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# Live test in 2022 proved that the low volatility premium is definitively not a bet on interest rates

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Minimum variance and low volatility have been one of the most popular strategies among investors as they tend to benefit from the so called "Low-volatility anomaly" and hence deliver higher risk-adjusted returns over the long term. The largest chunk of the literature has nevertheless focused on the recent history in the US markets, where such premium has been accompanied by the secular decrease of long-term interest rates in the US. To the point that back in 2015-2016 many in the industry were raising concerns that in a rising rate market environment these strategies may underperform. For its critics, the (low-)volatility premium was not to be linked to structural characteristics of the market, constrained investors or behavioural explanations. It was rather to be associated with the decrease in long-term US rates that benefitted more companies and sectors that typically made the core of low-volatility strategies[1]. To us this was an example of confusion between correlation and causation[2].

As experts in quantitative investment strategies and particularly in minimum variance, we wrote a paper back in 2017[3] (hereafter *DMB2017*) in which we tested the allegedly effect of interest rate changes in low- and high-volatility portfolios.

**In 2016, we had come to the conclusion, not shared by many, that the low-volatility premium is not a consequence of declining interest rates**

The paper reached a threefold conclusion:

i. The inclusion of the interest rate factor would not improve the explanatory power of a classic Fama-French-Carhart model
ii. The inclusion of the interest rate factor would not significantly reduce the positive and statistically significant alpha that historically has been measured for low-volatility portfolios
iii. There is a small but positive duration for low-volatility portfolios but not enough to explain away the positive risk-adjusted return that these portfolios show, even when accounting for traditional equity premia (Size, Value and Momentum).

In a nutshell, our paper, back in 2016 simply refuted the thesis that low-volatility investing benefitted of decreasing interest rates. This is not to say that interest rates have no impact on equities, rather than …" *these movements affect the market as a whole[4]*..".

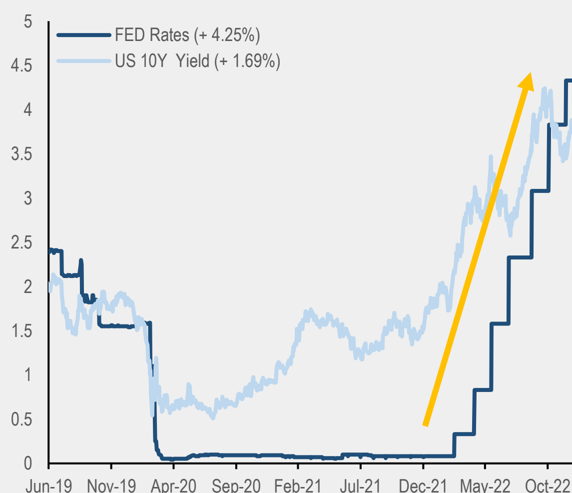
Fast-forward in 2022: following the COVID-19 pandemic, supply-chain disruptions, fiscal and monetary stimuli and then the energy shocks have sent US inflation into unchartered territory for the standard of the last 20 years. At the pick in June 2022, US CPI was at 9% YoY, the same level as in December 1981.

The US Fed answer has been impressive by historical standards (Exhibit 1), although some have been criticized the delay in the response, as inflation was initially though to be transitory. From March 16, 2022 to December 30, 2022, the FED rate range has increased from 0%-0.25% to 4.25%-4.50%. Over the same period, US 10Y yields have moved from 2.18% to 3.87% (+1.69%).

[1] See for example, Brian, A. (2017). "Low-Vol Strategies May Underperform When Rates Rise". Morningstar; or Rabener, N. (2018). "The dark side of low-volatility stocks". CFA Institute. https://blogs.cfainstitute.org/investor/2018/10/29/the-dark-side-of-low-volatility-stocks/. In this stream, one can also refer to Driessen, J. and Kuiper, I. and Nazliben, K. and Beilo, R. (2019). "Does interest rate exposure explain the low-volatility anomaly?". Journal of Banking & Finance, Vol 103, 51-61.
[2] Marcos Lopez de Prado, M. (2022). « Causal Factor Investing: Can Factor Investing Become Scientific?", ADIA Lab.
[3] De Franco, C. and Monnier, B. and Rulik, K. (2017). "Interest Rate Exposure of Volatility Portfolios". The Journal of Beta Investment Strategies Fall 2017. Vol 8 (2) 53-67.
[4] Page 63 ibis.

This offers a unique natural experiment to test how such increase in US rates has affected low- and high-volatility stocks.

**Exhibit 1 : FED rates and on-the-run 10Y US yields in percentage points. Source: Bloomberg**

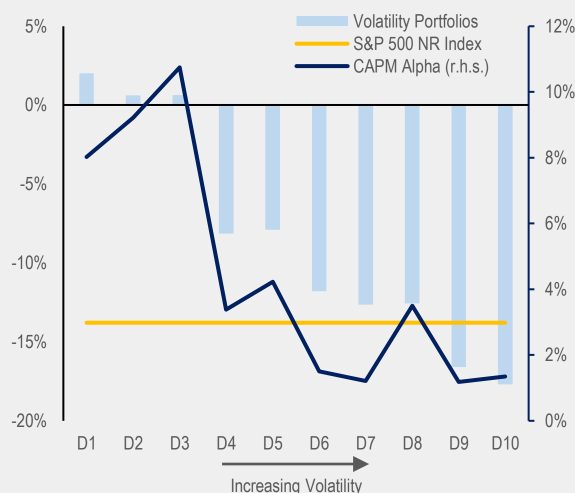



For this, we update (from June 2016, the end date in *DMB2017* to December 2022) the ten portfolios build on stocks that belong to the S&P 500 Index, based on their realized volatility, keeping the same methodology as in *DMB2017*: Monthly rebalancing, 500-days to estimate stock volatility and equal weighting within each portfolio. Decile1 (hereafter D1) contains therefore the stocks with the lowest volatility while Decile 10 (hereafter D10) is made of the stocks with the highest volatility.

**Low-volatility portfolios have substantially outperformed the market, even in a rising rate environment**

We then compute, for each portfolio, its annualized performance between March 16 and December 30, 2022, which corresponds to the increase in US rates triggered by the FED's actions. We also compute their CAPM alpha over the S&P 500 Index and a risk-free at 2.14% (annualized). Exhibit 2 collects these results.

**Exhibit 2 : Performances and CAPM Alphas for the 10 volatility portfolios and the S&P 500 reference level. Data in USD from March 16, 2022 to December 30, 2022.**




The portfolio D1 delivered an annualized +2% while D10 ends at -17.6%, which the S&P 500 Index at -13.8%. When adjusting for the risk, we see that the three low-volatility deciles (D1-D2-D3) have significantly higher alphas (in the range [8%-11%]), while the three high-volatility deciles (D8-D9-D10) shows substantially lower alphas in the range [1%-3.5%]. It should be noted that all deciles have positive alphas, as they are, by construction, equally weighted: Given the significant loss that large cap US equities have experienced over the period, such weighting scheme has helped all deciles to achieve positive alphas. Were we to use the S&P 500 Equal Weight Index[5] as the reference for the calculation of alphas, we would have alphas in the range [5%-7%] for D1-D3 versus [-5%, -2%] for D8-D10.

[5] Over the period, the S&P 500 Equal Weight Index has delivered -8.71% vs -13.78% for the S&P 500 Index.

An alternative way to view these differences is provided by Exhibit 3, which shows the performances of the ten portfolios if they were scaled to achieve a 10% volatility. In this way, the portfolios would be comparable form a risk perspective: As a matter of fact, D1 would have delivered half the volatility of D10.

**Exhibit 3 : Annualized volatilities for the ten volatility portfolios and the S&P 500 (Top panel). Performances of the ten volatility portfolios and the S&P 500 Index scaled to maintain the same volatility set at 10% (Bottom Panel). Source: Bloomberg, S&P, Datastream. Calculation in USD from March 16, 2022 to December 30, 2022.**

| | S&P 500 | D1 | D2 | D3 | D4 | D5 | D6 | D7 | D8 | D9 | D10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Volatility | 23.61% | 16.35% | 17.86% | 19.64% | 21.17% | 21.99% | 23.68% | 24.84% | 28.27% | 31.51% | 35.75% |
| Scaling portfolios to maintain iso-volatility at 10% | | | | | | | | | | | |
| Performance | -4.54% | 0.63% | 0.01% | 0.01% | -3.38% | -3.02% | -4.00% | -4.25% | -3.24% | -3.93% | -3.45% |

Wit the same level of risk, we would have a +0.63% for D1 which compares well against D10 at -3.93% and the benchmark (itself scaled to 10% volatility) at -4.54%.

**In 2022, the increase in rates which fueled the rise of the equity market volatility and its negative performance, does not explain the outperformance of low volatility portfolios.**

So far therefore, the large increase in both short- and long-term rates in the US has not proved detrimental to the performance of low-volatility stocks. On the contrary, these stocks, and the strategies built around this concept, have performed well in 2022, despite the allegedly unfavourable rate environment. The fear that high US rates would reduce the potential for low volatility strategies to outperform the market is simply not justified. This does not mean that low-volatility strategy will continue to outperform in the future: As with other risk-premia, we know that they tend to be time-varying and can experience periods of underperformance, although over the long-run they tend to deliver positive risk-adjusted returns. But the claim that high interest rates will play against low-volatility investing is not supported by the events.

Just as we said.

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