

Attention risk: the vulnerability of the markets is growing

The structure and behaviour of the capital markets have changed significantly over the past 10 years. The years of low bond yields and quantitative easing by central banks have left their mark on investors' activities. In addition, the intensifying regulation of banks following the financial crisis, the availability of faster and cheaper computers and the advance of exchange-traded funds and exchange-traded structured products, have changed the quality of liquidity on the markets. The consequences are one-sided positioning, pseudo-certainty, a lack of diversification and, if volatility picks up, insufficient liquidity. "Flash crashes" and recurring, abrupt corrections are becoming increasingly common. In fact, such events are now part of the normal market environment. Investors should be aware of this and review their portfolios in this context. For investors who do not act systematically, however, such market movements offer opportunities as well.

Change in investors' behavior

The central banks have prepared the ground for this. Limited real growth, low inflation and consequently negative central bank interest rates, as well as bond purchases by central banks, have triggered a "hunt for yields" over the past decade. In view of negative return on liquidity and the lack of sufficient premium for bearing the interest rate risk of long-term government bonds, investors accept other risks when chasing yields in order to collect a premium and generate a positive return. They replaced cash and government bonds, which barely yielded a positive return, with corporate, high-interest and emerging market bonds, equities, real estate and alternative investments. These asset classes benefited from this trend resulting in an overall inflation in asset prices.

Investors have thus not only taken on the associated risks, such as equity, credit and real estate risks, but they have also generally shifted from more liquid to less liquid asset classes. In an environment of low volatility in recent years, they may have underestimated the associated liquidity risks. Should they wish to pull out of these asset classes, for example because the risks assumed are no longer sufficiently compensated or because bank accounts and government bonds are again delivering higher yields, a strong widening of the respective risk premiums is anticipated.

As increasingly lower bond yields can no longer sufficiently compensate for the expected losses in the case of rising bond yields, many investors have also reduced the duration of their bond portfolios. The average duration of multi-asset portfolios declined, while equity, credit and liquidity risks increased. As a result, portfolio diversification decreased overall.

The environment of low yields and low volatilities has also lured investors into alternative carry trades in the form of short-volatility positions. Thereby investors effectively opt to receive an "insurance premium" by selling "financial market insurance". Empirical studies show that the implied volatility, ie the expected range of fluctuations priced in options, regularly and consistently overestimates the volatility

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One-sided positioning, lack of diversification and increasing liquidity risks make the markets vulnerable

Portfolio risks due to central bank policy

Prevalence of short-volatility strategies as a source of return



actually realised in the financial markets. This systematic overestimation is generally referred to as the volatility premium. As a result, the term curve of volatilities is generally upwards sloping – it is in contango. This is particularly true in an environment of low volatilities as it has been the case in recent years. Short positions on such a forward curve generate profits continuously.

The idea behind short-volatility strategies is to extract the volatility premium in a structured form. Derivative instruments are used to collect volatility premiums, for example short positions in VIX or VSTOXX futures or the sale of options. From an economic point of view, an “insurance” against capital market fluctuations is generally sold and an insurance premium is collected. In the medium term, continuous returns like those generated by well-managed insurance companies are appealing. Only in case of a large insurance case, a significant loss is looming. Should losses on the capital markets occur, volatilities normally increase, the seller of the volatility position loses, the buyer wins – the insurance pays off.

The continuous and very high yields have led to a dynamic rise of such strategies. This is illustrated by the Velocity Shares Inverse VIX Medium Term Exchange Traded Note (‘ETN’) (left figure on the next page). From the end of 2010 to the end of 2017, this ETN generated an annual return of 30%. The increase in volatility in the markets in 2018 was surprisingly well absorbed by this strategy – the biggest loss (drawdown) was “only” 34%. This is due to medium-term volatilities picking up quite modestly at the beginning of 2018.

The Velocity Shares Inverse VIX Short Term ETN, for example, has developed worse. In contrast to the Medium Term ETN, it focuses on the development of short-term volatility. It even generated an annual return of 40% from the end of 2010 to the end of 2017. However, after a decline of more than 96%, the product was liquidated in February 2018. Other short-volatility strategies followed a similar pattern during the financial crisis. Strategies that generate volatility premiums in different markets are less vulnerable, similar to a well-diversified insurance company. The risk of a large loss is therefore more limited.

It is also worth taking a look at the positioning of non-commercial, ie “speculative” traders. Over the past 10 years, they have on average been selling VIX futures contracts, ie the short positions exceeded the long positions. In other words, they are speculating to a large extent that volatility will remain low. In addition, the extent of the short positioning has increased continuously (right figure below). Should volatility increase due to an exogenous factor, the short-covering of short-volatility positions reinforces the already ongoing increase in volatility. Volatility peaks are intensified. The sharp rise of the VIX at the beginning of February 2018 underscored this fact. And yet the net short positioning in late July 2018 has already exceeded the level of the year’s start.

Such direct short volatility strategies make up only a fraction of volatility-dependent strategies. Much more important are volatility-dependent allocation strategies, whose behaviour is similar to that of short-volatility strategies. Systematic volatility-dependent allocation strategies, in particular strategies with target volatilities and risk parity strategies, have become increasingly important and not only within the framework of systematic risk management. Current forecasts estimate their volumes

More systematic volatility-dependent allocation strategies



at \$350bn and \$500bn, respectively.¹ Although these strategies do not explicitly sell volatility, their portfolio composition depends on the level of volatility so that they act as if they were short volatility.

Target-volatility strategies systematically allocate across asset classes of various volatility, so that the expected volatility of the portfolio corresponds to the target volatility. In some cases, options or futures are also used to achieve target volatility. In contrast to the more “traditional” allocation of capital, risk parity approaches aim at diversification through balanced risk contributions of individual asset classes. Accordingly, asset classes with low volatility are given a higher weighting than those with lower volatility. In the multi-asset area, bonds thus receive a portfolio weighting of around 70% on a historical average. In order to achieve an attractive absolute return with such an allocation, leverage is usually applied, especially in asset classes with low volatility. The pro-cyclical behaviour of both approaches reinforces market trend. When volatilities pick up, the strategies systematically reduce the allocation to risk investments and vice versa.

Target-volatility and risk-parity strategies

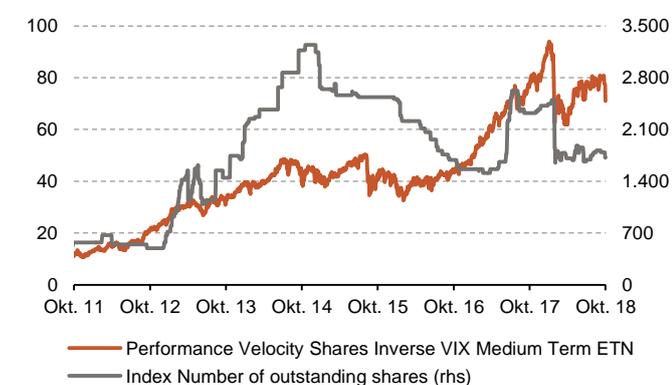
Commodity trading advisors (CTAs) represent another group of investors who reinforce market trends and thus implicitly bet on narrow fluctuation ranges. They systematically buy assets with positive momentum and short those with negative momentum. They also represent another \$300bn-350bn of the total volume of volatility-dependent strategies of more than \$1.5trn.

CTAs – commodity trading advisors

All these market participants contribute to regimes of low volatilities as well as to their rapid rise by acting in a co-directional and trend reinforcing manner. In the case of extreme positioning, it may not even take a major fundamental trigger to initiate this process, as the case of the sharp rise in volatility at the beginning of February 2018 demonstrated.

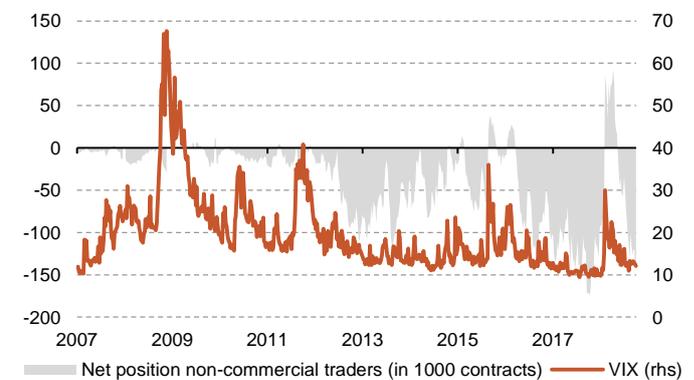
The positive performance of short-volatility strategies over the past few years has attracted strong inflow

Example: Velocity Shares Inverse VIX Medium Term ETN



Source: Bloomberg, Berenberg Period: 11/10/2011-11/10/2018

Speculation on low market volatility in VIX futures contracts increases



Source: CFTC, Bloomberg, Berenberg Period: 02/10/2007-02/10/2018

¹Bhansali, Vineer; Harris, Larry (2018): Everybody's Doing It: Short Volatility Strategies and Shadow Financial Insurers, Financial Analysts Journal, Vol. 74, No. 2, 2018, 12-22



Change in the market's liquidity

The one-sided positioning of investors, even in less liquid asset classes such as corporate bonds, the lack of diversification in multi-asset portfolios and the increase in trend-enhancing systematic investment strategies suggests that there are particularly high liquidity requirements in case of a crisis. Even with unchanged liquidity, this speaks for increasingly pronounced market reactions.

However, the underlying market liquidity has changed as well. First of all, bond purchases by central banks in the context of the quantitative easing over the past decade seem to be an obvious reason. In certain bond segments, central banks have absorbed a large part of the liquidity. For example, central banks hold approximately 28% of the Agency MBS market, 22% of European government bonds, 10% of all high-quality European corporate bonds or 42% of all Japanese government bonds.²

It is important to remember that there are also many insurance companies and pension fund investors in the bond segment who usually hold bonds until maturity. This portion of all outstanding bonds has been more or less taken out of normal liquidity.

In our view, however, the main reasons for the change in liquidity are the withdrawal of classical traders, the rise of electronic trading platforms and the increasing popularity of exchange-traded structured products (ETPs), in particular the exchange-traded funds (ETFs).

Increasing bank regulations and the availability of extremely fast computers are prompting traditional traders to step back. Rising capital requirements for banks implied a steep decline in the risk traders could take. Their profitability also suffered from years of low market volatility, low bond yields, increasing transparency and increasing competition from technological progress. The trading capacity of traditional bond dealers at banks has been reduced significantly, both in terms of the number of dealers and the size of their trading books. At the same time, the markets continued to grow rapidly. For example, the volume of corporate bond issues has increased substantially in recent years. Whereas US corporate bond holdings in the trading books of US traders accounted for 3% of all outstanding bonds in 2003, they are currently at only 0.3%.

Withdrawal of classical traders

Electronic trading platforms are closing this growing gap. In currency trading, for example, the share of transactions and volumes traded on electronic platforms has risen from nearly 0% from 10 years ago to well over 80%.³ In normal times, machines are better traders than people and liquidity is good. However, this does not have to be the case in times of distress.

The rise of the machines

The rise of the machines has created another group of market participants: computer-based high frequency traders (HFTs). Within micro- or milliseconds, their systems place and delete numerous orders based on algorithms that react to market conditions. These market participants improve liquidity under normal market conditions. In that case, they act like normal traders and thus seem to provide high liquidity. But the processing of fundamental information is not necessarily their strength.

HFTs – high-frequency traders

² Cross-Asset Dispatches – Yes, Large Moves Are Happening More Often, Morgan Stanley Research, July 22, 2018

³ Top of Mind – Liquidity, Volatility, Fragility, Goldman Sachs Global Macro Research, Issue 68, June 12, 2018

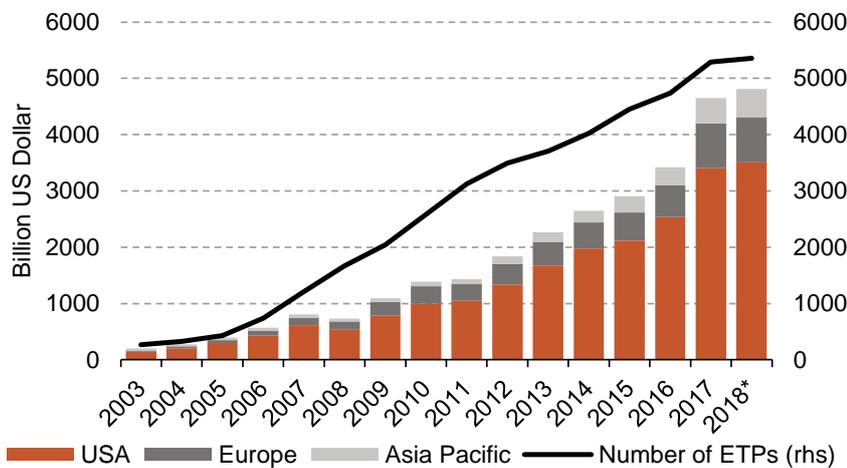


They tend to withdraw in case of uncertainty, for example before the publication of important macro data. Even more dramatic is that in turbulent times they shift the focus from “market making” to directional (market-driven) strategies and thus not only fail as liquidity providers but also become liquidity consumers themselves.⁴

Exchange-traded products (ETPs) comprise not only traditional ETFs but also exchange-traded commodities (ETCs) or exchange-traded structured products such as leveraged or inverse strategies. These product segments have grown continuously at high rates in recent years (see the figure below). In the US, the volume of ETFs already equals more than 20% of that of all mutual funds. The number of ETPs and the assets under their management has increased more than twentyfold globally since 2003.

Increasing use of ETPs

Steady growth: number and assets under management of ETPs



Source: Deutsche Bank ETF Research, Berenberg

*as of 31 July 2018

Normally, these products increase liquidity, especially for illiquid investments. These structures allow a large number of investors to invest easily in asset classes that are usually difficult to trade. However, this only applies to the “normal” market environment in which ETF market makers provide sufficient liquidity as intermediaries between ETF buyers and sellers. Transactions in the underlying asset (eg in a commodity) only take place in case of new issues of ETF units by the issuer or redemption of ETF units to the issuer. In a normal market environment, however, these only account for a small share of total sales.

But if one of the two sides mostly fails, which is usually the buyer in the risk case, the traders have no choice but to return the ETF shares on a large scale to the issuer. The latter must then reduce the corresponding exposure (eg the commodity) in the underlying market. This reduces the liquidity of ETFs to that of the underlying market if in the downside scenario and, for example, in the case of corporate bonds or even emerging market debt, will be severely limited. This can lead to additional pressure on prices.

Even if the ETF invests in an otherwise very liquid asset class, the result, in case of high market uncertainty, is sometimes a significantly higher bid-ask spread when

⁴ Hautsch, Nikolaus; Noć, Michael; Zhang, S. Sarah (2017): The ambivalent role of high-frequency trading in turbulent market periods, CFS Working Paper Series, No. 580, Goethe University, Center for Financial Studies (CFS), Frankfurt a. M.



trading with the corresponding ETF. In addition, under a strong selling pressure, an ETF can also trade far below its NAV (net asset value) in the short term.

Liquidity illusion as a result

In this context, it is problematic that investors have massively pulled out of their traditional asset classes and have taken higher and other risks. In recent years, for example, it has been very easy to build up positions in US dollar high-yield bonds using ETFs. With these investments, however, they are subject to a liquidity illusion. Although they have often opted for supposedly liquid ETF products, if the market fluctuates significantly, their liquidity is likely to deteriorate. The withdrawal from the market in case of a crisis could turn out to be considerably more difficult than expected and be associated with a substantial widening of risk premiums.

The effects of structured products, especially leveraged or inverse ETPs, can be even more dramatic. Leveraged ETPs allow investors to operate with leverage in the market very easily. In case of strong market fluctuations, investors in these products may be forced to buy or sell quickly, which intensifies the market's reaction and limits liquidity even further. Inverse ETPs allow investors to enter short positions very easily. Sharp market movements can result in forced covering (short-covering). The case of inverse VIX products has already been discussed in detail above.

Consequences

The low interest rate environment over many years has led to a strong leveling of many investors. Credit and liquidity risk premiums have been falling increasingly and market volatility has reached new troughs. As volatilities declined, volatility-dependent strategies have become increasingly risk-prone and the demand for riskier investments in these strategies has led to even lower volatilities, also supported by the constant supply of liquidity by central banks. The portfolios of many investors contain a mixture of equity, credit, liquidity and short-volatility risks with no actual diversification, as these risks are strongly positively correlated. The average duration of the bond holdings is usually low. This particularly applies to the duration in "low spread" safe haven government bonds.

The situation is now being exacerbated by the gradual withdrawal of the central banks. Central bank balance sheets continued to grow in 2018, but less than the nominal gross domestic product. Quantitative easing is thus already being reversed into quantitative tightening. In conjunction with solid growth, rising inflation expectations and interest rate hikes by the central banks in the US and the UK, bond yields have already begun to rise. As a result, the hunt for yields is likely to subside in the coming years and the asset price inflation of recent years will come to an end.

In addition, investors can no longer rely on liquidity being generally available. On the contrary: liquidity disappears exactly when it is needed most – liquidity deteriorates when volatility increases. These are the insights gained from the "Flash Crashes" of the recent years.⁵ The result is increasingly sharp market swings, which in relation to the trigger of the fluctuation – if it can be identified at all – seem to be exaggerated. It cannot be ruled out that such a movement could also lead to a sustained negative market development, especially if investors misinterpret technical sales as a signal of deteriorating fundamentals.

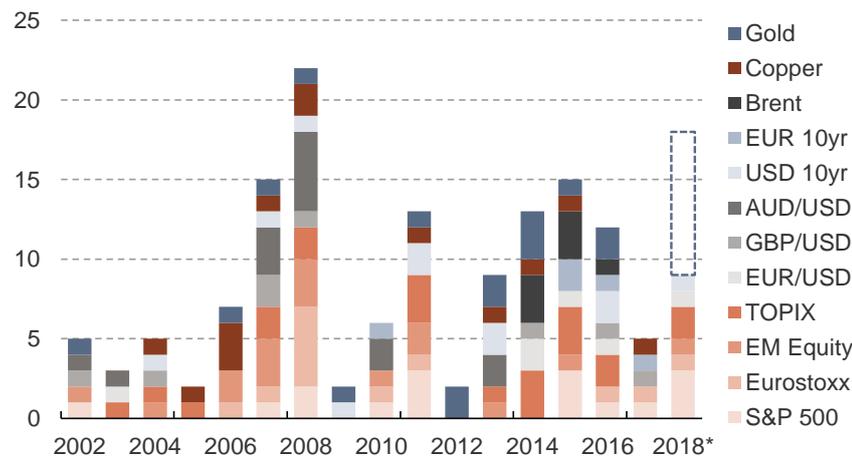
⁵ Examples include the sharp drop in the S&P500 during the day on May 6, 2010, the sharp fall in US government bonds during the day on October 15, 2014, the sharp correction of the British pound on October 7, 2016 and of course the rise in volatility (VIX) on February 5, 2018.



The strong stock market correction with the corresponding sharp increase in volatility in early February 2018 gives a foretaste of the potential dangers given the existing positioning and the changed liquidity situation on the markets – recurrent abrupt and sharp corrections. And indeed, as the following chart illustrates, the number of strong market movements has already increased across all asset classes.

The number of high market fluctuations is increasing across all asset classes

Number of daily movements at least four times greater than the volatility realized over the previous 100 days of the previous day



Source: Bloomberg, Berenberg, *projection for the full year 2018 based on the first half of the year

Therefore investors may wish to review their portfolios and preferably part with less liquid investments such as high-yield bonds soon enough so as not to fall into a liquidity trap in case of a rapid widening of risk premiums. As soon as safe haven bond yields offer some compensation for taking on interest rate risk, the duration of such bond positions in multi-asset portfolios may be extended in order to significantly increase the diversification within these portfolios again.



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PUBLISHER

Dr. Bernd Meyer, CFA | Chefstrategie Wealth and Asset Management

AUTHOR



Dr. Bernd Meyer, CFA | Chief Strategist Wealth and Asset Management
Head of the Multi Asset division and responsible for the capital markets
opinion of Wealth and Asset Management
+49 69 91 30 90-500 | bernd.meyer@berenberg.de

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Joh. Berenberg, Gossler & Co. KG
Neuer Jungfernstieg 20
20354 Hamburg (Germany)
Phone +49 40 350 60-0
Fax +49 40 350 60-900
www.berenberg.com
MultiAssetStrategyResearch@berenberg.de