PICTET 1805

Flash Note

Equity markets in a new regime

The recent 'flash crash' in equities was unusual by several measures. After 'goldilocks', equity markets have entered a new regime.

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Equity and bond prices declined simultaneously in the recent market sell-off, a pattern that has only occurred in a quarter of the last 25 equity market sell-offs.

Quantitative strategies have had a massive direct impact on implied volatility and on equities due to their high equity allocation.

Nevertheless, as volatility is a mean-reverting process, a spike in volatility is usually a good buying opportunity.

But there is an asymmetry: volatility can skyrocket quite suddenly before gradually decreasing. We have entered this new market regime.

The global equity market sell-off, which started in late January and accelerated over the first trading days of February, was rather unusual in a number of respects.

It was unusual because equities and bonds corrected simultaneously. Ten-year US Treasuries have posted negative returns only over six out of the last 25 equity market sell-offs, i.e. roughly one fourth of the time (see table 1).

Table 1: The last 25 S&P 500 drawdowns and 10-year Treasury returns

Peak date	Trough date	SP500 drawdown (total return)	US 10-year bond total return	US 10-year yield variation in bp	# calendar days
19.07.2007	15.08.2007	-9.3%	2.6%	-32	27
09.10.2007	10.03.2008	-17.9%	11.8%	-121	153
19.05.2008	20.11.2008	-46.6%	9.1%	-70	185
16.12.2008	09.03.2009	-25.3%	-3.4%	53	83
29.12.2009	29.01.2010	-4.5%	2.1%	-21	31
23.04.2010	05.07.2010	-15.6%	7.8%	-83	73
07.07.2011	03.10.2011	-18.4%	13.4%	-136	88
08.11.2011	25.11.2011	-9.1%	1.2%	-10	17
02.04.2012	01.06.2012	-9.6%	7.5%	-73	60
14.09.2012	15.11.2012	-7.3%	3.2%	-28	62
21.05.2013	*24.06.2013*	*-5.6%*	*-5.1%*	*60*	*34*
02.08.2013	30.08.2013	-4.3%	-1.1%	15	28
18.09.2013	08.10.2013	-3.9%	0.8%	-7	20
15.01.2014	03.02.2014	-5.7%	2.7%	-30	19
02.04.2014	11.04.2014	-3.9%	1.7%	-19	9
04.07.2014	07.08.2014	-3.7%	2.2%	-22	34
18.09.2014	15.10.2014	-7.3%	5.0%	-54	27
21.05.2015	08.07.2015	-3.7%	0.3%	0	48
20.07.2015	25.08.2015	-12.0%	2.9%	-30	36
01.12.2015	11.02.2016	-12.6%	4.9%	-50	72
23.06.2016	27.06.2016	-5.3%	2.6%	-31	4
07.09.2016	04.11.2016	-4.3%	-1.9%	24	58
07.08.2017	18.08.2017	-2.1%	0.6%	-6	11
08.11.2017	15.11.2017	-1.0%	-0.2%	1	7
26.01.2018	08.02.2018	-10.1%	-1.6%	19	13
Average		**-10.0%**	**2.8%**	**-26**	**48**

Source: PWM-AAMR, Factset

This dual negative return pattern, in which 10-year Treasuries failed to protect portfolios as expected while equities fell, was most pronounced during the May-June 2013 Bernanke taper tantrum.

AUTHORS

Jacques HENRY, CFA
jhenry@pictet.com
+41 58 323 2916

Pictet Group
Route des Acacias 60
CH - 1211 Geneva 73
www.pictet.com

Nevertheless, the recent sell-off was not just a carbon copy of 2013, because the timing of the long-term rate increase and the equity market sell-off was different. The 10-year Treasury rate accelerated from 2.43% at the start of the year to a peak of 2.85% on 2 February, whereas the 5 February collapse in equity markets occurred as the 10-year rate was trading sideways from its peak.

Furthermore, only one third (8 out of 25 equity sell-offs) were more severe in the US than in Europe.

This time around, US equities corrected by 10.1% from the 26 January peak to 8 February market close, compared to -7.4% for the Stoxx Europe 600. Table 2 highlights returns for the Stoxx Europe 600 compared to German 10-year Bund returns.

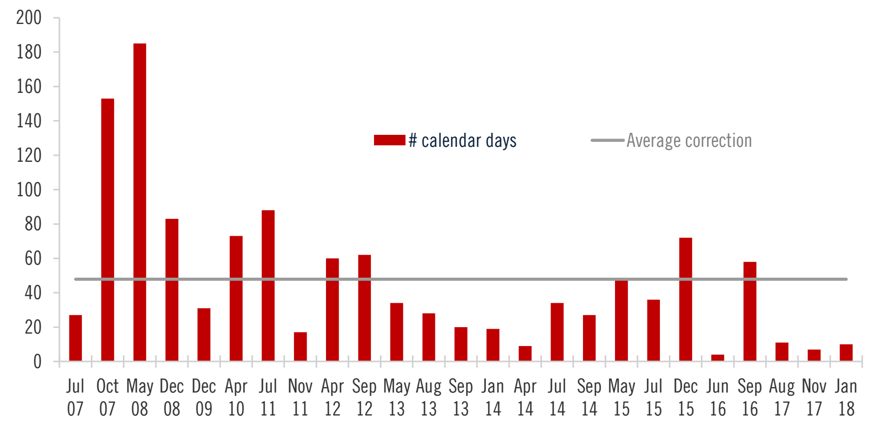
Table 2: Comparison of the last 25 Stoxx Europe 600 drawdowns and 10-year Bunds

Peak date	Trough date	Stoxx Europe 600 drawdown (total return)	German 10-year bund total return	German 10-year yield variation in bp	# calendar days
16.07.2007	16.08.2007	-11.6%	3.0%	-32	31
12.10.2007	17.03.2008	-25.1%	8.2%	-73	157
19.05.2008	21.11.2008	-44.5%	9.5%	-87	186
06.01.2009	09.03.2009	-25.5%	2.2%	-20	62
19.01.2010	05.02.2010	-8.7%	1.5%	-16	17
15.04.2010	05.07.2010	-11.8%	5.8%	-58	81
07.07.2011	22.09.2011	-21.8%	12.2%	-127	77
08.11.2011	25.11.2011	-7.8%	-3.1%	37	17
16.03.2012	04.06.2012	-12.7%	8.7%	-83	80
14.09.2012	16.11.2012	-4.5%	3.4%	-32	63
14.03.2013	17.04.2013	-4.5%	2.2%	-23	34
22.05.2013	24.06.2013	-11.0%	-3.4%	43	33
28.11.2013	13.12.2013	-4.7%	-1.0%	13	15
22.01.2014	03.02.2014	-5.3%	1.8%	-20	12
04.04.2014	15.04.2014	-3.5%	0.7%	-8	11
10.06.2014	08.08.2014	-6.8%	3.5%	-36	59
04.09.2014	15.10.2014	-10.7%	2.3%	-25	41
27.05.2015	07.07.2015	-8.6%	-0.8%	9	41
20.07.2015	24.08.2015	-15.7%	1.7%	-14	35
30.11.2015	11.02.2016	-21.1%	3.6%	-30	73
23.06.2016	27.06.2016	-10.8%	1.3%	-21	4
07.09.2016	04.11.2016	-6.0%	-1.8%	25	58
16.05.2017	11.08.2017	-5.4%	0.8%	-5	87
01.11.2017	15.11.2017	-3.7%	-0.1%	0	14
23.01.2018	06.02.2018	-7.4%	-1.1%	13	14
Average		**-12.0%**	**2.5%**	**-23**	**52**

Source: PWM-AAMR, Factset

The amplitude of the most recent S&P 500 drawdown, which is in line with the median drawdown since 2007, is far above the levels seen in the past two years. So far, the recent sell-off was intense, as it only spanned 13 calendar days (23 January to 8 February), compared to an average of 48 days in the past 25 market drawdowns, and with the bulk of the correction occurring over 2 trading days *(see chart 1).*

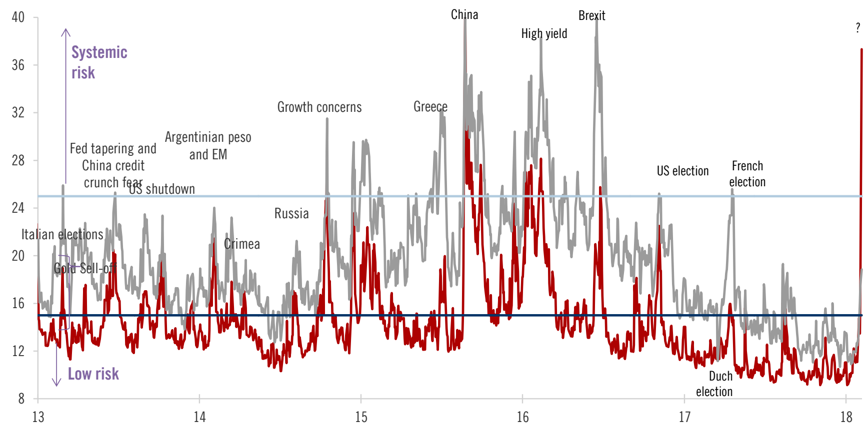
Chart 1: Calendar day duration of US drawdowns since 2007



Source: PWM-AAMR, Factset

The pattern in implied volatility was even more unusual. Starting from a very low level (for most of 2017 it remained between 10 and 12), the CBOE Volatility Index touched an intraday high of 50.3 on February 6 and was not associated with any exogenous systemic risk.

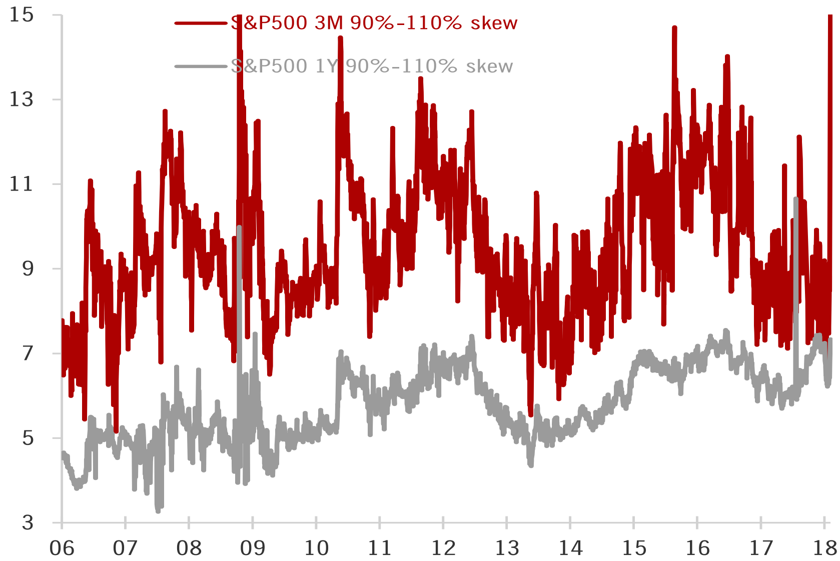
Chart 2: Equity implied volatility indices: US VIX (red) and Europe VSTOXX (grey)



Source: PWM-AAMR, Factset

Furthermore, unlike European and Japanese volatility term structures, an inversion occurred in the US during the recent market sell-off. In general, the opposite holds true in the event of drawdowns. In addition, investors' hedging of equities exploded, causing the volatility skew to skyrocket to a level observed only during the 2008 global financial crisis *(see chart 3).*

Chart 3: Implied volatility skew on S&P 500



Source: PWM-AAMR, SG

Portfolio repositioning explains the volatility skew

Such extreme moves in the volatility skew cannot be exclusively due to long-only, passive investors. The pattern is best explained by investors' efforts to reposition their portfolios. The usual suspects are to be found within the following quantitative-driven strategies:

1. Volatility targeting strategies, whose assets under management (AUM) are estimated at USD 250bn;
2. Commodity trading advisors' (CTA) trend-following strategies, the AUM of which is estimated at around USD 350bn.
3. Risk-parity funds, which have an estimated AUM of around USD 500bn (USD 1 trillion including leverage[1]).

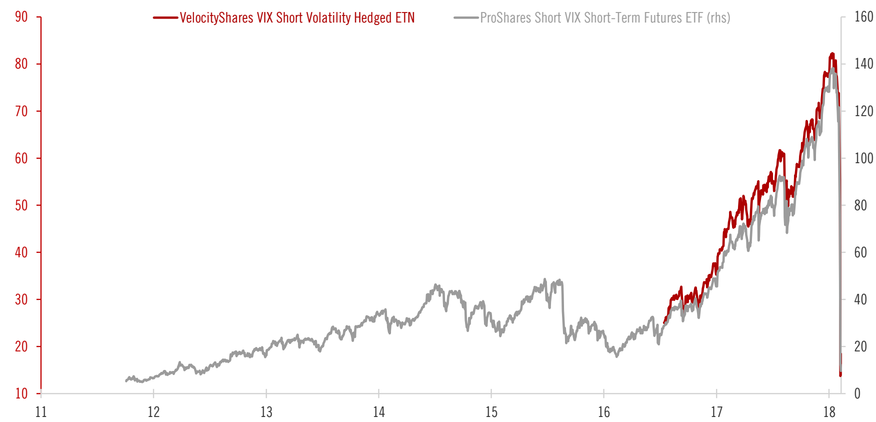
Massive impact on implied volatility

The first strategy mentioned above had a massive direct impact on implied volatility. As part of smart-beta strategies popular even among retail investors, shorting implied volatility was a profitable trade as long as spot implied volatility was drifting lower and term structures were in contango (steep upward sloping). This is due to the mean-reverting property of implied volatility.

The rise in popularity of such strategies explains to some extent why volatility was stubbornly low over 2017. These strategies were made available to retail investors through exchange-traded notes (ETNs), the most famous one being the VelocityShares VIX Short Volatility Hedged ETN (XIVH US), which rose by 119% over 2017 and early 2018, but lost 80% of its value in just two trading days (5- 6 February), when the implied volatility term structure abruptly reversed.

[1] Source of estimates: JPMorgan

Chart 4: Short volatility strategy



Source: PWM-AAMR, Factset

Extreme equity allocation of CTAs and risk-parity strategies

As equity prices steadily increased over the past two years, trend-following CTAs built up significant allocations to equities. A wide enough equity sell-off was bound to trigger automatic selling of those strategies, which are widely researched and documented. This is what happened, and some more CTA selling pressure is to be expected as they are forced to trim their equity exposure.

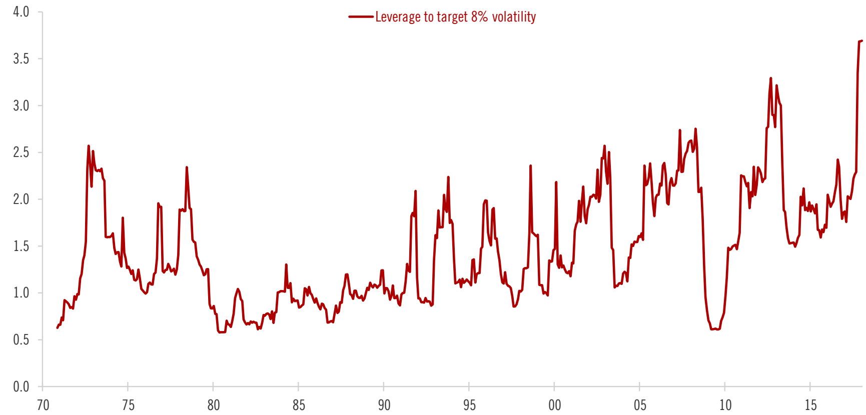
The least-researched area of quantitative strategies is probably risk parity, made popular by Ray Dalio of Bridgewater and its famous All Weather Fund. While counter-intuitive perhaps, risk-parity strategies' allocation to equities was high at the moment of the recent selloff, especially when taking into account leverage. Risk-parity deleveraging had a massive impact on the equity markets.

The basic aim of risk parity is to balance risk (academics talk about Equal Risk Contribution (ERC) allocation). In doing so, one ends up with a balanced portfolio, in which the highest weightings are in the least volatile assets. A simple example is a US risk-parity index that invests only in equities and bonds. To simplify further, let's assume investments are clustered in the most liquid assets, namely the S&P 500 and US 10-year Treasuries. Owing to low realised volatility in equities, those funds probably had a very high equity exposure at the end of January. We estimate the average equity weight of risk-parity funds at 41.5% at the end of January—down from a peak of 58% at the end of October, but still above the average of 35% that has prevailed since the 1970's.

The process of balancing risk does not lead to stellar returns. As a result, most risk-parity funds use leverage. Leverage in these strategies is a function of both realised volatility and correlations between underlying assets: the smaller the realised volatility of underlying assets and the more negative the correlation between assets, the higher the leverage.

As most risk-parity funds tend to target volatility levels, a straight-forward calculation shows that a volatility target of 8% would have translated into leverage of 3.7x on 31 January, an all-time high. Consequently, it is likely that leverage was at peak levels at the end of January, with risk-parity funds' levered exposure to equities at a peak as well.

Chart 5: Theoretical leverage of a US risk parity allocation (S&P 500 and 10-year US treasuries) targeting 8% volatility



Source: PWM-AAMR, Factset

While actual leverage was certainly smaller (around 2x, according to market estimates), deleveraging from risk-parity funds was probably a meaningful factor in recent stock market volatility. As in 2013, when such strategies incurred significant losses, it is likely that they will require more time to adequately reduce their equity exposure.

As volatility is a mean-reverting process, a spike is usually a good equity-buying opportunity. Yet investors should bear in mind that adjustments in volatility take time to unfold and that there is a certain asymmetry: volatility can skyrocket quite suddenly before gradually decreasing. We believe we have entered this new market regime.

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