

Margining methodology on the derivative markets

Definition of margin types

In line with the requirements only those margin elements are defined that are to cover the risks occurring until the liquidation of the relevant positions. The calculation is completed at the end of the day; therefore margin calculation is based on the status at the end of the clearing day, on positions not yet closed.

There are two margin types in the derivative market:

1. **Variation margin:** Theoretical loss/gain calculated for open positions with trade prices and settlement prices that is actually settled.
2. **Initial margin:** The value to cover risks arising from price changes until the position is liquidated.
 - a. In the case of options premium type margining is used that is part of the initial margin.
 - b. In the case of option instruments the initial margin includes the so-called 'Net Liquidation Value' (NLV) that is due to the buyer of the option and decreases the margin. (the full margin cannot go below 0).

Margins may be calculated and called intraday in the derivative markets.

Definition of instrument classes

In the case of derivative settlement instruments the following instrument classes are defined

- Index based instrument class
- Individual equity based instrument class,
- FX based instrument class,
- Interest rate based instrument class
- Grain based instrument class
- Gas based instrument class

Definition of the risk characteristics of instruments

Based on risk characteristics the following main groups of instruments cleared by KELER CCP can be differentiated. In terms of risk characteristic we differentiate multinet settlement instruments and futures instruments, and several sub groups can be formed within these main groups also.

In the case of futures risk characteristics are basically linear, where one unit of price change of the underlying is linked to a proportionate gain-loss.

○ **Index based instrument class**

Price is determined by the spot rate and the interest rates linked to the expiry. Settlement is in cash. Index based instrument prices are calculated from the individual equity based instruments that meet the mandatory requirements that are characterized by less volatility than the individual equities.

- **Individual equity based instrument class**

Price is determined by the spot rate and the interest rates linked to the expiry and the dividend. Settlement is physical.

- **FX based instrument class**

Price and all linked futures prices are determined by the spot rate and the interest rates linked to the expiry. Settlement is in cash.

- **Interest rate based instrument class**

Price is determined by the interest rates. Settlement is in cash.

- **Grain based instrument class**

Price and all linked futures prices are determined by the underlying, the storage costs and crop expectations, indirectly weather influences. There is material difference between the prices of old crop and new crop instrument that is largely effected by the joint influence of factors effecting the quantity of crop. International grain prices also exert a major influence; however, delivery costs also need to be taken into account. Settlement is physical delivery or cash settled. For certain instruments warehouse warrant settlement is available.

- **Option class**

The characteristics of option class instruments are not linear, therefore in the case of these instruments the calculation of expected loss gain can be completed with the use of the appropriate option pricing formula.

In the case of options – besides the current instrument range – we differentiate put and call type options and European or American type options.

For options the generally applied pricing formulas are detailed in the applicable specialized literature.

Determination of parameters

Variation margin calculation

There are no parameters linked to the variation margin part.

SPAN part

- **Futures price scan range**
- **Volatility scan range**
- other parameters (detailed under portfolio margining)
 - spread across expiries
 - spread across instruments

VaR calculation

Main parameters:

- period of data series: at least 1 year that includes stress period
- confidence level: 99%
- liquidation period: at least 2 days

Integration of protection against procyclical effects

The margin level is defined with 99% compliance in monthly reviews and it is increased with a multiplier of $b = \text{minimum } 1.25$ in normal periods. If it is found in the monthly review that a stress period occurred since the last review, with explanation comparable to the scale of stress established the margin defined is not required to include the buffer.

In the case of margin level exceeding the value at risk increased with buffer, decision on margins can be made based on other aspects also that can take into account fundamentals such as e.g. level of liquidity, market expectations, macro and global economic processes, market concentration, weather (e.g. grains,), etc.

Determination of the margin

The margin level of leading instruments is determined and the buffer is applied as follows:

- Determination of the VaR value of the price data series
 - $VaR1 = VaR(250 \text{ day}, 99\%, 1 \text{ day})$
- Determination of 2 days absolute value
 - $VaR2 = VaR1 \cdot \sqrt{2}$: a VaR % value multiplied by price
- Determination of value with 2 days buffer
 - $VaR2p = VaR2 \cdot b$: VaR values multiplied with b buffer against procyclicality
- VaR2 average value calculation
 - $VaR2_average$: VaR2 average for 250 days
- VaR2 buffer average value calculation
 - $VaR2p_average$: VaR2p average for 250 days
- Determination of margin
 - The margin values need to exceed the buffered value in normal periods.
 - The margin value does not change daily but is gradually rounded regularly or ad-hoc if that is necessary.
 - Accordingly it is temporarily approved for the actual margin value to fall below the minimum level of the buffer.
 - Margin rounding is completed freely in line with the individual price levels and instruments.
 - In stress periods the margin level can change between the VaR and the VaR with buffer, and, depending upon the scale of stress and the market conditions, it can also be outside the band temporarily.
 - In the period between the occurrence of the stress and the determination of the margin parameter in the case of short term volatility and price stabilization the margins can fall below the calculated VaR values, this needs to be explained.

Procedure in the case of new instruments (where no historic data is available)

If the appropriate data series are not available, the instrument to be introduced is to be put into the categories of instruments that it fits most and the margin values most characteristic of the group concerned is to be taken into account. Other factors: asset value per share, indicative price and other relevant pieces of information. In case of derivatives, the underlying must be analyzed. If information related to the similar instruments of external non-cleared markets is available, these can also be taken into account.

Portfolio margining

Spread across instruments

The spread parameter across instruments can be introduced only if there is a clearly identifiable strong correlation among the price movements of instruments.

Spread parameters can be determined across instruments that are linked to the same collective guarantee fund.

Spread parameter across expiries

The spread across expiries on the derivative market arises from the special feature that the prices of certain expiries are determined based on the price of the same underlying. With the continuous analysis of the prices and liquidity of expiries, within the opportunities available under portfolio margining, we offer spread preferences across expiries. Spreads are published for members.