

Default strategy – Equity and equity index products

Introduction

NASDAQ OMX will always attempt to close down positions with corresponding contracts if possible. This document describes different methodologies that are used to offset or close out the risks in a derivatives portfolio if the above is not possible.

Products

Generally the default strategies do not differ from one country to the other. On the other hand recommended hedging strategies very much depend on the liquidity in the various markets; hence different strategies may be used in different markets.

Equity products

The table below shows the different types of equity products that are currently cleared.

Country	Type	Attribute
Denmark	Futures, forwards, options	Standardized, tailor-made
Finland	Forwards, options	Standardized, tailor-made
Norway	Futures, forwards, options	Standardized, tailor-made
Sweden	Futures, forwards, options, binary options	Standardized, tailor-made

Equity index products

The table below shows the different types of equity index products that are currently cleared.

Country	Type	Attribute
Denmark	Futures, options	Standardized, tailor-made
Finland	Options	Tailor-made (custom made indices)
Norway	Futures	Standardized, tailor-made
Sweden	Futures, forwards, options, binary options	Standardized, tailor-made

Tailor-made products

Tailor-made (TM) contracts are handled similar to how standardized contracts are handled. There are two types of tailor-made contracts. The first type includes contracts based on specially approved underlying instruments. There are no market maker agreements on derivatives with these underlyings and the range of customers trading these instruments is very limited. The low liquidity in these contracts is reflected in the margin parameters which are typically higher than on standardized contracts. The second type of tailor-made contracts is based on standardized underlying instruments but have strikes and/or expiration dates that deviate from standardized contracts.

Risk assessment of defaulting portfolio

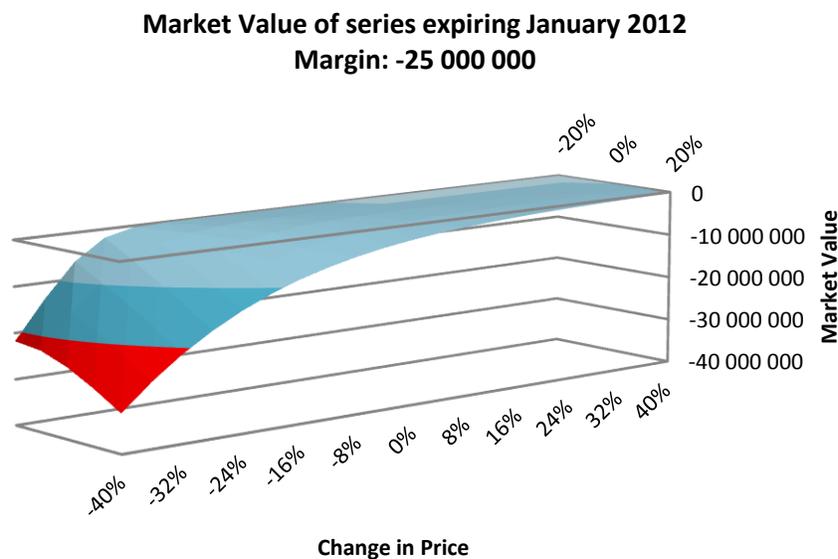
The Risk Management Department (RM) is responsible for providing a risk assessment to the Default Committee (DC), together with a proposed close-out and/or hedging strategy.

RM holds a wide range of tools, ranging from up to date intraday reports on positions and margins to in-house developed macros. These tools are used to perform risk assessments on a portfolio level as well as on a more segmented level. The portfolio is typically divided into sub-portfolios depending on:

- Market (country)
- Underlying type (stock or stock index)
- Expiration month

The aim is to quickly identify the most critical exposures and propose a method to close out these risks. If these positions are closed-out at fair prevailing prices (given a stable market) a substantial collateral buffer can be obtained that in turn mitigates the remaining exposure when closing out the remainder of the portfolio. RM also analyzes positions that are deemed less liquid, such as derivatives on underlying stocks with low trading activity and out-of-the-money options. These positions can have exposures that are not truly reflected in the margin requirements.

RM has developed an excel macro which performs a sensitivity analysis of stock and stock index portfolios which is quick and easy to use. The macro stresses underlying prices and volatilities to a desired “exaggerated” level and points out the vulnerabilities of the portfolio. This helps RM to pinpoint the contracts that create the exposure and that are to be prioritized when closing out or hedging the portfolio. The results are shown in 3D graphs that are easy to interpret. The example graph below indicates that there is an exposure in falling markets while volatility rises.



A second macro automatically segments the portfolio into risk neutral buckets. This is done per underlying and expiration date. The remaining positions are placed in different buckets based on underlying instruments and expiration dates. Delta values of these buckets are shown along with the current market value. By doing this RM is given a clearer view of the portfolio's exposures and is shown how much of the margin buffer that can be used to close out the buckets that have an exposure.

Hedging strategies

The Risk Management Department (RM) is responsible for assessing and recommending close-out or hedging strategies. The recommendations are to be presented to the Default Committee (DC) at the time of the default, or shortly after. The DC then decides the strategy that is to be used to handle the close-out or hedging of the portfolio.

Risk neutral batches

Larger portfolios are to be divided into batches, and when dealing with larger batches it is essential that these are as delta-neutral as possible. Members are not keen on taking on large exposures. Before hedging in the derivatives market the relevant custodian institution needs to be contacted for detailed information on the different stocks that might be held as collateral. Closing out larger positions of derivatives contracts often requires a combination of derivatives and underlying stocks.

Single stock futures and forwards

Forwards and futures have a linear payoff and are therefore easier to manage than options. The closing-out of the risks is done by using the following methods in order of preference:

1. Buying or selling underlying stocks
2. Go long or short in futures/options with similar maturities. This is recommended when handling with TM-contracts with maturities differing from standardized contracts.
3. Hedging with options is possible. Delta-hedging with options can only momentarily close out-the risks. The gamma value, i.e. the sensitivity of the delta value, has to be examined and the portfolio might have to be readjusted if the market moves in order to maintain delta-neutrality.

Stock index futures and forwards

Index futures can be hedged by going short or long in stocks but the larger indices include too many constituents for this method to be deemed feasible when time is of essence. Therefore the following methods are recommended in order of preference:

1. Hedge with similar ETFs (i.e. XACT OMXS30).
2. Go long or short in futures/forwards with similar maturities. This is recommended when handling with TM-contracts with maturities differing from standardized contracts.
3. Creating a basket of stocks that reflects the constituents of the index. A desired level of correlation to the original index is set in order to minimize the number of different stocks required in the basket.
4. Delta-hedging with options, although frequent readjustment is required. Sufficient liquidity in the options market is not to be expected when there is no liquidity in the futures market.

Options

First step when determining the close-out strategy for options is to verify if the options are “covered” or not. If short call options are covered by the underlying stocks the preferred method would be to offer the combined position of stocks and options. Otherwise the order of preference would be:

1. Go long or short in options with similar maturities or strike prices.
2. Buying or selling underlying stocks or index futures. This is preferred for in-the-money options with a delta value near 1.
3. Delta-hedging. Option portfolios are divided into buckets with different maturities. Each bucket will have its own delta value, along with the gamma value. With these values in hand it is relatively simple to determine what instruments that are needed to create a descent hedge. As always, a delta-neutral portfolio, which is not gamma-neutral, will need constant updating and readjustment in order to maintain delta-neutrality.

Binary options

Because of the nature of binary options the default handling strategies for these instruments have to be separated depending on the time to maturity.

Long-term options

Held binary call options are hedged by buying a call option with a strike below the strike of the binary option and selling a call option with a strike above the strike of the binary option. This limits the possible payoff of the option. The payoff curve of this position is similar to that of a binary option.

Short-term options

When the contract is close to maturity, with less than a week to expiry, the payoff curve is too steep to be hedged using the method described above. In this case the market maker and/or clients trading binary options will be contacted for prices. The position will be sold through either a closed or an open auction depending on the prices received from these parties. Since the hedging possibilities for these contracts is clearly limited the risk parameter will be raised on binary options when they near expiration.

Means of execution

Exchange Brokers (EB) are responsible for executing trades when hedging and closing out portfolios. EB will be given instructions and details on the default strategy set forth by the Default Committee. RM will assist EB during the closing-out process and will constantly update the risk profile of the portfolio as the process goes along. RM is responsible for updating the DC on a regular basis or if any significant change to the risk profile of the portfolio occurs.

EB keeps an updated list of market makers as well as a list of contact persons at each of NASDAQ OMX's members. The list provides telephone numbers and e-mail addresses as well as details on which products different people cover. An updated list of market makers is also kept by Product Management (PM).

For illiquid instruments, or instruments lacking market makers, all parties trading the same or similar instruments will be contacted for prices. If interest is low and prices are considered unfair it is possible to

hold an open auction. Clearing Operations (CO) will assist EB in putting together an auction of the positions by contacting all relevant parties. An exchange notice with details will also be published. Members will be notified of position details, time of auction and what prices that are deemed “acceptable”.

If required, stocks and ETFs will be bought or sold through Exchange Brokers. Agreements with Nordea and SEB, see attached contact list, allow NASDAQ OMX to trade equities on the Nordic stock markets.