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18.10.2018 / Multi-asset

Don't be fooled by low volatility

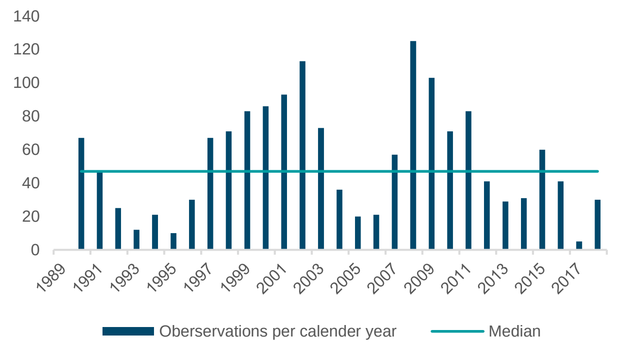
Just because realized volatility is low in many developed equity markets doesn't mean things are calm below the surface. Extreme moves at the edges of the distribution of returns compared with the middle reached a record high this year. The fatness of the tail, so to speak, is measured by kurtosis in statistics – and potentially signals fragility in markets.

Realised volatility is low

It is widely understood that the realised volatility in equity markets has been low in recent years. In 2017, for example, the S&P 500 index only moved more than 1.1 per cent in a trading session five times, well below the annual median of 47 such days since 1989.

As can be seen in Figure 1, the number of daily trading moves in excess of 1.1 per cent – the standard deviation of daily returns since 1989 – has been falling post the financial crisis, with last year being extraordinarily unusual. So far in 2018, there have been 30 moves greater than 1.1 per cent, suggesting a normalisation of sorts.

FIGURE 1: NUMBER OF TRADING DAYS WITH RETURNS EXCEEDING 1.1 PER CENT

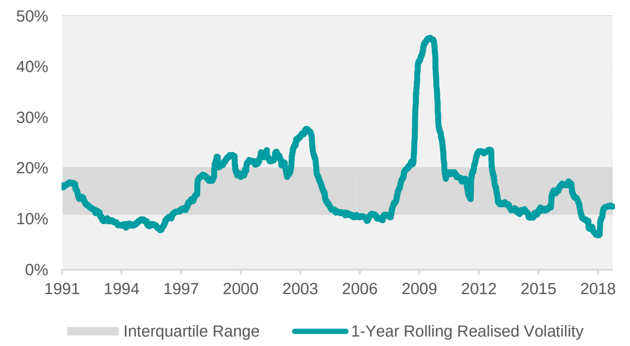


Source: DWS. 29.12.1989 – 28.09.2018. Past performance is not a reliable indicator of future returns.

Meanwhile Figure 2 looks at volatility as a standalone measure of risk and it can be seen that the line is also depressed relative to history. Notwithstanding the rise so far this year, the average level for 2018 is still below the 30th percentile of volatility over the period.

Realised volatility tends to move between low, medium and extreme regimes. In the chart below, the darker band - the interquartile range - marks periods of medium volatility, as per much of the post-financial crisis period. More extreme levels of volatility occurred during events such as the dot.com and financial crises, or the eurozone wobbles in 2012. Low readings, as experienced recently, accompany benign markets. In other words, US stocks are currently trading slightly above the lowest quartile of realised volatility.

FIGURE 2: 1-YEAR ROLLING REALIZED VOLATILITY AND REGIMES



Source: DWS. 29.12.1989 – 28.09.2018. Past performance is not a reliable indicator of future returns.

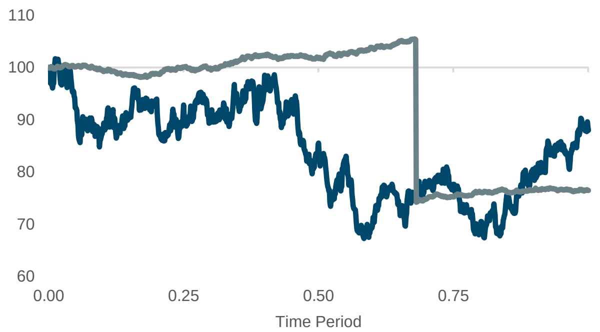
Headline volatility not whole story

When analyzing and managing portfolios, understanding return distributions is key. But too often investors simply focus on volatility and miss the full picture. Another aspect of the return distribution is captured by kurtosis.

The reality is that two investments with the same volatility can be very different. Kurtosis measures the “tailedness” of a random distribution. A higher kurtosis is the result of infrequent extreme deviations. A lower kurtosis reflects more frequent, modestly sized deviations.

Consider the chart below. The grey and blue lines have the same volatility but the former has higher kurtosis. For three quarters of the time period an investor would have supposed the grey series to be less volatile. While for the whole period the volatility is the same for both lines, the returns of the grey line were hurt by a significant correction.

FIGURE 3: SIMULATED RETURNS WITH IDENTICAL VOLATILITY



Source: DWS. 28.09.2018.

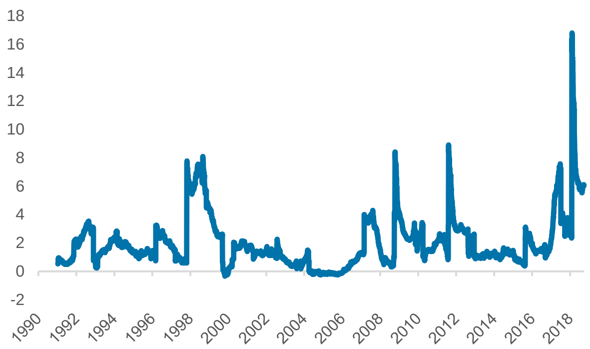
Counterintuitively, therefore, low volatility may in fact reflect extremely high kurtosis, as the middle of the distribution calms down relative to a riskier tail. In other words, storms become increasingly rare, but also more dangerous. Such lulls can often fool investors into thinking all is fine when in reality the fragility in the system is edging up.

Kurtosis at multi-decade highs

We showed above that S&P 500 volatility remains depressed relative to history. And it is worth remembering that most investors consider low volatility to be a benign state of affairs, an indicator that worries are few and extreme losses are unlikely. Indeed the VIX index is often referred to as the “fear gauge”.

But what about the “tailedness” of the market? Could US stocks be more fragile than they look? Figure 4 suggests this might be the case, plotting kurtosis of the S&P 500 over time.

FIGURE 4: 1-YEAR ROLLING EXCESS KURTOSIS

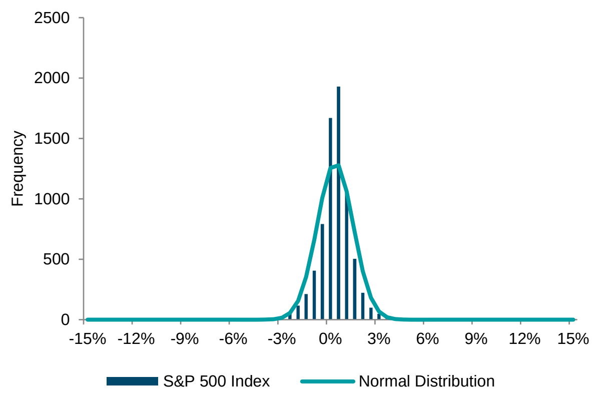


Source: DWS. 29.12.1989 – 28.09.2018. Past performance is not a reliable indicator of future returns.

Far from being an ocean of calm, the rolling excess kurtosis of the S&P 500 hit a record high in 2018 – reaching levels far more pronounced than during the financial crisis and the dot.com boom and bust. This after a year when everyone was talking about how quiet everything was. Volatility remains relatively low today, hence why few investors have noticed the spike in kurtosis. This is worrying, because portfolio management is about the whole distribution, not just volatility.

Still, investors may be excused for missing these tremors as they occur deep beneath the surface. Look at the realised return distribution of the market in Chart 5 and the market seems quite normal.

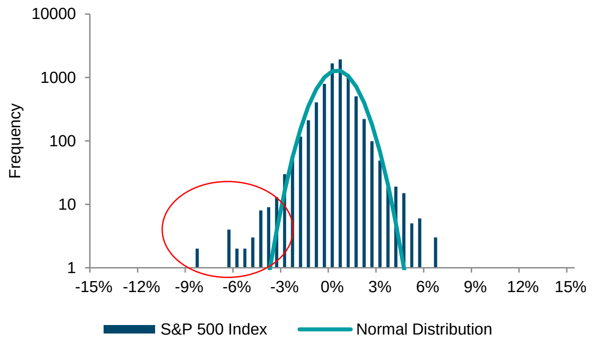
FIGURE 5: FREQUENCY DISTRIBUTION OF DAILY RETURNS



Source: DWS. 29.12.1989 – 28.09.2018. Past performance is not a reliable indicator of future returns.

Switch to a logarithmic scale for the y-axis, however, and it can be seen more easily that the tails of the distribution do not look so normal.

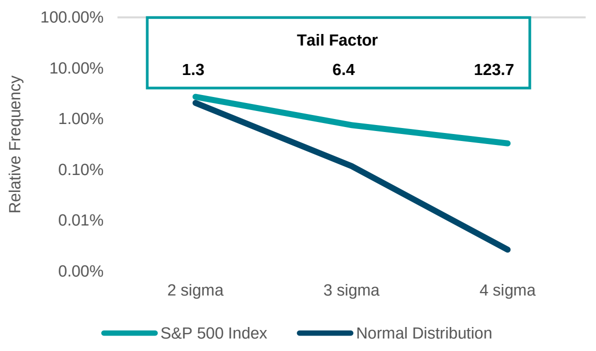
FIGURE 6: FREQUENCY DISTRIBUTION OF DAILY RETURNS



Source: DWS. 29.12.1989 – 28.09.2018. Past performance is not a reliable indicator of future returns.

Another way to illustrate this phenomenon is to analyse how excess events compare with a normal distribution. A so-called tail factor ratio does this. For a given set of returns, of the S&P 500 for example, one can calculate the number of observations in excess of say, two, three of four sigma moves. That is then expressed as a percentage, as shown by the green line in Figure 7 below. The same can be done for the normal distribution of returns. Dividing one by the other gives the tail factor ratio, displayed in the box. So it can be seen that three sigma events have occurred six times more often for the US equity market than the normal distribution would suggest.

FIGURE 7: TAIL FACTOR TO MEASURE EXTREME EVENTS



Source: DWS. 29.12.1989 – 28.09.2018. Past performance is not a reliable indicator of future returns.

Implications and opportunities

For brevity we have concentrated on American stocks, but rising kurtosis has also revealed itself in other markets.

Many investors remain oblivious. Here are three take-ways from this paper for consideration.
The first the risk that financial models might fail to forecast the next structural break in markets as they overlook changes to the composition of volatility. Many portfolio management tools rely on simple volatility as an input, such as risk/return measures, spread/volatility ratios, etc. Investors could be overpaying for assets based on an unrealistically low assessment of future volatility, whereas incorporating kurtosis would capture tail impacts.

That is not to equate kurtosis with fragility per se – just as it is wrong to label volatility a pure gauge of risk. The truth is that many factors can cause an asset class to crack. But what can be said for sure is that higher kurtosis is not captured in many tools investors use to analyse the relationship between risks and return.

A second take-away, therefore, is that investors should also look at kurtosis as a viable reason to maintain a high degree of flexibility in portfolios. Our guess is that few investors realise there are currently six times the number of three sigma events than a normal distribution would expect. Portfolio managers need to be able to respond quickly to a sudden gyration in markets, which will come as more of a surprise to everyone else.

For example, forced selling means a chance to buy assets cheaply. This is the main opportunity investors should watch for. And remember that kurtosis is a relative measure of a distribution's tail versus its centre. So just as important as being ready to respond to extreme events is understanding that these extended periods of calm may reflect higher kurtosis. Now might be an ideal time to deal with positions that may suddenly become illiquid when volatility spikes.

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