Factors’ tails are fatter than you think

In factor investing, losses that are supposedly ‘once in a lifetime’ can be a regular occurrence.

Investors might not realise quite how fat-tailed factor returns can be. But recent research from Rob Arnott and Vitali Kalesnik, of investment firm Research Affiliates, and academics Campbell Harvey and Juhani Linnainmaa provides an indication.

Their work shows that the distribution of factor returns far from fits a classical bell curve. Reasonably sophisticated long/short fund managers will take this into account, says Kalesnik, the firm’s European head of research. More naïve ones might not.

The research also provides a warning to factor investors not to put too much faith in past simulations that could include these same mistaken assumptions about the distribution of likely returns. That could lead to some nasty surprises.

The authors studied the most negative monthly returns over 55 years for 14 factor strategies leveraged to achieve a consistent target volatility.

An investor who believes that momentum obeys the precepts of normal distribution would expect its worst month since 1963 – a 24% loss – only once in 4.1 quadrillion years, the authors found. That’s every 4.1 million billion years.

Operating profitability – one formulation of the quality factor – is even further out of synch. Its worst spell was a one in 4.7 quadrillion event by the bell curve’s assumptions.

Indeed, the worst month for 11 out of the 14 individual factors that the authors examined ‘should’ have occurred less than once in the past 2,000 years. Yet, as the authors observe, many such episodes have happened even within the past 15.
“For nine of the factors [such bad months] should have occurred less than once during the span that biologically modern humans have roamed on earth, and three should have occurred less than once since the birth of our universe, about 13.8 billion years ago,” the paper notes.

The common antidote to these sorts of factor drawdowns is diversification – mixing portfolios of different factors that are expected to counterbalance each other's short-term fluctuations. Value and momentum are often seen as such an offsetting pair.

But when Research Affiliates looked at this area they identified clear time variation in the correlations between factors; diversification broke down at times of stress. Simulations that treat factor returns as being well approximated by independent normal distributions woefully underestimate the likelihood of big losses, Kalesnik says.

Furthermore, other research, also by Research Affiliates and Linnainmaa, indicates that when a factor sees extreme losses, more losses are likely to follow.

In more than 50 years' worth of data up to 2016 this effect was powerful enough for a notional strategy exploiting it to reach a Sharpe ratio close to 0.7, not accounting for transaction costs.

For the unwary, the effect on long-term returns of such wealth depletion can be large, Kalesnik points out. A simple momentum strategy today is still catching up losses experienced in 2009, for example. Factors' fat tails are not to be ignored.