Understanding and Using VSTOXX® Futures

Trading Fear Via Europe's Volatility Index, by Tariq Dennison

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January 2021

Warren Buffett famously suggested that successful investors should "Be fearful when others are greedy. Be greedy when others are fearful." That leaves investors asking, "how can we know whether others are fearful or greedy?" Two of the world's most-followed "fear barometers" are the US-based CBOE VIX® (https://www.cboe.com/tradable_products/vix/) index and the European EURO STOXX 50® VSTOXX® index ("SX5E") (https://www.eurex.com/ex-en/markets/vol/vstoxx). This article takes a closer look at the VSTOXX® volatility index, explains how this benchmark is calculated, and how the Eurex-listed VSTOXX® futures contracts can be used to trade short-term volatility or harvest yield.

What is the VSTOXX®, what does it mean, and how is it calculated?

A volatility index like the VSTOXX® measures the expectancy of future stock index movements. The VSTOXX® measures expected volatility in the EURO STOXX 50® index (https://www.stoxx.com/index-details?symbol=sx5E) of 50 Eurozone blue-chip stocks over the next 30 days.

The index value is an "annualized standard deviation," meaning that if the VSTOXX® is at 20:

- The market expects there to be a roughly 65% chance ("1 standard deviation") that the index will be within a ±20% range one year from now, and
- a roughly 95% chance ("2 standard deviations") that the index will be within a ±40% range one year from now.

Time horizons for standard deviation (also known as volatility) scale with the square root of time. So, to translate a VSTOXX® value of 20 into how much the market expects the SX5E to move in the next 30 days (about 1/12th of a year), we divide by the square root of 12, or around 3.5. This means that when the VSTOXX® is at 20, the market expects:

- A roughly 65% chance that the index will be within a ±5.7% range one month from now, and
- A roughly 95% chance that the index will be within a ±11.4% range one month from now.

Expected market volatility has long been priced into listed options (https://www.eurex.com/ex-en/markets/idx/stx/blc/EURO-STOXX-50-Index-Options-46548); however, options are an "impure" way to measure or trade volatility, as the sensitivity to volatility changes of an option contract varies with how far the strike price is from the index at any given time. In 1999, a team at Goldman Sachs published a paper (https://emanuelderman.com/more-than-you-ever-wanted-to-know-about-volatility-swaps-the-journal-of-der/) explaining how to calculate and trade the expected rate of volatility out to any option expiry date with a weighted portfolio of options across strikes at that expiry. The portfolio of SX5E options added up to calculate the VSTOXX® index is available on the "Data" tab of the VSTOXX® info page (https://www.stoxx.com/index-details?symbol=v2tx), with weights rebalanced daily so that the weighted average term of options centers around 30 days at all times.

The VSTOXX's Historic Ups and Downs

If we look at the historical levels of the VSTOXX® going back to 1999, we see a pattern where expected volatility occasionally "spikes" and then gradually falls back down to a "normal" level, usually around 25. Times that the VSTOXX® index drops below 15 tend to be periods where markets are relatively calm (and arguably complacent), and when the market index tends to rise steadily and gradually. The biggest and fastest shocks to the market can be seen in the only two times so far that the VSTOXX® spiked above 80: most recently in March 2020 when the COVID-19 pandemic started growing exponentially in Europe, and in September 2008 when the Lehman Brothers bankruptcy started a global financial crisis. There were also notable spikes above a VSTOXX® level of 50 after the September 2001 terrorist attacks, the 2002 collapses of Enron and WorldCom, and the Greek debt crisis in 2011-2012. Although volatility measures movements in both directions, the tendency of the VSTOXX® to spike on market declines indicates a pattern of "skew" in stock returns, where more than half of returns are positive and slightly above average, and offset by relatively rare but large, negative drops. Historically, it seems fair to use a rule of thumb that markets are most "greedy" when the VSTOXX® is below 15 and the most "fearful" when the index is above about 40, with "average amounts of uncertainty" in between.

Source: Quandl.com (https://www.quandl.com/)

How VSTOXX® Futures Work

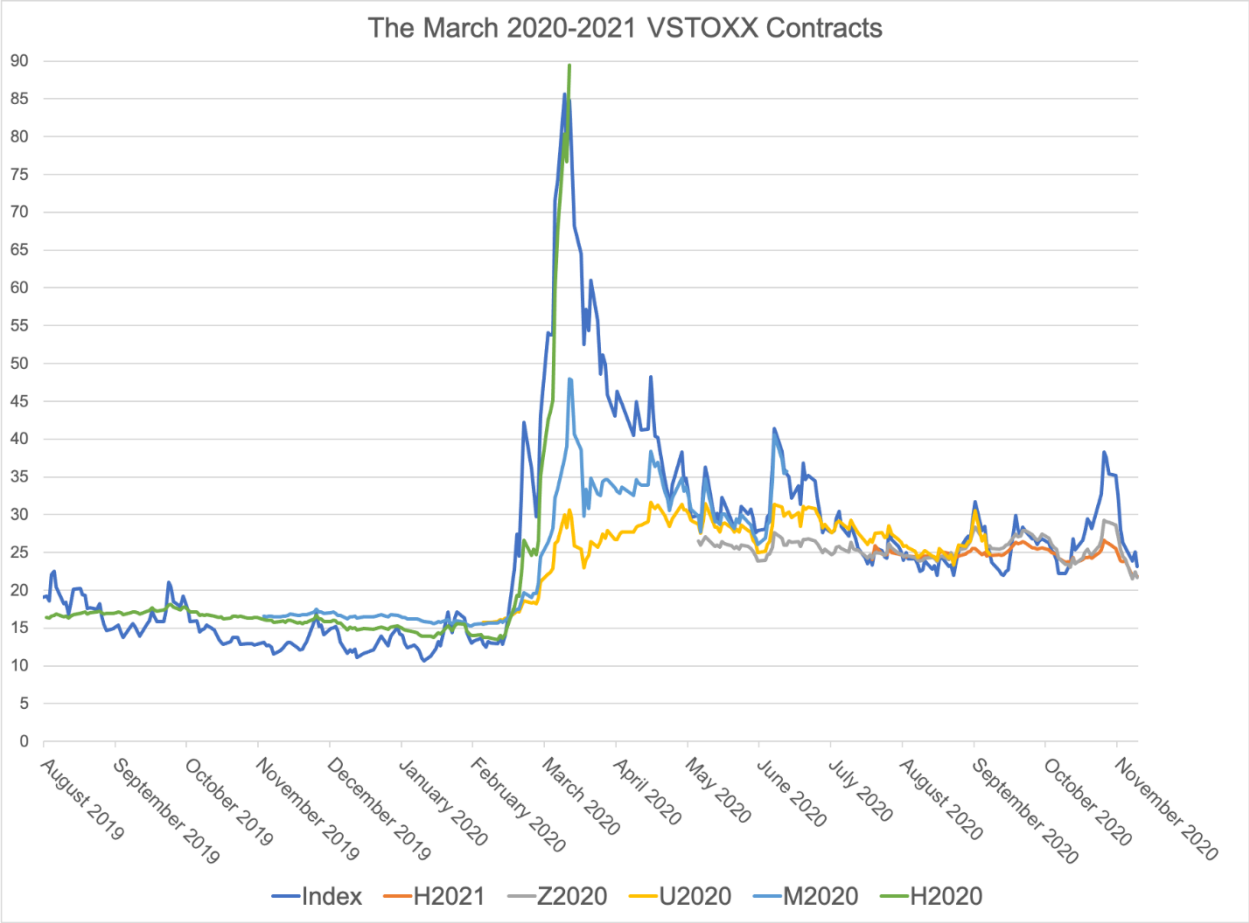
Like other index futures contracts, Eurex's VSTOXX® futures (https://www.eurex.com/ex-en/markets/vol/vstoxx/vstoxx-futures-and-options/VSTOXX-Futures-253604) are an exchange-traded instrument you can use to trade the value of the index on a given future date. The difference between the current level of the VSTOXX® index and the price of a VSTOXX® futures contract expiring on a specific future date can be significant. It is essential to understand how this difference can work for or against you when you trade these futures.

From when you enter to when you exit, the profit or loss on a VSTOXX® futures contract is simply €100 per point, for example:

- If you buy one VSTOXX® contract at 20, you will ***lose*** €200 if the price ***falls*** and you sell at 18, and you will ***make*** €200 if the price ***rises*** and you sell at 22.
- If you sell one VSTOXX® contract at 20, you will ***make*** €200 if the price ***falls*** and you sell at 18, and you will ***lose*** €200 if the price ***rises*** and you sell at 22.

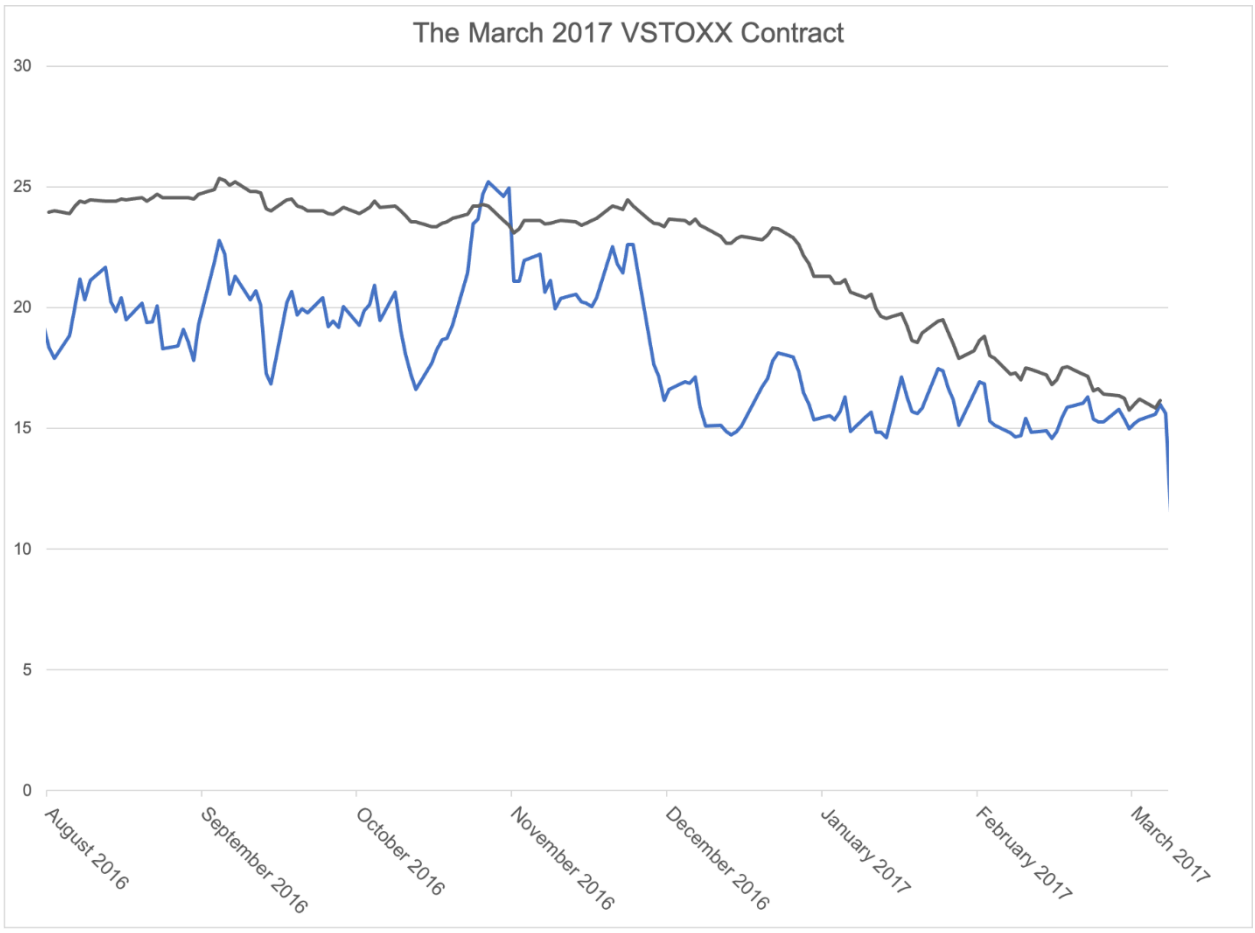
It is equally "easy" to buy or sell a futures contract depending on whether you think the price will go up or down, but remember that if you sell at 20, and the contract price rises to 80, you can very quickly lose €6,000 per contract.

This next chart shows how the VSTOXX® index spiked in March 2020 and how VSTOXX® futures contracts with five different expiry dates (H = March, M = June 2020, U = September, and Z = December, so H2020 = March 2020 etc.). At any given time, VSTOXX® futures with different expiry dates often trade at different levels depending on how volatile the market expects the SX5E to be that far out in the future (based on how options expiring on that date are priced, as described above). This is why, of the March, June, and September contracts, only the about-to-expire March contract converged to the VSTOXX® index level above 80 when the index spiked in March 2020. At that time, the June contract traded around 45 and the September traded around 30, reflecting the market's expectation that the VSTOXX® index level would come back down to those levels by summer and autumn. So, it is important to keep in mind that convergence of the futures price and index only happens at expiry and that the futures can trade far from the index before expiry.



Source: Quandl.com (https://www.quandl.com/)

By contrast, this next chart shows how the March 2017 contract traded relative to the index in late 2016 and early 2017. This may be considered a "dream scenario" for an investor who sells a longer-term contract above the current index value with the expectation that the index is unlikely to rise to the price level the futures contract was sold at. In the below example, in August 2016, the VSTOXX® index was around 19 while the March 2017 futures contract was trading around 24. An investor who sold one contract at 24 in August 2016 would have seen little movement in the contract price for the following five months, even as the index "peaked" above the futures price in late October, before starting to converge down to the level of the index as March 2017 approached. One year later, volatility sellers faced major losses when volatility spiked in what was known as "volmageddon" (https://www.bloomberg.com/news/articles/2019-02-06/the-day-the-vix-doubled-tales-of-volmageddon).

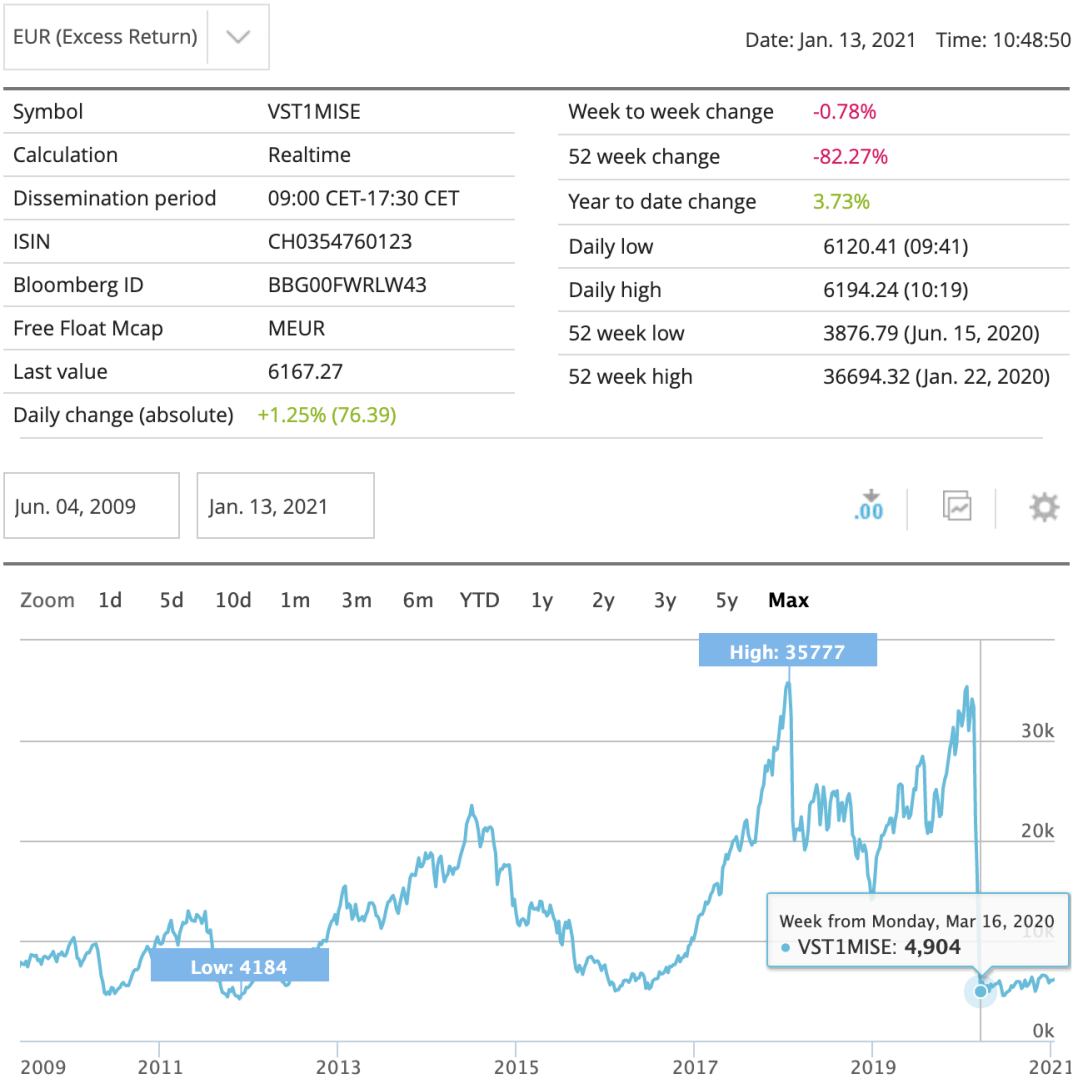


Source: Quandl.com (https://www.quandl.com/)

Actionable Strategies

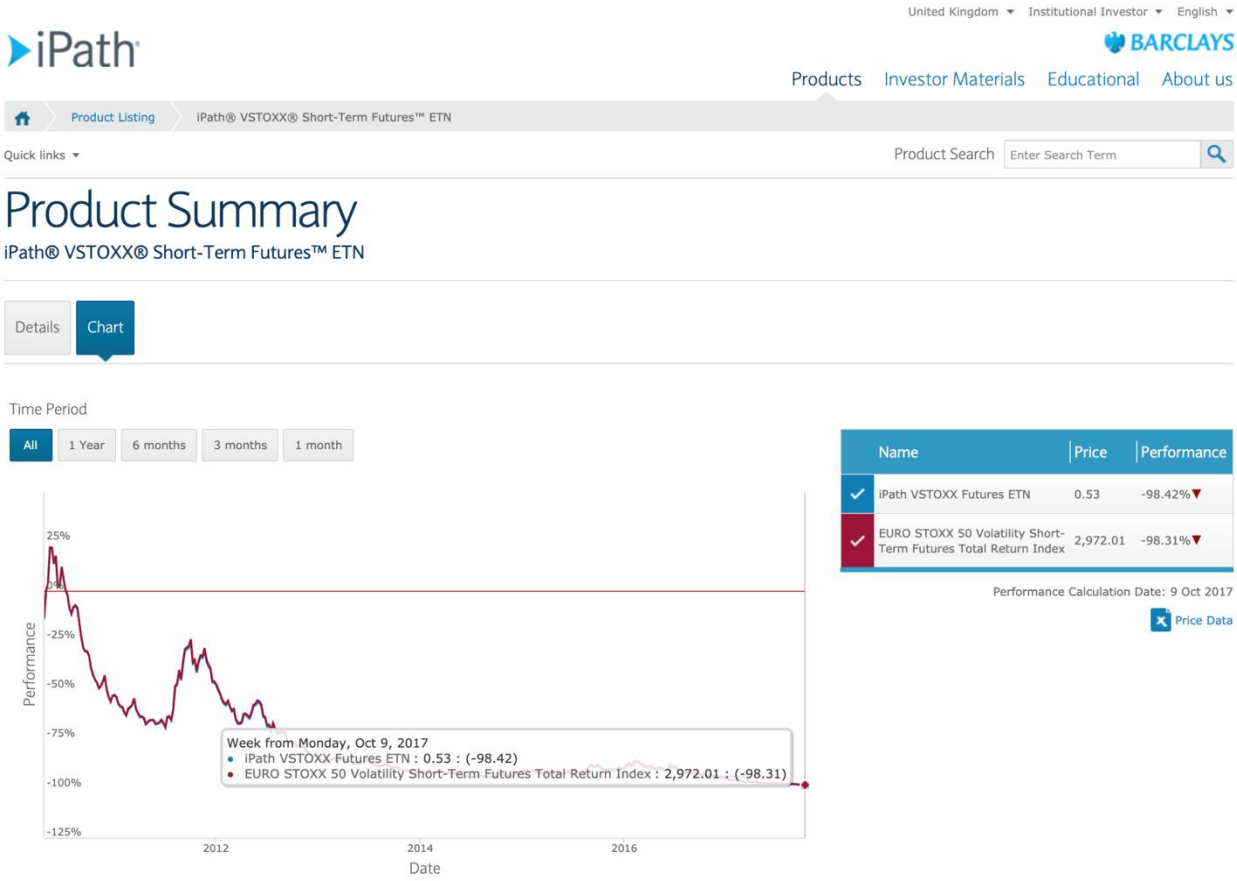
Although there are myriad ways to trade the different expiry dates of VSTOXX® futures, here, we will focus on two simple strategies that can be thought of as "two ends of the spectrum": the "permanent" long-term seller versus the "tactical" short-term buyer.

Seeing how relatively "easy" the above sale of the March 2017 contract would have produced €800 per contract profit in seven months, there are investors who regularly sell volatility futures when they are significantly above the level of the index, and "roll down the curve" as the futures converge the index. While it is difficult to find a benchmark of returns for selling 6–7-month futures as described above, the following chart (https://www.stoxx.com/index-details?symbol=VST1MISE) shows the returns of a strategy that sells and rolls 1-month VSTOXX® futures contracts. As the chart shows, there are periods like 2016-2017, where this strategy works very well, and other periods like March 2020, where years of profits from this strategy can be lost in a day.



To see what the returns of a "constant long" or short position in VSTOXX® futures would be, we can look at an exchange-traded note (ETN) that tracks returns from buying and rolling the front-month VSTOXX® futures every month: the iPath VSTOXX® Short-Term Futures ETN. This ETN has lost almost 98% of its value since it was launched in 2010. The occasional volatility spikes have not been enough to make up for months of losses from rolling into long VSTOXX® futures contracts at higher prices every month during periods of relative stability.

This next chart, of the ETN tracking the returns of constantly being long VSTOXX® futures, may seem to imply that rolling a "permanent short" position might be the more profitable strategy over time, but it is important not to forget the previous chart showing how quickly years of gains can be lost.



Source: https://ipath.barcap.com/GB/16/en/details.app?instrumentId=60586

In contrast to the "permanent" strategies, many traders use VSTOXX® futures for tactical, short-term trades, often with one of the following views:

- The level has fallen very low (even below 15), and the trader sees more upside than downside, or
- In anticipation of an event that is expected to increase market volatility, for example, an election.

When formulating your VSTOXX® futures strategy, it is essential to understand the index, how the futures work, and how these products fit with your overall portfolio.

As an Asia resident, I'm also pleased to see that the VSTOXX® futures contracts now have extended trading hours (https://www.eurex.com/ex-en/trade/trading-hours/thx) starting at 08:00 Singapore time, allowing us to trade this index 20 hours per day.

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