Vontobel

Information on Volatility

Bank Vontobel Europe AG

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1. What is Volatility?

Volatility is a measure of the intensity of price fluctuations over a certain period of time. The term comes from the field of statistics. In the financial sector, volatility describes the standard deviation of the change in yields over a period of time.

In the case of financial assets, volatility is used in particular as a risk indicator. The more intensive the price fluctuations in a financial instrument or market are, the higher the volatility. High volatility is, therefore, often seen as a sign of high uncertainty in the financial instrument or market concerned.

Volatility can be measured by reference to actual historical price changes in a particular financial instrument or market (**historical volatility**) or it can relate to expected future volatility (**implied volatility**).

2. Implied Volatility

Implied volatility is the range of fluctuation expected by the market over a certain future period. The implied volatility is thus, for example, one of the main factors influencing the price of an option over its remaining term (until maturity). Its influence on the price of the option is the same for both call options and put options: if the implied volatility increases, the price of the option increases and vice versa.

3. Volatility

The implied volatility expected by the market in each case can be observed using volatility indices such as the VIX® Index and the VSTOXX® Index. For example, low volatility values in the single digits may indicate excessive carelessness in the markets, while volatility values in the higher double digits may indicate fear or panic. In very simple terms, lower option prices indicate a decline in demand for hedging options, which tends to lead to a decrease in implied volatility, while an increase in the need for hedging leads to higher option prices and thus to an increase in implied volatility.

With regard to the stock market, the following therefore applies in principle: if stock prices rise, implied volatility regularly falls; if stock prices fall in the event of major corrections, implied volatility regularly increases. In phases of consolidation, which may include, for example, a decline or sideways movement of a price after a previous trend movement, volatility generally decreases.

However, this principle does not apply to other asset classes. For example, commodities such as gold or oil can exhibit increasing implied volatility in both periods of falling and rising prices, if the corresponding movements are dynamic.

3.1. VIX® Index

The volatility index VIX® Index expresses the expected future fluctuation range (implied volatility) of the US stock market over 30 days. The calculation is based on the prices of call and put options of the S&P 500® Index.

3.2. VSTOXX® Index

The volatility index VSTOXX® Index expresses the future fluctuation range (implied volatility) of the EURO STOXX 50® Index expected by the market. The VSTOXX® Index indicates the expected volatility of the EURO STOXX 50® Index over the next 30 days. The basis for the calculation of the VSTOXX® is a basket of index options on the EURO STOXX 50® Index.

4. Reference Value

The reference value of a certificate in relation to the development of volatility is usually not the relevant volatility index but a future (futures contract) on the volatility index traded on the stock exchange.

For the VIX® index is the CBOE Volatility Index (VIX) future the reference value, for the VSTOXX® index is the VSTOXX® future. Information on the respective future is available from the respective futures exchange (reference point) on which the future is traded:

CBOE Volatility Index (VIX) Future: Chicago Board Options Exchange (CBOE) http://www.cboe.com/vix

VSTOXX® Future: Eurex https://www.eurexchange.com/exchange-en/markets/vol/vstoxx

Since index futures are forward transactions, the performance of the index future may deviate from the performance of the relevant volatility index to which the future relates. This is the case, for example, if the index future is traded on the futures exchange with a premium or discount compared to the index because certain market factors are valued differently in the futures market than in the spot market for the index.

Note Roll-Over: Each Future has a specific expiration date, so the index future as the reference value of a product without a corresponding maturity limit must be regularly replaced by a longer-term future (so-called roll-over).

With regard to the roll-over, it plays a decisive role whether the price of the longer-term future into which the roll-over is being made is above or below the price of the expiring future. In a so-called "Contango Market", the price of the futures into which the roll-over takes place is higher than the price of the expiring futures. The opposite is true for a so-called "Backwardation Market". Here, the price of the future into which the roll-over is made is below the price of the expiring future. Depending on the price deviation, the execution of the roll-over can have a negative impact on the performance of a product with a future as reference value.

Index futures on volatility indices usually have a contango market (i.e. with a higher price of the longer-running future into which they are rolled), which is why the roll-over usually has an adverse effect on investors in a product based on such an index future.

5. Market Expectations and possible Products

Various factor certificates are available for participation in the price development of the above-mentioned index futures on volatility indices. The underlying instrument of a factor certificate is a factor index that refers to the respective index future and reflects its price movements. Both unlevered participation in price movements with leverage 1 or -1 in the case of inverse (i.e. opposite) participation and disproportionate (leveraged) participation or opposite participation with leverage greater than 1 (or -1) are possible.

Possible products in the following market expectations:

- Constantly **rising** volatility future: Factor Certificate **long**
- Constantly **falling** volatility future: Factor Certificate **short**
- **Alternating rising and falling** volatility future (sideways markets): Factor certificates are **not** suitable for this

Since the above-mentioned products are designed for participation in rising or falling volatility - depending on the direction of the product (long or short) - they are also unsuitable, for example, for phases of consistently high or low volatility.

Investors should generally bear this in mind when investing in Factor Certificates:

Factor certificates are more suitable for short-term investment horizons (e.g. intraday or 1 day) and less for a longer-term "buy and hold" strategy.

- The Factor Index (the underlying of the factor certificate) contains a financing component, which can reflect the costs or even the returns of an investment in the reference value and can have a value-reducing effect.
- An index fee is charged for the management and calculation of the Factor Index, which is deducted in the Factor Index.
- Intraday index adjustment: In order to avoid a total loss, Factor Indices are equipped with a threshold. It describes the maximum permissible negative change of the Reference Value for the investor compared to its last valuation price before an intraday index adjustment is made. This is equivalent to the realisation of the losses incurred.

Additional Information

Available on our prodcut page: zertifikate.vontobel.com

- Product brochure Factor Certificates
- Key Information Document
- Final Terms and Base Prospectus
- Derivatives Glossary: zertifikate.vontobel.com/DE/Wissen/Glossar

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