization problem of large portfolios (Rockafellar y Uryasev [2002], Acerbi [2002]).

CVaR Expert Enterprise Edition lets you calculate, with very high precision, the composition of the «minimum CVaR portfolio», an absolute benchmark of minimum risk.

CVaR Expert is the complete solution for measuring, analyzing and managing risk using Historical VaR and CVaR methodologies. In addition to the traditional measures of Value-at-Risk (such as Beta VaR and Component VaR), *CVaR Expert* incorporates modules to project VaR and CVaR for different horizons and simulate VaR and CVaR using the current portfolio composition or its historical compositions.

CVaR Expert enables you to work with assets individually as well as forming portfolios, creating assets groups (for countries, currency, clients, brokers ...) and making multi-currency investments.

CVaR Expert integrates an advanced numerical optimization module that calculates the portfolio with minimum CVaR, based on the historical market information and taking into account constraints and preferences of the investor, thus giving the best benchmark to be replicated. It also counts with a module that uses Stochastic Simulation to draw every possible portfolio on the CVaR-Return plane, letting you analyze your current position strategically on the map of all feasible positions.

Editions

CVaR Expert is presented in three different editions: Standard, Professional and Enterprise, designed to attend the needs of academic users, small/medium firms and bigger investment firms, respectively.

The following table summarizes the main features of the three editions:

Edition	Standard	Pro	Enterprise
Number of assets (maximum)	**10**	**50**	**500**
Observations (maximum)	**200**	**500**	**5000**
Multicurrency investments	✘	✘	✓
Asset groups	✓	✓	✓
Stochastic simulation	✘	✘	✓
Portfolio optimization	✘	✘	✓

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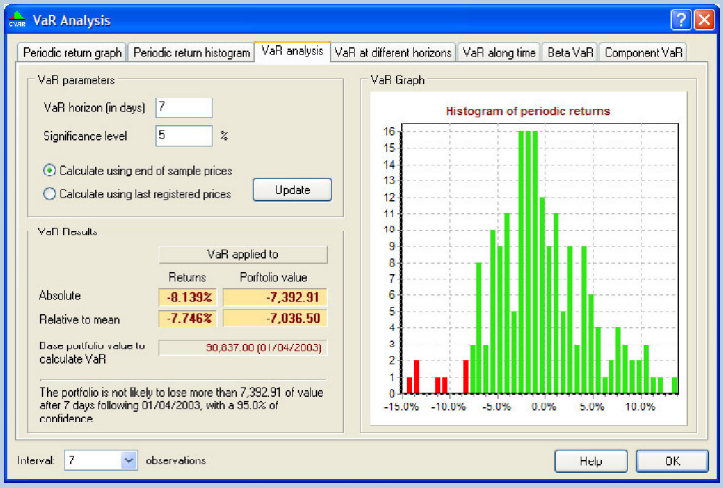
Features

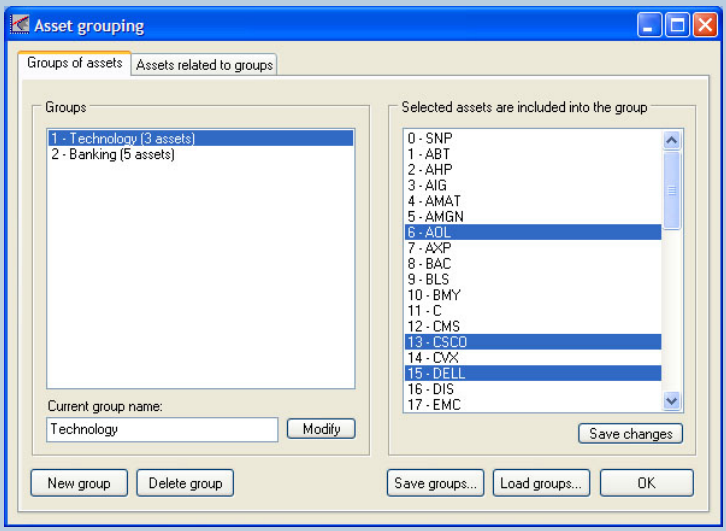


VaR and CVaR measures

VaR and CVaR are estimators of how much a portfolio can lose in a determinate time horizon, considering a confidence level (probability of error).

One of the advantages of this estimator is that it is expressed in currency units.

CVaR Expert automates the data management and calculation processes needed to get the historical VaR and CVaR.



Asset grouping

CVaR Expert lets you create groups of assets with simplicity and flexibility.

Groups can be created by type of asset, country, currency, or by any user defined characteristic. The groups are not necessarily disjoint, as they may contain common assets.

Once defined, the software can analyze the marginal risk contribution of every single group of assets to the total risk of the portfolio.

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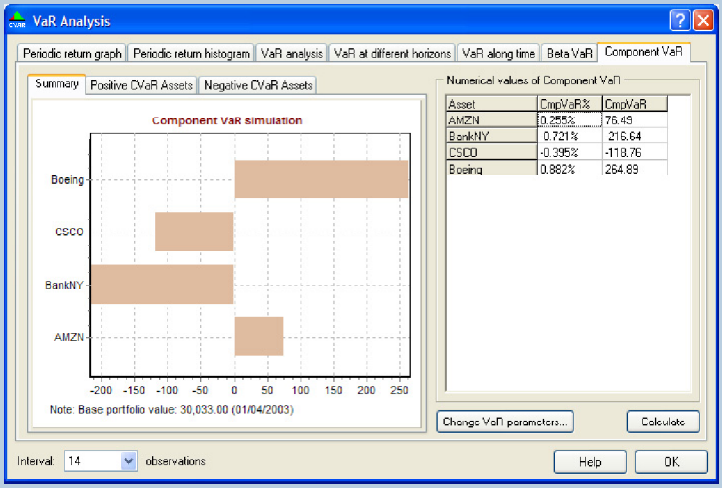
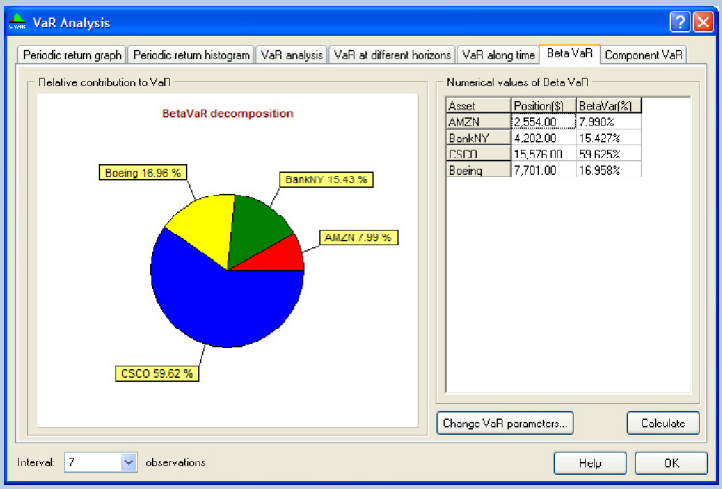


Marginal VaR

Component or marginal VaR is calculated estimating the VaR before and after including and asset, group or currency into the portfolio.

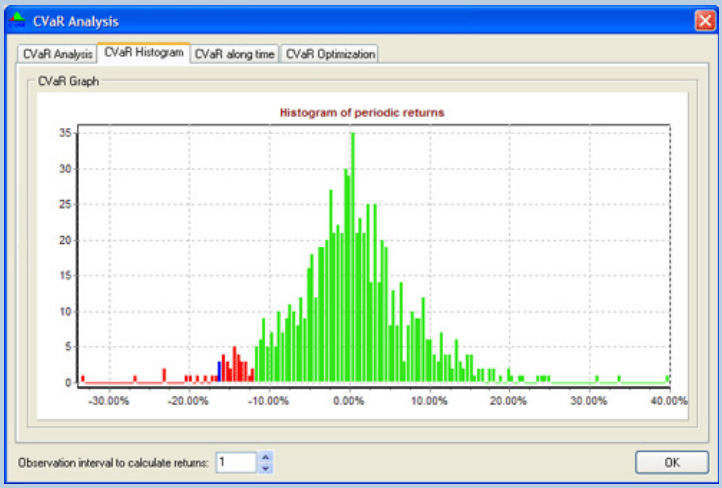
The main advantage of this result over traditional VaR is that it provides a very clear measure of group and specific risk in a portfolio.



Beta VaR

Beta VaR quantifies the relative contribution of an asset to the total risk of a portfolio and is expressed as a percentage.

The Beta coefficient estimates the sensibility of the returns of an asset to changes in the returns of a well diversified portfolio.



Histograms

CVaR Expert presents histograms that show the return distributions of individual assets and the portfolio. VaR and CVaR measures are clearly marked with different colors.

All graphs created with the program can be exported to other applications for reporting purposes.

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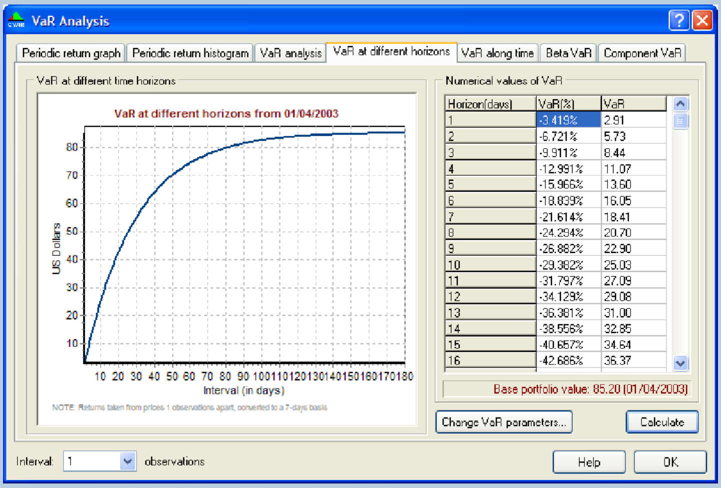
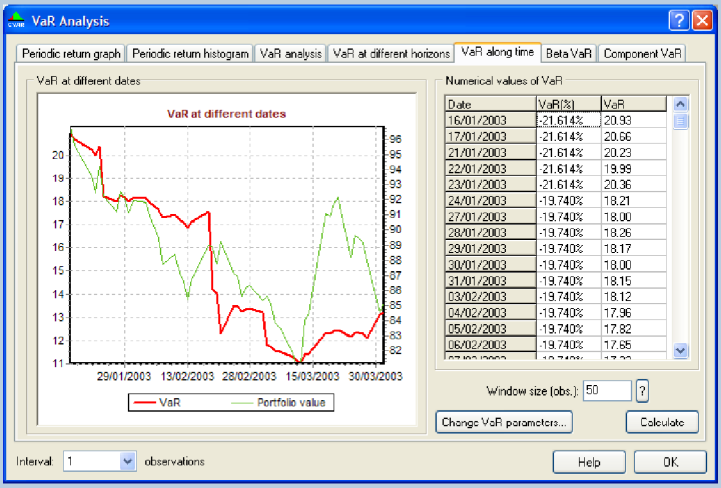


VaR at different horizons

CVaR Expert projects VaR and CVaR at different time horizons and creates graphics and tables showing the expected maximum loses (percent and absolute) of the portfolio at those horizons.

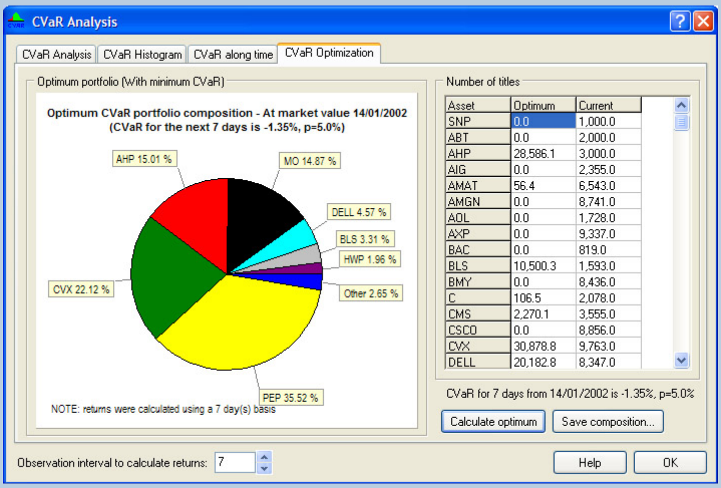
All information is presented in tabular format and can be exported to a spreadsheet in order to generate customized reports.



Historical simulations

CVaR Expert simulates the evolution of the portfolio VaR and CVaR through time, allowing you to analyze the historical risk profile of the portfolio.

The program can calculate the historical risk measures using either the current portfolio composition with past asset prices (*ceteris paribus historical analysis*) or the past portfolio compositions with the corresponding asset prices (*proper historical analysis*).



CVaR Optimization

CVaR Expert is able to calculate the optimum composition with minimum CVaR (minimum risk) even for large or complex portfolios. This is an effective way to define an absolute benchmark portfolio for the selected assets.

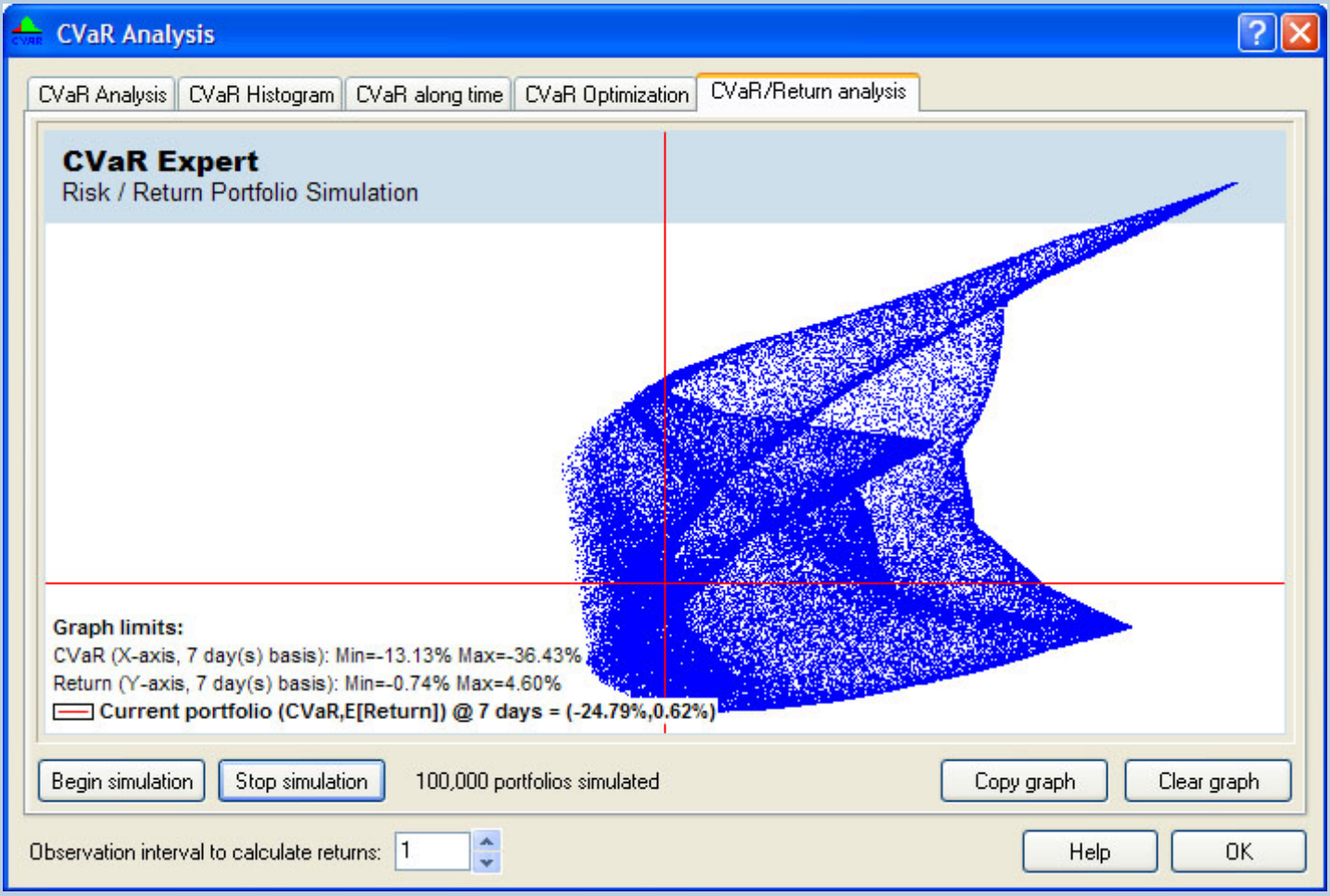
Once the numerical optimization is completed, the optimum composition may be saved for future reference or copied into the current portfolio in order to develop a deeper analysis.

Portfolio stochastic simulation
CVaR-Return analysis

CVaR Expert is able to conduct a Risk-Return analysis (CVaR versus Expected Return) based on all the portfolios that may be formed with the assets that compose the current portfolio.

The program uses an advanced stochastic simulator to examine thousands or even millions of feasible portfolios. For every feasible portfolio composition, *CVaR Expert* draws a correctly positioned point on the Risk-Return plane. An appropriately located crosshair indicates the current portfolio combination of Risk and Expected Return, so you can judge how your portfolio is performing compared to the rest of alternatives, including the global optimum.

This powerful module allows you to analyze the position of the current portfolio with a more strategic perspective, revealing the improvements that could be made to the Return and Risk of the portfolio by adjusting its composition.



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CVaR Expert licenses

Professional and Enterprise licenses

Edition	Pro	Enterprise
First license	**$ 5,000**	**$ 15,000**
Licenses 2 - 10	**$ 1,500**	**$ 5,000**
Additional licenses	**$ 500**	**$ 2,000**

(*) Per license prices. Each license applies to an individual PC.

Standard licenses
for personal and academic users

Edition	Standard
First 10 licenses	**$ 100**
Additional licenses	**$ 80**

(*) Per license prices. Each license applies to an individual PC.

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