The SSPA Risk Figure

1 Value at Risk (VaR)

Value at Risk (VaR) is the financial industry's most widely used assessment method for the market risk of an investment. It answers the question, "If I lose money, how much could I lose?" For instance, VaR might indicate that with a probability of 99 percent, a certain investment will lose no more than a specific amount in a 10-day investment period.

VaR calculations systematically examine the effect of changes in risks factors, such as volatility, interest rates and price of the underlying, on a product or portfolio, to infer the level of a potential loss and its probability.

The VaR as used to assess an investment is expressed as a figure, usually a percentage. A 13-percent VaR of a structured product tells us that a loss on a CHF 10,000 investment should not exceed CHF 1,300 according to the given VaR scenario. The loss may be lower or not occur at all. As a rule VaR, holding period and confidence interval, so-called, are stated as one. The holding period states the time frame during which VaR applies. A 10-day holding period indicates that one is invested for the next ten days. The confidence interval indicates the significance of the VaR. For instance, a 99-percent confidence interval means VaR is accurate 99 times out of a hundred.

2 Value at Risk Methods

VaR may be calculated analytically or by simulation. The advantage of analytical calculation is its quick and simple risk assessment – a considerable advantage for large portfolios. But because the process is inaccurate for structured products, SSPA does not use it.

VaR calculation by simulation makes use of either the Monte Carlo or historic simulation. In Monte Carlo simulations, loss distribution is based on the results of computer-generated scenarios. While this method may involve a lot of calculation steps, scenarios do not have to be limited to normal distribution.

Historic simulation method calculations are based on historic data sets, which themselves represent possible scenarios, thus rendering computer generation unnecessary. SSPA calculations make use of historic simulation, a method known to work when applied to structured products and widely used in the financial community.

3 Historic Value at Risk

VaR based on historic data aims to predict quantitatively market risk. The choice of time window is crucial for accuracy of the results. Too wide a time frame raises questions of the relevance of very old data. Too narrow a time window and the data may not be representative, nor contain a sufficient selection of extremes. Today's volatile market suggests a limited, 250-day, time window.

VaR calculations based on historic data dispense with assumptions of price distribution or correlation of different underlyings, because it doesn't make any model assumptions.

It is important to remember, however, that historic data depict only known events and are unable to take account of new products or future market changes. In other words, only known scenarios are evaluated.

In the case of structured products, the historic VaR cannot be derived directly from price history (see Appendix for an actual example). Therefore the underlying's past statistics and scenarios are used to determine a structured product's VaR.

4 The SSPA Risk Figure

SSPA is introducing the VaR as Risk Figure to improve the transparency of structured products listed in Switzerland, with historic VaR the preferred means of calculating the VaR.

As SSPA standard a time window of 250 days, a 10-day time horizon and a 99-percent confidence interval is chosen. These are parameters that conform to the international VaR calculation standard.

Risk Figures are calculated daily on close of market and published on the following day prior to market opening. Both Risk Figure and SSPA Risk Rating are available on the SSPA website (www.svsp-verband.ch/riskrating_en). Data vendors, banks, portals and other market participants can access the information through the Swiss Market Feed's (SMF) SIX Exfeed.

Derivative Partners Research AG collects and manages the data. Calculation agents Riskmetrics Group calculate the actual VaR based on this particular data..

To support the risk assessment, structured products are ordered according to VaR in six risk categories. The categories comprise the SSPA Risk Rating for each structured product listed in Switzerland.

Risk Class	Risk Perception	Comparable to
1	low	Money Market, Deposits
2	moderate	Bonds
3	medium	Mixed Portfolio Bonds / Shares
4	increased	Blue Chips
5	high	Small / Mid Caps, Emerging Markets
6	very high	Options, Futures

Because the VaR rises or falls with the market conditions, an independent risk commission checks intervals regularly and adjusts them accordingly based on a fixed set of rules. In extreme cases and at static intervals, yield optimization products may be assigned to risk category 6 – the risk level of leverage products. Periodic checks of VaR intervals ensure that market risks of individual products are appropriately classified in the correct relation with each other.

5 The Risk Commission

Together with the introduction of the Risk Rating, SSPA has appointed an independent risk commission consisting of experts from the structured products and risk management fields. Its tasks include promoting the transparency of structured products with regards to risk, yield opportunities and complexity, as well as assessing new analytical methods and improving existing ones.

Also, SSPA's Risk Commission determines dynamic risk rating threshold values and regularly monitors and corrects intervals for the six risk categories as needed in order to ensure that structured products' Risk Ratings are in the correct relation with each other. Furthermore, for the sake of greater transparency and understanding, SSPA has ruled that Risk Commission changes are to be based on the above-mentioned rules, which are derived from a series of benchmark indices.

Benchmark index Value-at-Risk figures are calculated weekly and the six risk categories automatically adjusted according to the resulting interval limits. The Risk Commission may decide to take ad hoc action in the case of events of unforeseeable impact on market risk, for instance systemic risk.

More information can be found in the document «rules for automatic interval adjustment of the risk categories».

Appendix: An Example of Value at Risk for Warrants

This example explains primarily the evaluation process. For simplicity's sake we assume a 10-day time frame, a 99% confidence interval, a 500-days of historic data and two risk factors, the underlying's spot price and historic volatility. Additional factors taken into account for SSPA's VaR are current volatility and interest rate.

1. Historic Scenarios

Changes in the two risk factors are calculated based on their history. The number of scenarios depends on the time frame. A 10-day time frame and a 500-day historic horizon result in 490 possible scenarios:

Tab.1 Historical data 500-day

Day	Price of underlying (CHF)	Volatility (%)
1	21.7	32.6
2	21.9	32.5
…	…	…
500	16.2	54.2

Tab.2 Changes of the underlying risk factors spot price and volatility, 10-day horizon

Historic scenarios	Change in price of underlying (%)	Change in volatility (%)
1	4.3%	-11%
2	-0.6%	-10%
…	…	…
490	4.9%	-8%

2. Simulation Based on Historic Scenarios

As shown in Table 3 for the example of call warrants, products are evaluated and future changes estimated on the basis of historic scenarios.

Tab.3 Estimate for call warrants using historically generated scenarios, CHF 20 strike

Scenario	Price of underlying (CHF)	Volatility (%)	Value of product	Change in value (%)
1	16.9	48	0.1360	21
2	16.1	49	0.0672	-39

…	…	…	…	…
490	17.0	50	0.1706	52

3. Making Use of VaR

Changes in value help establish loss distribution, from which the VaR can be determined, as follows: Changes in value are listed in descending order to provide a range from maximum profit to maximum loss. At a 99-percent confidence interval, the VaR sought is to be found at the lowest one percent of values. If the list of changes in value contains 490 figures, for instance, then the VaR sought will be in the fifth-to-last figure of the series (1 percent of 490 equals approx. 5). The next paragraph contains ten calculation examples.

4. Some calculation examples

Calculations are based on the above method. Previously mentioned simplifications may result in benchmark deviations, which affect risk classification to only a minor degree.

Tab.4 Call warrant VaRS, varying strike prices

ISIN	Underlying	Strike (CHF)	Volatility	Interest (%)	Dividend (%)	Price of underlying	10-day, 99% VaR
CH0025469443	ABB N	30	0.4907981	0.753	0.0185	16.95	81%
CH0045809909	ABB N	28	0.5330507	0.897	0.0185	16.95	73%
CH0032460815	ABB N	35	0.5312445	0.753	0.0185	16.95	88%
CH0032487776	ABB N	36	0.9610488	0.428	0.0185	16.95	99%
CH0033376119	ABB N	32	0.7130746	0.428	0.0185	16.95	99%
CH0034884004	ABB N	50	0.7077225	0.753	0.0185	16.95	97%
CH0034883998	ABB N	38	1.012151	0.428	0.0185	16.95	99%
CH0035424735	ABB N	44	1.021928	0.428	0.0185	16.95	99%
CH0045343180	ABB N	24	0.4843161	0.897	0.0185	16.95	63%
CH0039500019	ABB N	36	0.5716195	0.827	0.0185	16.95	70%