**December 2021**

# Volatility as an asset class - Taking stock after the coronavirus crisis Catch-up potential remains intact

Twenty months after the coronavirus crisis reached its peak on the global financial markets and six months after we first analysed developments on the volatility markets, it is time for us to take another look at volatility as an asset class.

- *How has the asset class performed this year after being exceptionally heavily impacted by the historic market crash in March 2020?*
- *How has the coronavirus crisis changed the market dynamics of volatility as an asset class?*
- *What conclusions can we draw about the future development of this asset class based on the current market environment?*

## 2020 - Explosive surge in volatilities

The market crash in March 2020 was tremendously fast and was accompanied by exceptional declines of more than 33% on the global equity markets. Within no time, the market switched from a phase of extremely low fluctuations (and thus very low implied volatilities) to one of extreme volatility. At the peak of the crisis, for example, the volatilities realised on the S&P 500 reached 96%. Calculated over a month, this equates to an average fluctuation of more than 6% per day (!) on the US equity market. The volatilities realised for US equities in 2020 were the third-highest ever observed after 1929 and 1987. These tremendously strong market movements also caused implied volatilities to explode, as demonstrated by the VIX and VSTOXX with volatility peaks of 85% and 95% respectively. This equates to a seven-fold increase within just a few weeks.

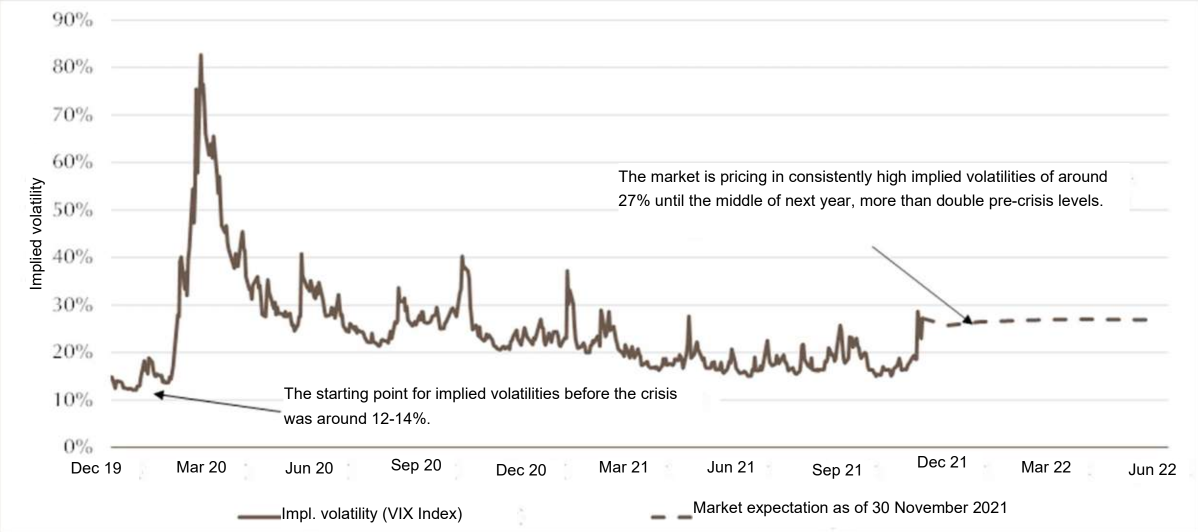


Fig. 1: Implied volatility of S&P 500 (VIX Index)
Source: Bloomberg, own calculations; as at: 30 November 2021

**2021 - Realised volatility returns to pre-coronavirus levels, implied volatility remains slightly high**

After the drastic rise in implied volatilities in March 2020, the market calmed down significantly and relatively quickly. The combination of fiscal and monetary intervention by governments and central banks, as well as the rapid progress of vaccination programmes, boosted the equity markets. By the end of November 2021, shares more than doubled from their March 2020 lows (S&P 500: +109.6%) to reach new all-time highs. This market recovery and the significant drop in realised volatilities also caused implied volatilities to ease once more. By the end of November 2021, the VIX reached a level of 27.2% and the VSTOXX 30.1% (see Fig. 1).

When analysing the market, it is important to consider how implied volatilities move in relation to realised fluctuations. **Realised volatilities** fell considerably during the course of the year to return to pre-coronavirus levels in 2021. As a result, the realised volatility on the S&P 500 was back to just 11.9% by the end of November. For comparison, the average realised volatility on the S&P 500 for the full-year 2019 was 12.4%. In contrast, and despite significant declines, **implied volatilities** are still roughly twice as high as they were before the crisis at 23% (VIX, start of 2020: 12-14%). This reflects many investors' continuing appetite for hedging in the markets.

Consequently, realised volatility has already returned to pre-crisis levels, while implied volatility has not. From an investor perspective, this has a positive effect on the volatility risk premium (VRP), i.e. the difference between implied and realised volatility. This premium is twice as high as it was in 2019 and is well in excess of the average over the past 15 years. Technically speaking, this means that when realised fluctuations are similar to those in 2019, almost double the volatility levels can be sold.

In figures: **Since March 2020, the risk premium of 7.7 percent has been more than double the long-term, 15-year average of 3.7 percent. The VRP is currently higher even compared to stocks measured after the financial crisis in 2009 and 2010.**

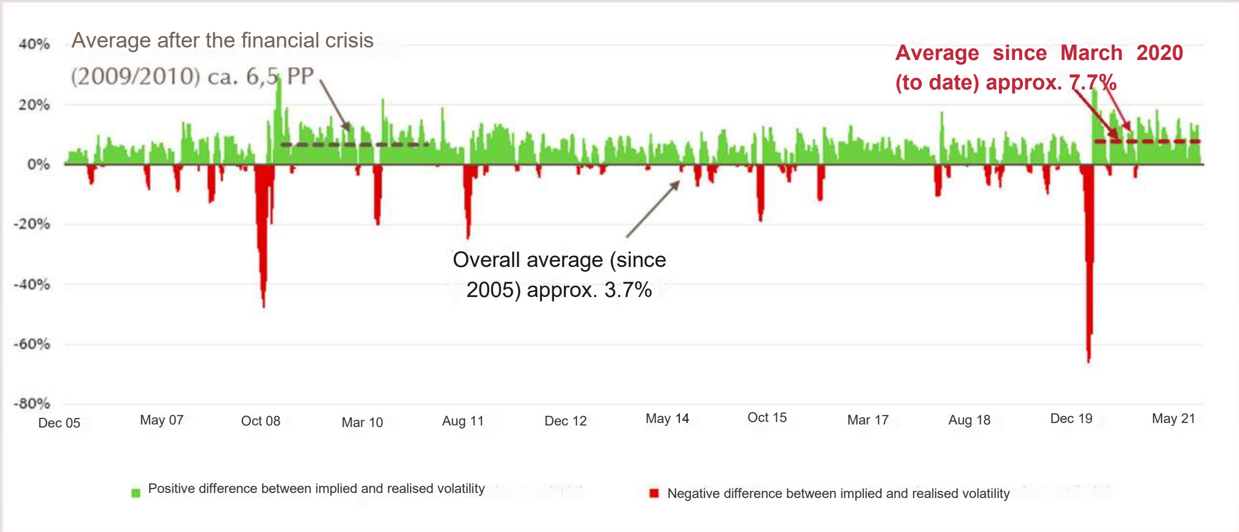


Fig. 2: Development of volatility: S&P 500 and Euro Stoxx 50M average
Source: Bloomberg, own calculations; observation period: Dec 2005 - Nov 2021

This well above-average VRP is due to changing dynamics on the supply and demand side of implied volatility, i.e. insurance against unexpectedly high fluctuations on the equity market. Let us start with the supply side: During the sometimes extremely heavy losses in March 2020, a succession of systematic volatility sellers exited the market. In particular, providers of particularly aggressively scaled investment strategies left the market. A double-digit number of funds disappeared from the market in Germany alone. In addition, the withdrawal of other regular sellers of implied volatility, such as investment banks with their structured products, caused supply to shrink further.

There has been temporarily increased and/or consistently high long-term demand for this reduced supply since the crisis in March 2020, particularly for options to hedge market declines (put options). What is particularly striking is that this trend shows no sign of abating, despite new highs on the equity market and low realised volatilities. According to analysis from Goldman Sachs, daily trading volumes of put options on US equity indices have more than doubled from pre-crisis levels. There is also strong demand for call options on US share indices in order to participate in the limited risk of further market growth (daily trading volumes here are up by around 50%). The fact that buying options is tantamount to buying (implied) volatility helps to explain this increased demand. As a result, expected volatility remains well above pre-crisis levels.

**This development is particularly noticeable with options contracts, which act as a tail hedge to protect investors against extreme events. For example, they include index put options with a short maturity that are well out of the money. Demand for these contracts has increased even faster, with volumes growing three-fold compared to the average for previous years (see Fig. 3).**

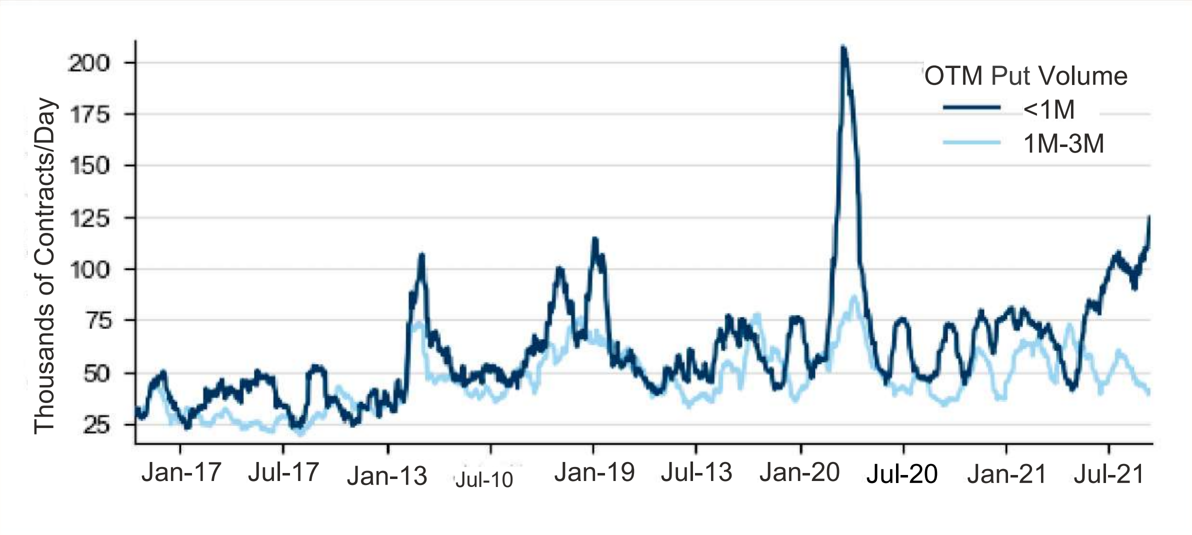


Fig. 3: Daily trading volumes of well-out-of-the-money S&P 500 put options with a short residual maturity
Source: Goldman Sachs - Index Volatility: Four Observations Ahead of September's Quarterly Expiration; as at 14 September 2021

In addition to the demand for index options driven by institutional investors, demand for call options on individual stocks also rose sharply among retail investors, resulting in higher implied volatilities on the equity market. According to Goldman Sachs, daily trading volumes of call options on individual stocks have more than trebled between the end of 2019 and summer 2021. One major driver of these developments on the retail side is the emergence of new brokers (neo-brokers such as Robin Hood, for example) who provide retail investors with affordable access to trading equities and derivatives.

**Outlook: appetite for hedging at high level; forward volatility risk premium shows above-average potential**

Overall, demand for hedging continues to significantly exceed the supply of implied volatility on the market, creating a situation similar to that observed after the 2008/2009 financial crisis. As a result, this new relationship between supply and demand has led to an extremely high VRP over the last 18 months. The premium is currently twice as high as the long-term average.

Although this outcome applies to the entire volatility market for equities, it is particularly pronounced for tail hedge options. By selling these hedges, the remaining providers in the market are generating extremely high premiums amid historically high implied volatilities. The rule here is that the more extreme the hedged risks, the higher the risk premium. The historical strength of this trend is apparent from the "skew index" in Fig. 4. This index shows how expensive well-out-of-the-money options are in relation to in-the-money options on the S&P 500. The higher the skew index, the more costly it is to hedge against tail events on the S&P 500 (see Fig.
4). The skew index is currently at its highest level in 20 years.


Fig. 4: Price of out-of-the-money options compared to in-the-money options on the S&P 500 (skew index). The higher the index level, the more costly it is to hedge against extreme movements (and thus the more expensive tail hedges are); 3-month average.
Source: Bloomberg, own calculations; as at: 30 September 2021

One particular beneficiary of the high VRP is short volatility funds, **which have performed extremely well since March 2020. Both Lupus alpha Volatility Invest and Lupus alpha Volatility Risk-Premium have fully made up for the drawdowns in March 2020 and reached new highs by the summer of 2021. This trend has slowed very little during the course of 2021. The risk premium and thus the performance of short volatility strategies are currently well above-average. This is due to the stable and extremely marked difference between implied and realised volatility despite a drop in the absolute volatility level.** Based on developments after the financial crisis, this exceedingly attractive environment for collecting VRP is also likely to persist. After 2008, it took several years for a renewed increase in supply (of implied volatility) to normalise the risk premium. As a result, volatility as an asset class continues to exhibit catch-up potential, particularly when compared with other asset classes such as equities or, in particular, high-yield bonds.

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