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Bull run shows up differences in how factor strategies are built

The wide differences in factor strategies' performance in 2017 reflect market exposure, factor construction and risk budgeting, writes Luc Dumontier of La Française Investment Solutions

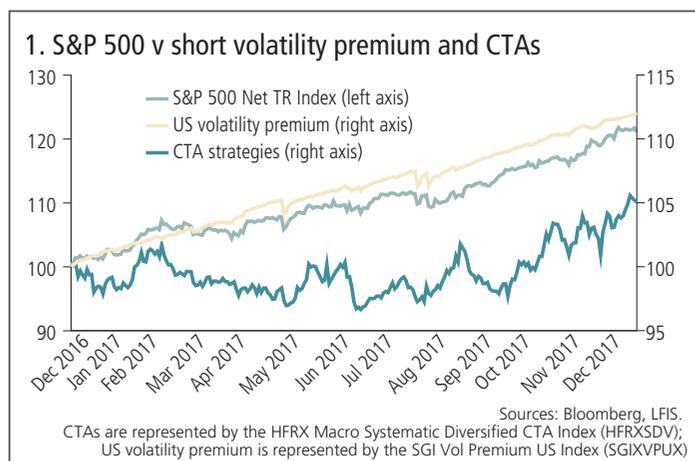
Last year, the S&P 500 delivered a net total return of about 21% – its best yearly performance since the launch of the first factor-investing strategies. Annualised volatility was around 7%, and implied volatility dipped regularly below 10%.

Yet the performance of different factor strategies varied widely – both for strategies based on different premia and for specific implementations of strategies based on the same premia. Why?

A look back at the year shows how the answer lies in market exposures, the construction choices implicit in factor products, and how exposures in multi-factor funds are balanced.

Underlying premia

Firstly, the equity market exposure of different strategies generated much of the performance disparity. Two examples of strategies that benefitted were the volatility premium on the S&P and trend-following strategies such as commodity trading advisers (CTAs).



The volatility strategy on the S&P consists of monetising the difference between implied and realised volatility, for example by rolling one-month variance swaps. This approach generated an excess return of almost 12% in 2017 (see figure 1) with a high correlation with the S&P of 60%, according to the SGI Vol Premium US Index. The realised beta of the strategy was 0.2 in 2017.

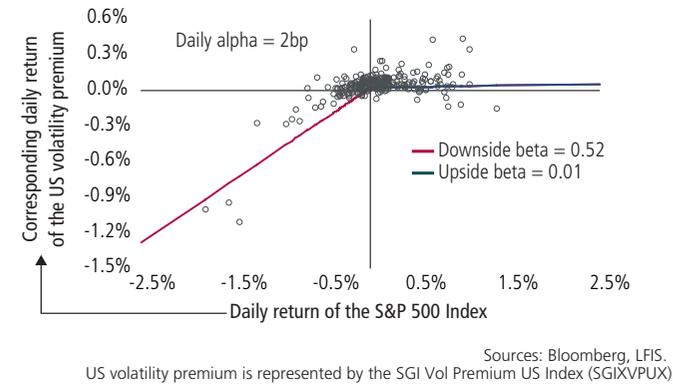
However there is a worrying bias worth noting here. The strategy has strong negative convexity. Estimating the beta of the strategy when the daily returns of the S&P were positive (the blue line in figure 2) and negative (the red line), it looks similar to selling out-of-the money put options: investors accepted a downside beta of more than 0.5 in 2017 to capture daily alpha of just two basis points.

Compare that with 2012, which was also a low volatility period and when the volatility premium strategy on the S&P returned a similarly high 14%. In 2012, however, as figure 3 shows, investors captured twice the amount of alpha (five basis points) with only half the level of downside beta risk (0.31).

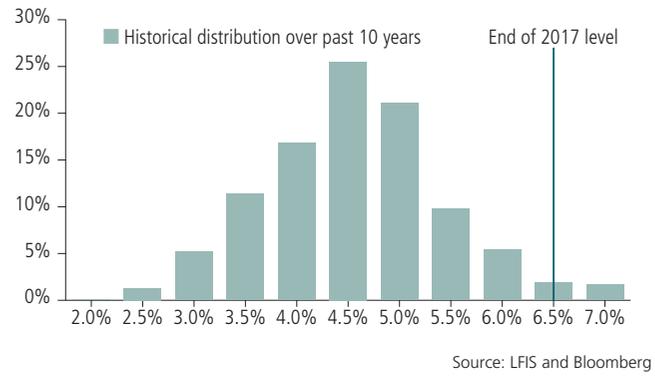
Furthermore, 2017's 0.52 downside beta is the result of a historical regression which actually underestimates the current risk of the strategy. An instantaneous measure of the downside risk is the "95–100 downside skew", or the difference between one-month implied volatility levels at strikes of 95% and 100% of the current spot price. This is effectively an estimate of the rise in implied volatility that would follow an instantaneous decline of 5% in equity markets. Figure 4 shows that the current skew is 6.4% and in the extreme range of its historical distribution. That is to say, the volatility premium strategy has rarely been more negatively exposed to a sharp decline in the equity markets. At today's levels, this spring is tightly coiled and the spread could be expected to snap higher, triggering large losses for volatility premia strategies.

CTA strategies that rely on trends in asset classes also profited from the steady performance of equity markets, especially in the fourth quarter.

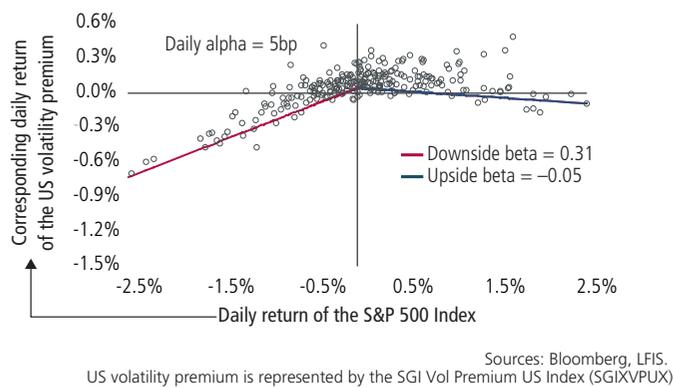
2. Risk/return profile of the “short volatility strategy” in 2017



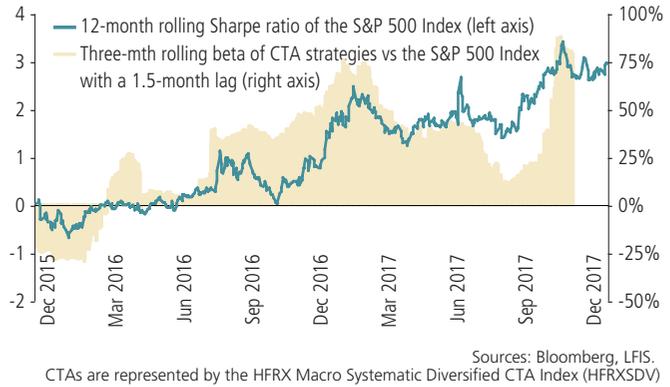
4. S&P 500 95–100% ‘negative skew’ on one-month maturity



3. Risk/return profile of the “short volatility strategy” in 2012



5. Equity market exposure of CTA strategies



A rolling three-month regression of the performance of CTA funds versus annual returns of the S&P shows this.

In figure 5, the line on the left axis corresponds to the one-year Sharpe ratio of the S&P; while the shaded area corresponds to the exposure of CTAs to the S&P estimated by the regression analysis. We have lagged exposure levels by six weeks as the calculated beta corresponds to an average over three months. The result: CTAs had average exposure – implicit or explicit – to the S&P of more than 80% in the fourth quarter of 2017. This explains their excellent performance in the last months of the year (see figure 1).

The one-year Sharpe ratio of the S&P remained very high and steady in the fourth quarter, at around three. CTAs therefore entered 2018 with raised equity exposure. The ratio between the performance of CTAs and the S&P in 2018 year-to-date, as at January 24, is 94% – a YTD return of 5.8% for CTAs compared with 6.2% for the S&P.

Product construction

A second reason for differences in factor strategy performance comes from how strategies are built. Industry specialists broadly attribute differences in implementation to three things: nuances in factor definitions, the mechanics of stock-weighting approaches, and actual portfolio turnover and trading costs. Even for momentum, which at first looks simple because it depends only on stock prices, the implementation choices are considerable.

Questions include, for example, whether to use total return or price return, whether to adjust returns for risk, and which risk measures to use – beta, volatility or idiosyncratic volatility.

More recent returns might be overweighted using exponential averages. Momentum can be measured over different periods, usually 18, 12 or six months. Often the most recent period, in which mean-reverting phenomenon usually appear, is ignored. Sometimes, strategies consider returns from before the formation period.

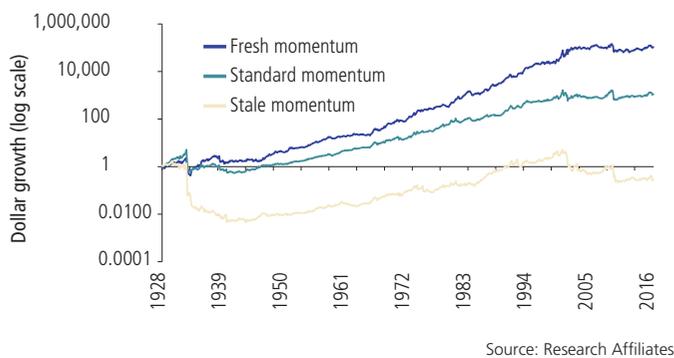
Rob Arnott et al distinguish between “standard,” “stale,” and “fresh” momentum signals. Standard signals are based on the last 12-month performance, ignoring all other information about prior returns (the green line in figure 6).

The stale momentum ‘strategy’ selects stocks with the most extreme performance in the same direction used for momentum selection in the 12 months preceding the last year (the yellow line).

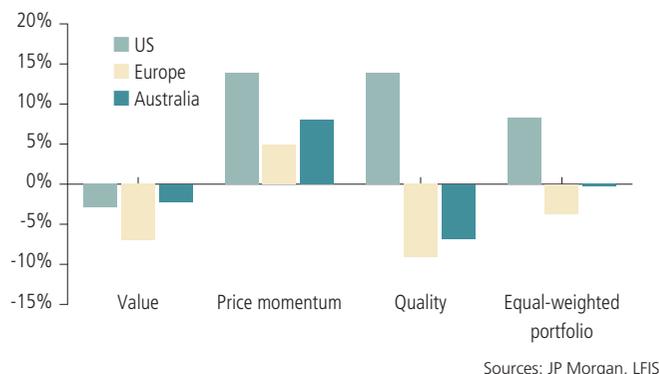
A fresh momentum approach selects stocks with the most extreme performance in the opposite direction to that used for momentum selection in the 12 months preceding the last year (blue line). The idea is to avoid buying or selling stocks that are too expensive or cheap. As figure 6 shows, the results are very different from one to another.

Stock-weighting approaches also offer a number of implementation choices. Once the stocks are selected, should equal weights be favoured over a capitalisation approach? Or should weights depend

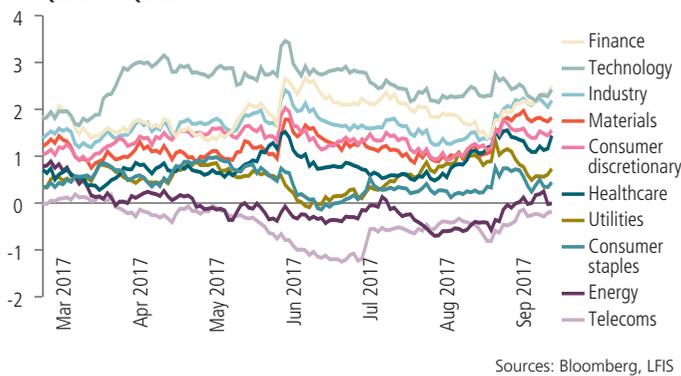
6. Comparison of fresh, standard and stale momentum long/short US portfolios



8. Equity-style premia by country in 2017



7. One-year rolling Sharpe ratios of US sectors (GICS level 1) in Q2 and Q3 2017



on the strength of the score? How many stocks should be bought and sold? Should you build the long portfolio using index futures, or by also shorting single stocks? Should you risk-adjust the short leg to the long leg? Based on which risk: volatility, beta? Should the allocation be country-neutral? Sector-neutral? Or should both inter- and intra-sector bets be considered?

In 2017, equity momentum strategies where inter-sector bets were permitted benefitted from the gradual outperformance of technology, financial and industrial sectors versus energy, telecom and consumer staples. During the second and third quarters, it is striking how far the ranking of rolling one-year Sharpe ratios for the US sectors (GICS level 1) remained almost unchanged (see figure 7).

Portfolio turnover and trading costs also contribute to performance dispersion. Different strategies rebalance with frequencies from daily to monthly. Some require entry or exit signals to persist over several days to buy or sell stocks.

Strategies employ different approaches to placing market orders to rebalance the portfolio. Controlling turnover and the manager's investment infrastructure are both key. Several studies, including from Novy-Marx and Velikov, show that strategies with low turnover, such as value and size, incur small to moderate trading costs, while higher turnover strategies, like momentum and low-risk, can have trading costs high enough to wipe out the alpha.

Risk budgeting

Thirdly, investment solutions that rely on the same premia and are implemented in the same manner can still deliver different performance if they have different risk budget allocations.

The performance of equity premia designed by the same research team at JP Morgan but in different countries provide a good example (see figure 8).

The value and momentum premia delivered similar performance across different countries. However, quality saw strong performance in the US and delivered negative returns in Europe and Australia. The overall impact for the equal-weighted portfolio was that average total performance was positive for the US, but negative or flat elsewhere.

The big winners of 2017 were of three types: strategies that were explicitly or implicitly exposed to risky asset classes; equity alternative premia, especially those implemented in the US market; and strategies that extended the price momentum approach to inter-sector trades.

Looking back, the experience across the industry reinforces the point that factor investing is an investment framework rather than a standalone strategy. Implementation choices are critical. And for end investors, these strategies should be selected by taking into account other investments already in their portfolios. ■

Luc Dumontier is a partner and head of factor investing at La Française Investment Solutions in Paris. This article was written with contributions from Guillaume Dupin, Guillaume Garchery and Yann Le Her, all partners and senior portfolio managers at LFIS.

>> Further reading

- Mannix R, 2017 'Great rotation' highlights clash over unseen risks in factor investing www.risk.net/2480714
- Arnott R, V Kalesnik, E Kose and L Wu, 2017 Can momentum investing be saved? www.researchaffiliates.com/en_us/publications/articles/637-can-momentum-investing-be-saved.html
- Novy-Marx R and M Velikov, 2014 A taxonomy of anomalies and their trading costs papers.ssrn.com/sol3/papers.cfm?abstract_id=2535173