

Quantax® News

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Welcome!

After integrating our colleagues from talkfinance, the Quantax Operations are now streamlined out of the COMIT Zurich headquarters.

The Product Development Team worked closely together with the specialists of the Quantax Services Team to bring you the Enhanced Equity Model, which is the main focus of Quantax 4.5.2 and this issue of Quantax News.

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News

We are pleased to welcome Jürgen Hetfleisch in the Quantax Team. Jürgen joins us from Austria. He brings an extensive experience with Quantax due to a past employment. In August 2009, Fabio Scala will join our team for the last year of his apprenticeship as an Application Developer.

Meanwhile, Hansjörg Anderegg, "father of Quantax" has written three more novels and gained quite a readership in the Quantax community – see www.hjanderegg.ch.

Enhanced Equity Model

Up to Quantax 4.5.1, the VaR calculation always mapped equity risk to a single market, determined by the issuer's country. Quantax 4.5.2 provides more flexibility: Equity risk can now be mapped to three different Risk Factors:

- Country Index (Classic Capital Asset Pricing Model (CAPM))
- Specified Market Index (Extended Single Index Model)
- Specific Equity Risk (Granular Model)

This flexibility is especially welcome in the current climate of market distortions, as well as in the context of more complex instruments, which map into a particular sub-market.

The services we provide as part of the Quantax solution have also been enhanced to take advantage of the flexible mappings.

Quantax Enhancements

Mapping to Market Indices

The risk of equities can be explained by several risk drivers. On the one hand, some risk is explained by the movement of some market index; on the other hand the equity itself incurs a specific risk.

For each of the new mapping strategies, (i.e., market index or granular), the corresponding data (volatilities, correlations, and the beta of the equity relative to the index) are required.

The volatility can be provided via a scenario or the VaR Volatilities rate object. If some volatility is not available, the risk is mapped to the default country index, as in previous versions.

VaR Calibration Report

Different volatilities, betas, and optional risk scaling factors are used to calculate the value at risk of a certain position. The VaR Calibration Report shows which input variables are used and compares it to the other possible input values. It shows the scaled volatility that is actually used in the calculation, hence providing transparency into this rather complex process.

In addition, the report shows selected parts of the underlying correlation matrix, helping to understand the correlation effects that are so important when analyzing the risk of a complex portfolio.

Quantax Q-VaR-Set provides the statistics

Assigning the country index to an equity was easy – there was no choice involved. Selecting the most appropriate index from a set of available indices requires a fitting process, designed to minimize the specific, "unsystematic" risk that is not attributable to the movement of the index.

The Q-VaR-Set, as part of our Quantax Services, has been extended to provide full flexibility around the new Quantax functionality:

Country Index Volatilities, Correlations, and Betas

We support the Extended Single Index Model by determining for each equity or fund the market index with the highest correlation. We then calculate the required volatilities, correlations, and betas and feed them into Quantax.

In addition we support the Granular Model by calculating and maintaining all required equity-specific volatilities in a dedicated database.

Outlook

In future versions, we will develop Quantax further towards a Multifactor Model, which allows for a more precise, albeit less transparent, mapping of equity price movements to a small number of underlying market factors. We will base this model on the experience with the model described in this article as well as on feedback gained from our clients.

Quantax Release 4.5.2

Quantax 4.5.2 is a Service Pack with considerable new functionality, mainly in the area of Exotic Baskets and Value at Risk. It contains about 100 changes and fixes. Quantax 4.5.2 is available since end of May 2009.

Instruments and Deal Capture

Exotic Baskets

There are three new instruments where the underlying is a basket of equities and indices. The valuation is performed by a Monte Carlo simulation.

Window Barrier Rainbow Options

There are various possibilities to define such a product: different barriers can be defined on the underlyings or on the basket, whereas these barriers can be active only in defined time intervals. The payoff is defined via payoff expressions.

A payoff expression uses pre-defined functions and given variables such as the simulated paths or the static data of the asset itself. As for the rate index function, the payoff expression can be defined using site-specific Python code to model a very specific payoff scheme.

Window Barrier Rainbow Options can be either European or American style, or the user can define special exercise windows (Bermudan).

Reverse Convertibles

Reverse Convertibles are short-term bonds linked to a basket of underlying stocks. The coupon rate is rather high. The redemption depends on the events happening until expiry. Instead of the nominal, a fixed number of stocks may be paid back when the value of the stocks is less than the nominal.

There are two types: Multi Barrier Reverse Convertibles have a fixed barrier below the stock's initial price. Inverse Multi Barrier Reverse convertibles have a barrier above the initial price.

Value at Risk for Exotics

A naive implementation of Monte Carlo VaR for exotics would perform a Monte Carlo valuation of the exotic asset for each random path of the Monte Carlo VaR (the so-called MC² problem). To avoid this, Quantax approximates the value of the products at horizon using a Taylor expansion.

Composites

A zero monkey cash is now always shown in a decomposed Composite that has a market value, ensuring that the Composite itself always appears in reports.

Analytics and Reporting

Portfolio Definition uses absolute quantity

The absolute transaction quantity is used for comparisons in portfolio definitions. This allows to select transactions larger or smaller than a certain quantity, irrespective of their sign.

FX Spot Position Drilldown

The drilldown in the FX Spot Position reports now includes FX transactions for which the split currency is part of the selected pair and cash transactions with base product `fxcash` and the commodity corresponding to the selected pair.

PF @ Glance

The percentage of portfolio value columns can now be based on one of the hierarchy level, e.g., using book as 100%. Hierarchy levels above the selected level are shown against the grand total.

Moreover, the new `% of next higher level` column shows the percentage of this line against its containing hierarchical level.

Value at Risk Enhancements

Support for Market Index Single Models

A specific vol can now be set on a market index, and affects all equities that use this index and have no specific vol themselves. The definition is recursive, i.e., an index may refer to another index. The beta of the equity always refers to the first index. If no index has a specific vol, the ccy continues to be used as the VaR RF.

Furthermore, use of Specific Vol can be enforced for Parametric VaR or MC VaR calculations. Specific Vol can be always, never, or according to the setting of equity.

VaR Calibration Parameters Report

The report now lists all equity risk factors used in the current portfolio. The following columns are shown:

- equity descriptor: Name and descriptor of the equity
- mktindex: The market index used (to which beta refers)
- varRF: The VaR RF to which this equity contributes
- ccy: The ccy of the equity
- spec: 'X' if a specific vol is used for this equity.
- scvoleq: volatility of the equity in the scenario
- scvolRF: Volatility of the VaR RF in the scenario
- varvoleq: Volatility of the equity from VaR volatilities data set
- varvolRF: Volatility of the VaR RF from VaR volatilities data sets
- caleq: Calibration factor of the equity
- calRF: Calibration factor of the VaR RF
- beta: Beta against the mkt index
- effvol: Effective volatility used for VaR calculations
- used vol: vol descriptor used for calculation

There is a new, optional section in the report that can be used to show subsets of the correlation matrix. Risk factors to be shown on the vertical and horizontal axes can be selected using patterns. If only a horizontal pattern is supplied, all equity risk factors of the current portfolio are listed vertically.

Moreover, the report format has been made more legible with section titles.

MC VaR Stratification / Student t distribution

The MC VaR stratification algorithm has been replaced by a better one. The old algorithm produced unstable results if portfolio contained only a few risk factors. The Student t distribution implementation also has been corrected.

Miscellaneous

MC VaR now calculates Component VaR (cvar) considering the Top Level, consistent with Parametric VaR.

Other Reports

The Role controller can now run a Limit Report.

The `tally` element of a Transaction Report is 1 for each transaction; this allows easy totaling over the number of transactions.

Negative break-even is now correctly handled in Issue Position.

Static Data and Rates

Limit Definition

A limit can now be restricted to one or more reports. This is useful if different limits are to be set against reports with different parameters, e.g., two VaR reports with different horizon periods.

QIRF changes

Note: Infotec is now called GL Infolink. Therefore, QIRF now stands for *Quantax Infolink Rate Server*.

QIRF now performs a bounds check on Yield Curve rates. The default acceptable interval is 0 to 20%.

QIRF now handles equities quoted in Great Britain Pence (GBX) correctly.

A symbol can be changed by a configurable hook function `symbolhook` before being passed to the Infolink server.

Empty XML files (with no declaration or no `<Quantax>` tag) are ignored and no error message is issued.

Technical

Quantax Server Installer

Quantax 4.5.2 introduces the Quantax Installer with the following capabilities:

- New installation and upgrades (starting with 4.5.1 as basis)
- Installs Quantax and its underlying components Zope, Python, registers Windows Services.
- Configuration steps: Adapts all configuration files (for Zope and ZEO mode), creates Zope instance, sets up Data Warehouse interface, installs license.

Archiving Changes

Archiving does now consider the book date of transaction, in order to avoid archiving old transactions that were recently (re-)entered in Quantax.

In previous releases, archiving generated separate buy and sell transactions (for each key). This change affects cash and issue transactions; it does not affect OTC transactions.

Payment Cashflows are now omitted in the XML export of archived transactions. This makes the export faster and more compact.

Restarting Workers

Workers can now be restarted using the *Restart selected* button in Utilities→ Worker Processes. Workers are restarted automatically upon Memory Errors, after a certain number of requests have been executed (in order to avoid restart loops).

Prevent running reports in main process

In Quantax 4.5, reports run in the main process if there is no free worker at the time the report is requested. Reports in the main task run slowly and also slow down other operations in Quantax. A new parameter setting may be used to prevent running reports in the main process. A grace period can be specified, causing report execution to wait for a worker to become free.

For more than 25 years, the name COMIT has been synonymous with high quality IT advice and the implementation of specialized IT solutions. Our in-depth knowledge of our business sector has empowered us to build bridges between the IT and Finance. We are able provide our customers with true end-to-end solutions, from strategic consulting through system implementations to the operation of an implemented solution.

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