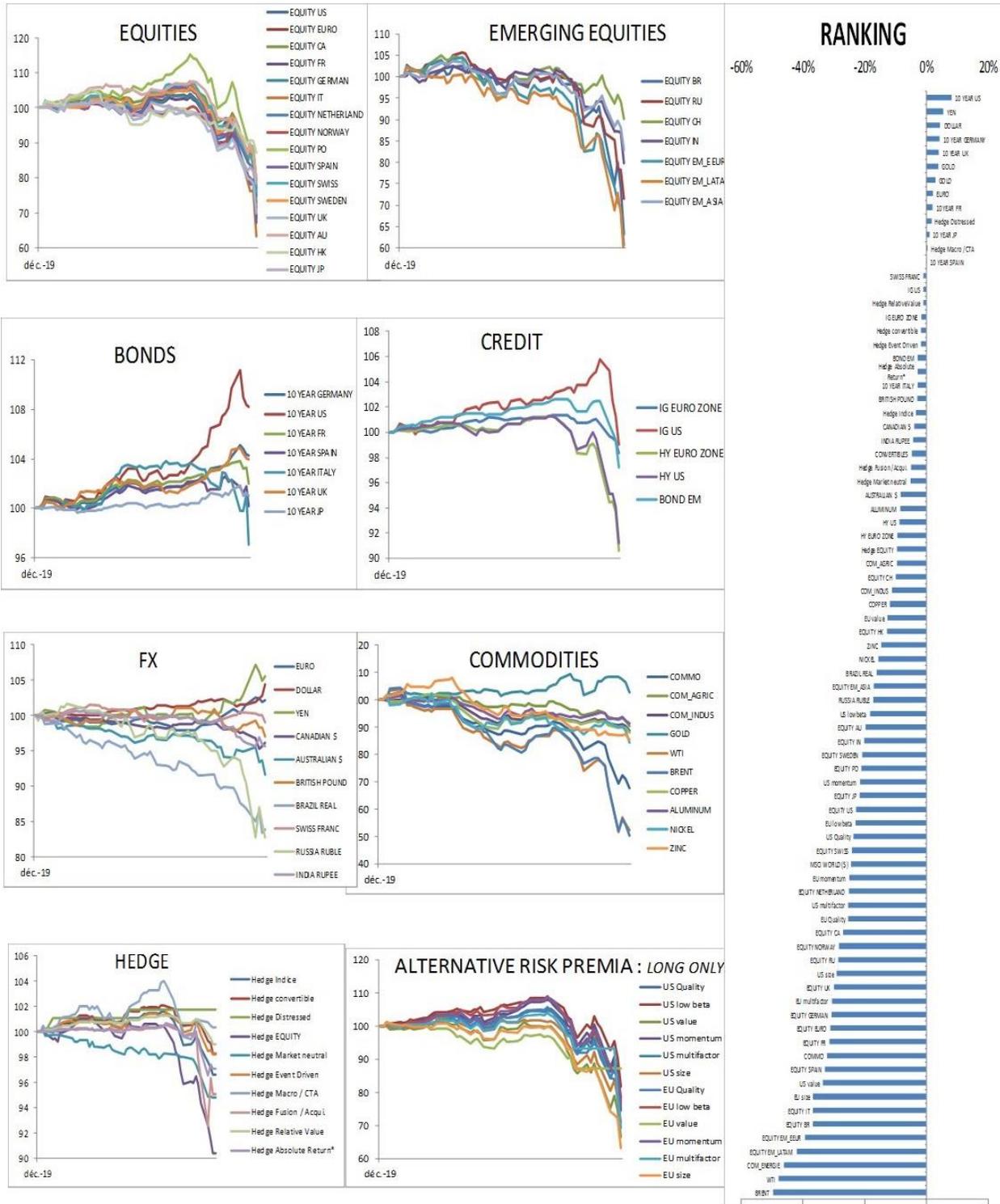


Losing your shirt, institutional style

To start, a quick summary of asset returns as of Friday 3/13/20:



This not a pretty picture, and the situation has actually worsened since Friday.

Everybody will suffer, but probably the retirees the most.

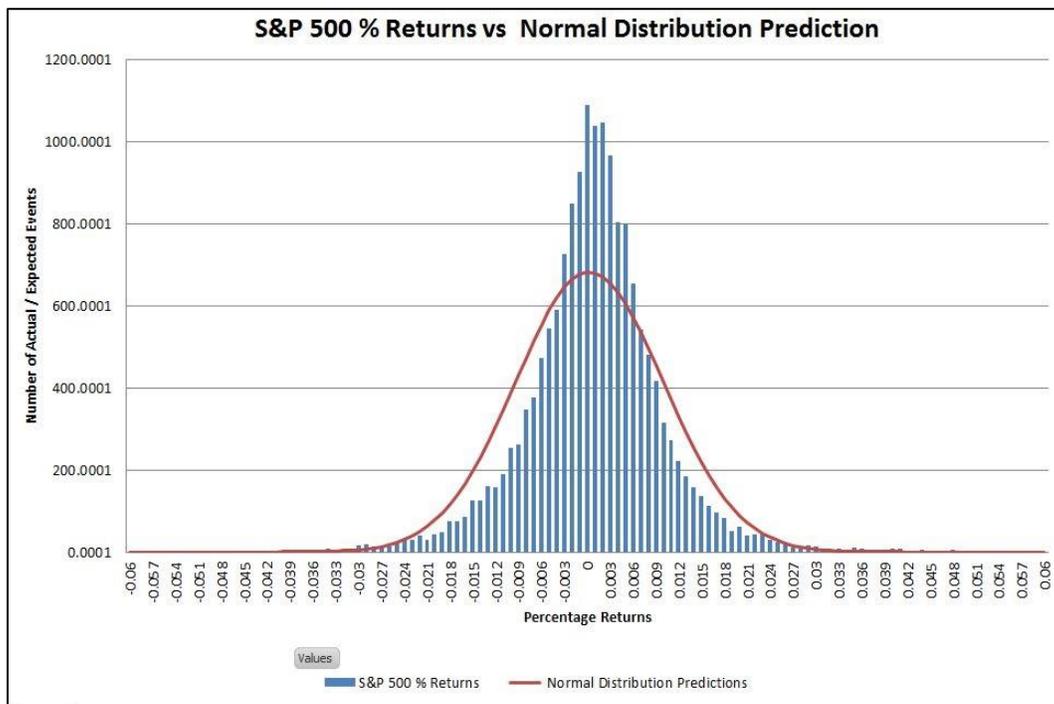
The mathematics of rare events

This may be a large and sudden deterioration, but don't get fooled. Such events are far from rare.

Previous articles¹ explain why derivatives traders monitor carefully how frequent such 'rare' events happen. Their profitability depends on it, as the returns of a delta-hedged option is quadratic in spot:

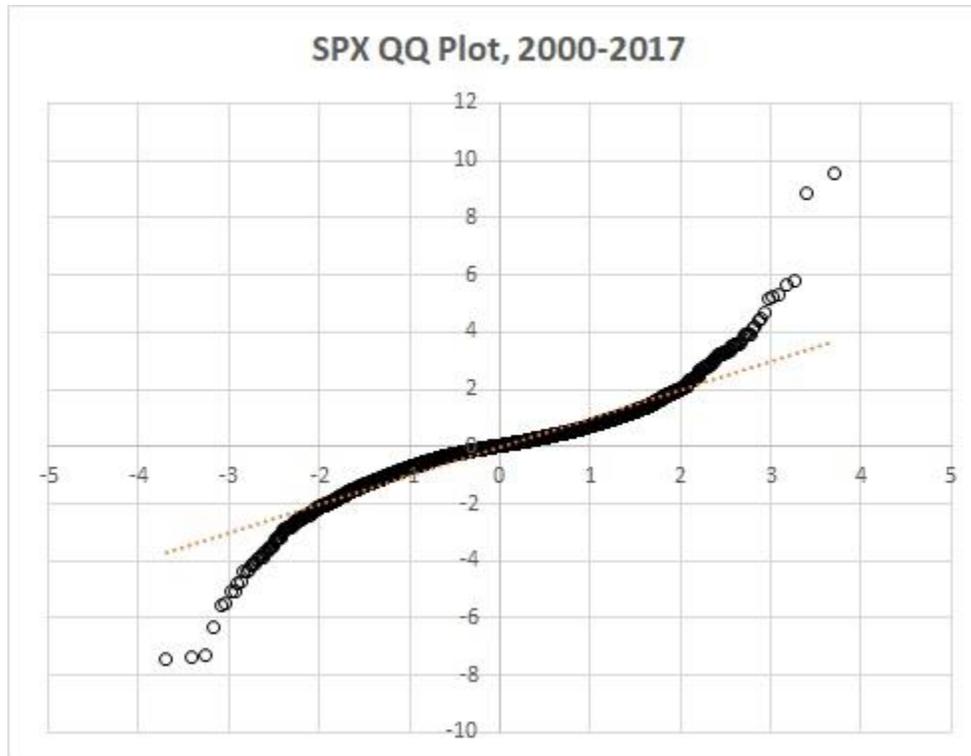


On the S&P 500, and equity indices in general, these events are way way more frequent than a standard measure of probability distribution (Gaussian) implies.



¹ Several articles are available at www.NavesinkInternational.com, of which
[Gamma Scalping 101 – Gamma/Theta Trading](#)
[Gamma Scalping 102 – The Undisclosed Risks](#)

The S&P 500 is known to have very “fat tails” both upward and downward, as displayed by this Q-Q plot:



Investors should not bet against the likelihood of such events, precisely because they are more frequent than thought, and because their financial outcome can be significantly large. It's like picking up dimes in front of bulldozers. It's easy, because the bulldozer is so slow. You win small but you win so often! Your income is di-ver-si-fied. Until the day where the bulldozer for some reason wins the race.

In investment jargon, selling insurance against market crashes shows attractive risk-adjusted returns, a 'high Sharpe'. Consistent returns, with little and rare downsides. Usually.

Many investors, from small to large, have fallen into that trap. We have seen this scenario unfold several times the last decade:

- Victor Niederhoffer lost hundreds of million of client assets in the October crash of 1997, and then again in 2007.
- AIG was bailed out in September 2008, after selling massive amounts of CDS² as 'diversification'.
- 'Karen the SuperTrader' lost and hid hundreds of millions of losses between 2014 and 2016 on S&P straddles.
- LJM Preservation and Growth Fund (sic) was structurally selling puts on indices, without the protections they pretended to have. The fund lost over 90% of its AUM in the first few days of February 2018.
- OptionSellers.com managed to blow up hundreds of retirees' savings³ in November 2018, after selling naked puts on commodities⁴.

I will repeat it again. On derivatives trading floors, 'selling the small puts' is a beginner's mistake.

² Credit Default Swaps (CDS) are linear insurance contract on bonds, similar in behavior to puts on indices.

³ Retirees lost more than their invested savings as OptionSellers was managing SMAs.

⁴ Numerous articles will explain the events. Here is one <https://earlyretirementnow.com/2018/12/18/the-optionsellers-debacle/>.

Here is Ray Dalio's comment, from no later than March 3rd, 2020:

Additionally, it seems to me that this is one of those once in 100 years catastrophic events that annihilates those who provide insurance against it and those who don't take insurance to protect themselves against it because they treat it as the exposed bet that they can take because it virtually never happens. These folks come in all sorts of forms, such as insurance companies who insured against the consequences that we are about to experience, those who sold deep-out-of-the-money options planning to earn the premiums and cover their exposures through dynamic hedging if and when the prices get near in the money, etc. The markets are being, and will continue to be, affected by these sorts of market players getting squeezed and forced to make market moves because of cash-flow issues rather than because of thoughtful fundamental analysis. We are seeing this in very unusual and fundamentally unwarranted market action. Also, what's interesting is how attractive some companies with good cash yields have become, especially as many market players have been shaken out.

The market movements of the last few weeks will shore up other examples of this strategy. This article explains the latest one, very institutional.

Volatility and variance swaps

Volatility is the main measure of risk in the financial markets. It is the standard deviation of annualized returns. Simply said, when an asset grows, it can deviate more or less from a long-term trend. Volatility measures by how much the asset deviates from this trend:



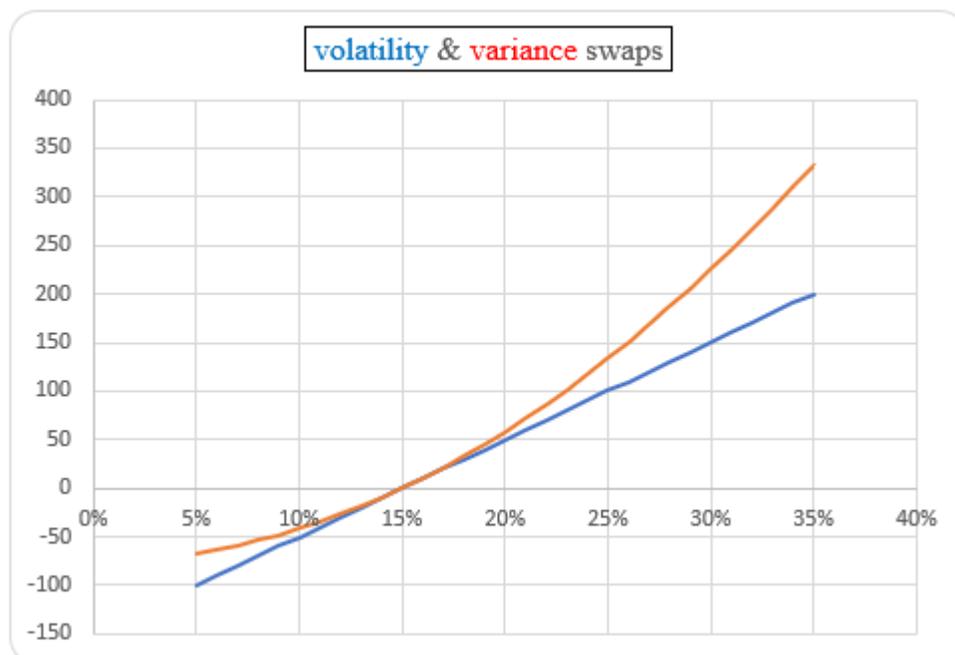
Options and derivatives are closely related to this metric of noisiness. Daily delta-hedging a call or a put generates returns similar to that volatility. Option traders can replicate and therefore trade pure volatility.

As the markets have grown in technology and technicity, volatility became a more accessible 'asset class'. There are now exchange-listed contracts exchanging volatility levels. The most famous one is the VIX futures, which pays the 30 day implicit volatility priced in a specific maturity strip of S&P options.

Volatility also trades through OTC contracts called 'volatility swaps' and 'variance⁵ swaps'. Like all OTCs (over-the-counter) they are contractual agreement between two individuals to pay or receive the volatility of an asset:

- The *buyer* of a *volatility swap* will *receive* the value of the *realized volatility* over a certain period if it is above the initially agreed level. It will pay the underperformance if it goes lower.
- The *seller* of a *volatility swap* will *pay* the value of the *realized volatility* over a certain period if it is above the initially agreed level. It will receive the underperformance if it goes lower.
- The *buyer* of a *variance swap* will *receive* the *square of the realized volatility* over a certain period if that amount is above the initially agreed level. It will pay the underperformance if it goes lower.
- The *seller* of a *variance swap* will *pay* the *square of the realized volatility* over a certain period if that amount is above the initially agreed level. It will receive the underperformance if it goes lower.

For an initial strike at 15%, the payouts are

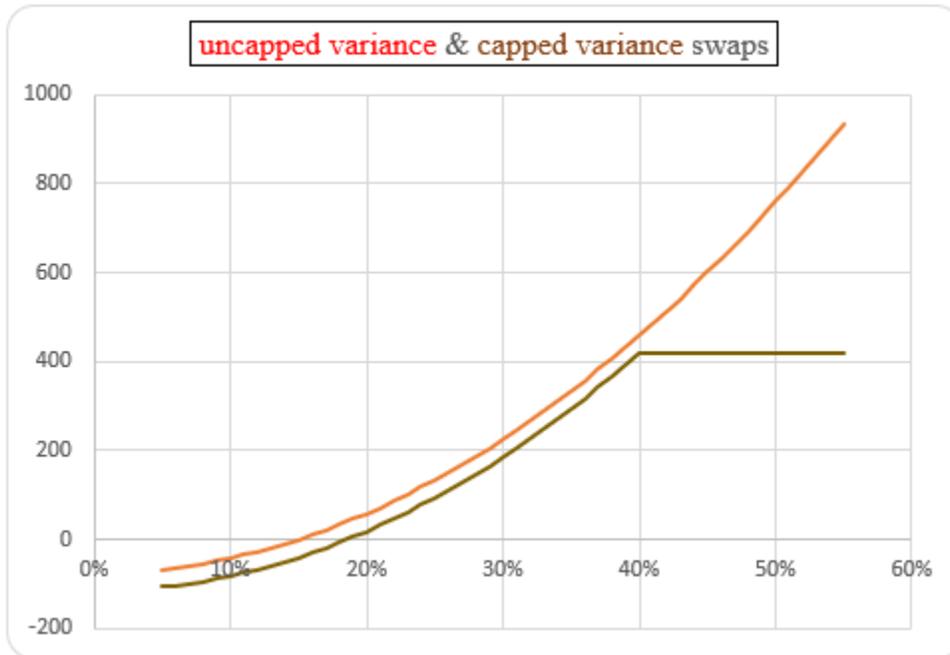


Now there are several flavors of these contract. In particular, they have capped and uncapped versions.

- An *uncapped variance swap* pays the square of a volatility, whatever that amount will be.
- A *capped variance swap* pays the square of the volatility, *up to a certain amount*.

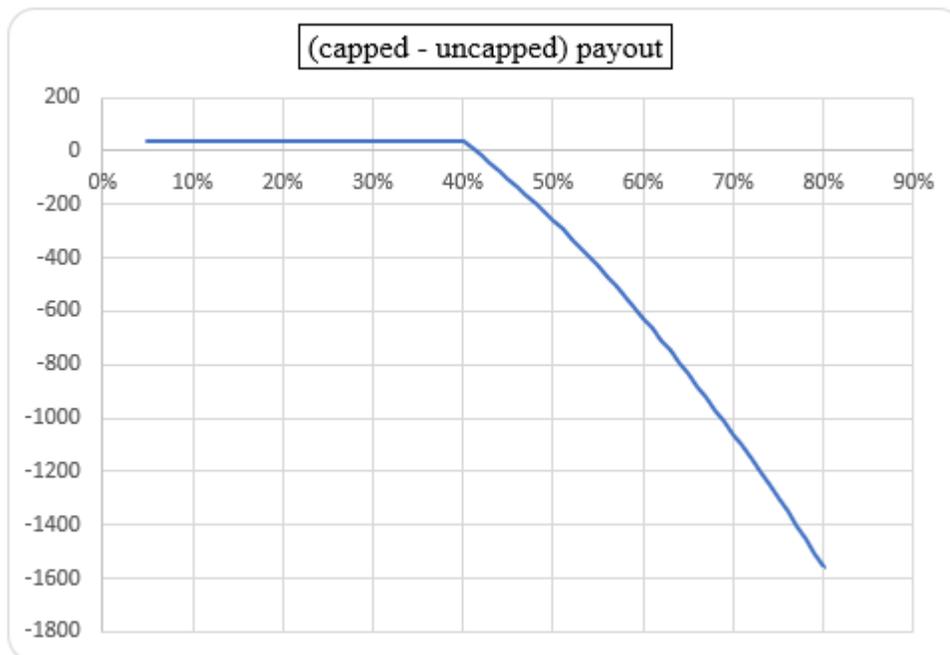
⁵ The square of a volatility is called a variance

That cap is typically set around 2.5 x the times the initial level. So, for an initial level of 15% and a cap at 40% (in vol, or 0.16 in variance) the payouts become:



Because the payout of the capped version is lower, its initial price is also lower. As a result, if you buy the capped version and sell the uncapped version, you will collect that difference. The net position will be that slight difference... as long as the volatility remains below the cap.

If the volatility touches or goes above the cap, your payout becomes:



Does this ring a bell to you? When the market crashes, the volatility of the market spikes. If the volatility is above a certain amount, this position starts to cost you a very large amount. That strategy is a 'short tail' strategy – you sell the far ends of the Gaussian distribution. It is equivalent to selling insurance on market crashes. Yes, every day you collect a bit. Crashes are rare. But when crashes happen, it costs a lot.

Pennies in front of bulldozers.

Malachite Capital Management

Malachite is a registered investment advisor, based New York, which started in 2013. They specialize in derivatives trading, volatility and variance swaps.

Here are extracts of their risk disclosure:

Material Risks (Including Significant, or Unusual Risks) Relating to Investment Strategy

A brief explanation of the material risks associated with Malachite's principal investment strategy and methods of analysis follows.

- **Nature of Investments.** While it is anticipated that Malachite will invest primarily in equity derivative products, Malachite has broad and flexible investment authority. Investments may be affected by business, financial market or legal uncertainties. There can be no assurance that Malachite will correctly evaluate the nature and magnitude of the various factors that could affect the value of and return on investments. Prices of investments may be volatile, and a variety of factors that are inherently difficult to predict, such as domestic or international economic and political developments, may significantly affect the results of Malachite's activities and the value of its investments. In addition, the value of portfolios may fluctuate as the general level of interest rates fluctuates. No guarantee or representation is made that Malachite's investment objectives will be achieved.

Risks Associated with Types of Securities that are Primarily Recommended (Including Significant, or Unusual Risks)

- **Variance and Volatility Swap Agreements.** Malachite enters into variance, forward variance and volatility swap agreements on behalf of the client accounts. A volatility swap is a forward swap agreement where the underlying asset is the realized volatility of a given index or other security. A variance swap is a type of volatility swap with a payout that is related to realized variance rather than realized volatility. A forward variance swap is a variance swap whereby the inception date of the variance swap is at a date starting after the trade date. In addition to general market risks, variance and volatility swaps are subject to liquidity risk and credit risk. Investors who sell an uncapped variance, forward variance or volatility swap risk unlimited losses if the realized or implied volatility, as the case may be, of the underlyer exceeds the reference strike of the swap at expiration.

Read between the lines. Their core business is to sell that difference between the two variance swaps.

They actually described other strategies in this [Barron's interview](#)⁶:

- selling the time structure of the VIX,
- selling the difference between historical and implied volatility on the S&P,
- selling vol-of-vol (options on the VIX).
- They also sell variance on vol-target funds⁷.

⁶ <https://www.barrons.com/articles/how-one-hedge-fund-solved-low-volatility-1500370273>

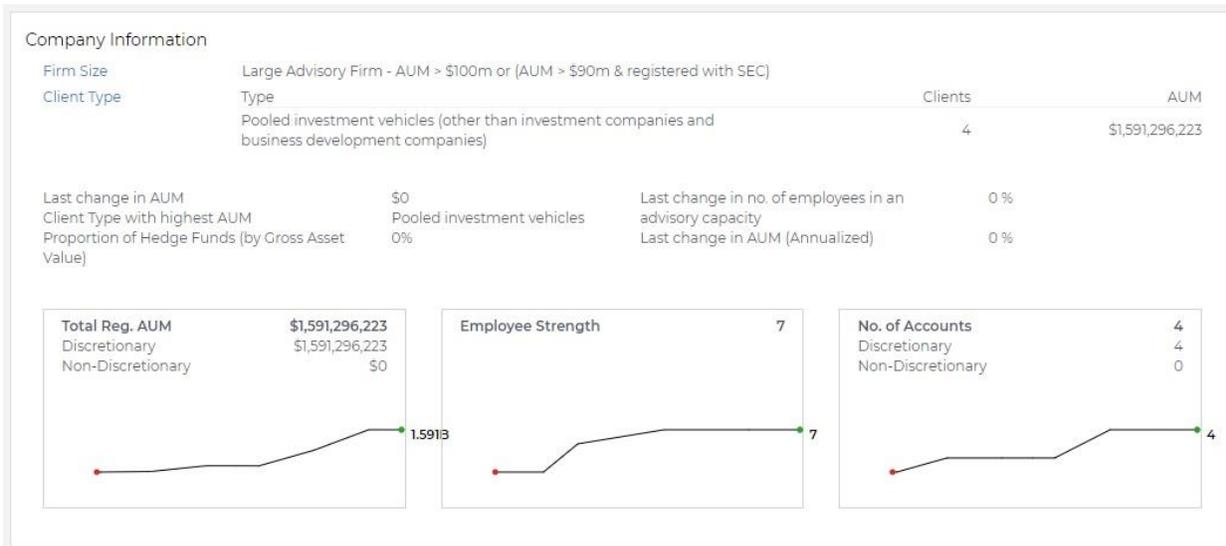
⁷ Vol-target funds rebalance their assets at regular intervals (by increasing or decreasing the leverage) to remain at a certain volatility level, say 10%. If they can rebalance quietly, the realized vol will remain close to 10%. If the market suddenly moves before they can rebalance, their realized vol can be much higher. This just happened – the coronavirus crisis arrived extremely fast.

All these strategies have a common thread: they are short-tail. They all generate regular profits, as long as the market is calm or within reasonable bounds. If the market tanks and vols go up, they cost a fortune.

Malachite's AUM

With a Sharpe of ~2.5, and a history of generating profits in many types of markets, saying you are smarter than the market attracts a lot of interests, awards and assets!

The last form ADV indicates that the fund now stands at \$1.6 bn⁸.



Not bad for 7 employees and 4 (?) clients...

The outcome

To generate income for that type of AUM, you need to sell a lot of spreads between the two variance swaps. A lot.

Rumor is, they had maxed out their risk limits with every OTC provider of the industry. That gives you an indication of the notionals and risks.

At the time of writing this article, Malachite is in default of payment; the entire AUM of the fund is not enough to pay the margin calls requested by the banks.

- That is a pretty bad omen for the investors in the fund. We will know better when the dust settles, but they have most likely lost their entire investments.
- They will not be the only losers. The broker-dealers who traded the OTCs with Malachite are also in a bind. They bought the tail exposure that Malachite was selling and sold it into the market to hedge themselves. Now, because Malachite is in a credit default situation, they will *not* receive from Malachite the payout they expect on the uncapped variance swap. Net-net, they are short tail through their market hedges.

How big that one is going to be, is still anyone's guess at this stage...

⁸ The reported notional sums all legs of a fund's trades and likely overestimates the trade premia. Two caveats: 1 Risks are much larger than premia. 2 Malachite announced in 2017 that they would triple their AUM from their current \$300 and close the fund to new investments at \$1bn. The AUM was likely to be around \$600m at the time of the events.



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Jontran de Quillacq has 25 years of experience in portfolio management, derivatives trading, proprietary trading, structured products and investment research. He has worked with top-tier banks and hedge funds in both London and New York.



Background Experience - After his European and US education, Mr. de Quillacq traded derivatives for two decades, from vanillas to exotics, both proprietary and client-facing, at top-tier banks in the square mile and on Wall Street. As a portfolio manager, he researched and managed investment strategies, delivered both in hedge fund and in structured note formats. He initiated the distribution of investment strategies through derivatives, an activity now called 'portable alpha' and 'smart beta'. For the following five years, Mr. de Quillacq ran due diligence on investments strategies and selected senior investment personnel for some of the world's most famous and most demanding hedge funds and asset managers. In 2017, he co-founded a quantitative activity deploying the latest machine learning techniques in global long/short equities. Mr. de Quillacq is a quantitative researcher and portfolio manager in an asset management firm deploying volatility trading strategies.

Expert witness / litigation consultant - Mr. de Quillacq's own investment experience and his cross-sectional review of other professionals give him unique experience on what can be done, what should be done, what should not be done, and the grey areas in-between. During a personal case, his legal team was so impressed by his wide and thorough knowledge in finance, his capacity to explain complicated ideas in simple terms, and his strong performance on the stand, that they strongly recommended he expand into litigation support services. Mr. de Quillacq is now a FINRA/NFA arbitrator, a member of the **Securities Expert Roundtable** and an IMS Elite Expert. He has consulting affiliations with **Ankura, Barrington Financial Consulting Group, The Bates Group, Moskalev Consulting** and **SEDA Experts**.

Mr. de Quillacq is an alum of the Ecole Normale Supérieure de Lyon in theoretical physics, obtained his doctoral degree in electrical engineering at Sup'Elec and became in 1995 an alum of HEC Paris. He was an international fellow in atomic physics at the Stanford Research Institute and a visiting scholar in differential algebra at UC Berkeley. Mr. de Quillacq served as an army officer during the first Gulf war.

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