

If any further proof that trading limits in terms of Value at Risk (VaR) cannot be taken seriously were needed, we now have it.

Last week Bloomberg News reported that HSBC and BNP Paribas both repeatedly breached VaR trading limits in March's 'market mayhem'. Over 10 years has passed since the failure of VaR as a risk measure was exposed for all to see. Better late than never, the regulators subsequently mandated the use of Expected Shortfall (ES) which is the average loss conditional on a VaR breach. But it's still VaR breaches that are reported and misunderstood, as they always have been. As John McEnroe said, repeatedly, "You cannot be serious!"¹

What exactly is Value at Risk?

Value at Risk (VaR) is actually a very simple and useful concept. Nevertheless it has routinely been described in a way that would fall foul of most of the world's Advertising Standards regulations. The 99% 1-day VaR is usually, and misleadingly, described as the maximum 1-day loss at the 99% confidence level. In plain English, that means that it's the most you will lose in a single day, 99 days out of 100. That may, as it's meant to do, sound fairly reassuring.

It may even sound, as is still reported in the press², that it's the maximum you could lose in a set time frame.

Of course that's not at all what the definition says. If it's the most you will lose 99 days out of 100 then, as surely as night follows day, *it's the least you will lose 1 day in 100*.

Described correctly, VaR prompts us to ask the right question about risk.

Most intelligent children, at this stage, would ask: What will I lose on that 1 day in 100? If they have the good fortune to ask a statistically literate adult, the answer will be that there's no way to know except on average.

They will also be told that we can and should calculate the average loss on that 1 day in 100. The average loss, conditional on breaching the 99% VaR, is called the 99% Expected Shortfall (or sometimes 99% Conditional VaR). VaR is only a marker to separate the 'everyday' from the unusual. And 1 day in 100 is not very unusual given that there are some 250 trading days in a year.

VaR, calculated properly, is very important. But not as a risk measure. You need to know what you can expect to lose on the 'unusual' days. And, at least in principle, Expected Shortfall (ES) tells you that.

After the Great Financial Crisis, belatedly, the Basel Committee on Banking Supervision (BCBS) revised

its capital requirements to mandate the calculation of ES. More than 10 years ago we pointed out how, properly calculated, ES would have warned about frightening increases in potential losses long before the crash in September and October 2008.³

The problem is not that VaR is 'backward looking'.

According to Harry Wilson of Bloomberg, the problem with VaR is that it's a backward looking measure"⁴. What, precisely, would allow a 'measurement' of something in the future? A time machine would work but so far as we know, these are either non-existent or in very short supply if the events of March are anything to go by. Or perhaps they're so expensive that even Bridgewater and the Renaissance Institutional Equities Fund simply couldn't afford them.⁵

VaR and ES, properly calculated, actually provide predictions of the future, using data, obtained without a time machine. Data from the past.⁶

But regulators have had to relax their bank capital rules.²

So the question is, why are regulators retrospectively changing capital requirements after a flurry of VaR breaches? There's no mention of ES breaches in the Bloomberg story.

Amazingly, the BCBS's Minimum Capital Requirements for Market Risk⁷ explicitly provides for the use of a normal distribution as a model of market returns. And with such a model there is no hope that the calculated VaR and ES will prove accurate in anything but the most placid of markets.

Financial market returns are simply not normally distributed, as we have been pointing out since before the 2008 crash.⁸

continued

If any further proof that trading limits in terms of Value at Risk (VaR) cannot be taken seriously were needed, we now have it.

Measuring market risk properly is a problem that has already been solved.

There is no excuse for continuing to use the normal distribution as a model for financial market returns. We showed in 2009 that during periods of moderate risk a Laplace distribution was a much better model. But during periods of market turbulence, only models using Extreme Value Theory could be relied upon.⁹

In January of this year, using our proprietary approach to modelling extremes, we warned that there was a 1 time in 7 month chance of U.S. equity markets exceeding the 20-day loss levels last seen in the first Quarter of 2018. And that if that happened the average loss would be over 20%.⁶

If your risk manager is unable to compute VaR and ES accurately (and your results in March will tell you) get help.

If you are still using VaR to measure your risk exposure and even worse, are using a normal distribution to do it, then as John McEnroe said: 'You cannot be serious'.

¹ John McEnroe, Wimbledon 1981

² Investment Banks Get a Coronavirus Trading Pass, Elisa Martinuzzi, Bloomberg, 21 April 2020.
<https://www.bloomberg.com/opinion/articles/2020-04-21/covid-19-wall-street-gets-a-coronavirus-trading-pass?sref=6cCCNZTR>

³ Risk (Mis) Management and the Financial Crisis, William F. Shadwick, Lecture 2, University of Hawaii Distinguished Lecture Series February 2010.
<http://www.math.hawaii.edu/~erik/lectures/shadwick/slides/lecture2.pdf>

⁴ Harry Wilson "Obviously VaR is a backward looking measure..." Bloomberg 6 May 2020.
<https://www.bloomberg.com/news/articles/2020-05-06/hsbc-bnp-repeatedly-breached-trading-limits-in-market-mayhem?sref=6cCCNZTR>

⁵ Hedge Fund Hotshots Suffer Humbling Losses in Coronavirus Chaos, Nishant Kumar and Bei Hu, Bloomberg 17 April 2020.
<https://www.bloomberg.com/news/articles/2020-04-16/hedge-fund-hotshots-suffer-humbling-losses-in-coronavirus-chaos?sref=6cCCNZTR>

Renaissance Says Quant Models Misfired During March Mayhem, Miles Weiss, Bloomberg 17 April 2020.
<https://www.bloomberg.com/news/articles/2020-04-17/renaissance-says-quant-models-misfired-during-march-mayhem?sref=6cCCNZTR>

⁶ Accidents Waiting to Happen The U.S. Equity Market 13 January 2020 and UPDATE 31 March 2020.
<https://www.omeganalysis.com/>

⁷ Basel Committee on Banking Supervision. Minimum capital requirements for market risk. January 2019 (rev. February 2019). https://www.bis.org/basel_framework/

⁸ The CS Character and Limitations of the Sharpe Ratio, Ana Cascon and William F. Shadwick, IMCA Journal of Investment Consulting, Vol 8, No 1, Summer 2006, pp 36-52.

⁹ A New Approach to Tail Risk, Ana Cascon and William F. Shadwick, IMCA Journal of Investment Consulting, Vol 10, No1, Summer 2009, pp 33-48.

LEGAL NOTICE

Please read this notice carefully:

The contents of this document are for illustrative and informational purposes only. No information in this document should be considered a solicitation or offer to buy or sell any financial instrument or to offer any investment advice or opinion as to the suitability of any security in any jurisdiction. All information is subject to change and correction due to market conditions and other factors. This document has been created without any regard to the specific investment needs and objectives of any party in any jurisdiction. Specific instruments are mentioned in this document but this should not be construed in any way as a recommendation to invest in them or in funds or other instruments based on them. They are used for informational purposes only. Omega Analysis Limited does not provide investment advice. Investors need to seek advice regarding suitability of investing in any securities or investment strategies. Any decisions made on the basis of information contained herein are at your sole discretion and should be made with your independent investment advisor.