

At ReSolve<sup>1</sup>, we believe alpha is the product of continuous evolution and innovation. While the ensemble based “style premia” models that motivated our original strategies prior to October 2020 were a great step in the right direction, our evolution to “bespoke” models informed by best practices in data science represents a leap forward for our alpha products.

Prior to October 2020, ReSolve's active strategies were inspired by best practices in the field of empirical finance. Specifically, ReSolve ran style premia strategies that included trend, mean-reversion, carry, relative value, and volatility signals, based on academic and practitioner studies published in major finance journals. ReSolve bolstered alpha from these styles by adding features such as ensemble methods to improve robustness, and portfolio optimization to make best use of diversification.

Under a style premia paradigm, once optimal portfolios were formed it was best practice to continuously re-scale portfolio leverage to reach a constant target portfolio volatility. The rationale for this was that traditional empirical finance offers no tools to determine when expected returns for each market, or the portfolio, are expected to be high or low. Rather, style premia strategies generally assume a constant edge, which warrants a constant portfolio target volatility.

The assumption of a constant edge runs into challenges when theory collides with the reality that the strength of any given edge will fluctuate over time. Temporarily weaker edges can be especially dangerous when they coincide with long and short positioning that results in low portfolio volatility. This then leads to the use of higher leverage to achieve a target volatility at the most inopportune times. This is why style premia strategies can sometimes have their largest portfolio exposures during their worst performing periods.

Another interesting property of traditional style-premia strategies is that they seem highly resilient to methods aimed at reducing trading turnover. For example, we observed very little performance decay in simulation prior to 2017 from trading, say one-twentieth of the portfolio each day to approximate a smooth monthly rebalance. After all, we had seen very few acute crashes over the 27 years back to 1990, which represented obvious analogs to the liquidity-induced crashes markets experienced over the 2018 – 2020 period.

It probably isn't difficult to assume where such a style-premia strategy might have experienced negative outcomes from this miscalibration. The Evolution Program suffered during February 2018 with an acute 19% drop that was further compounded by an additional loss of 18% in September and October 2018. After rallying back to an all-time high-water-mark by mid-December 2019, the strategy was maximally leveraged into the COVID related crash in late February and March of 2020, leading to a 31% peak-to-trough loss.

Continuous volatility targeting and trade smoothing have another bogeyman – acute crashes with V-bottoms. When markets crash on sharp spikes in volatility, strategies that continuously re-leverage to target volatility, especially those with portfolio weights that are averaged over several days, can take too long to adjust exposure in response to escalating market pressures. As such, they realize most of the drop before fully adjusting to the higher volatility levels. And if markets experience a V-bottom – for example from massive central bank and/or government intervention – these strategies have minimal exposure as markets rebound higher. It's clear how V-bottoms pose major challenges to continuously managed volatility strategies. ReSolve's strategies suffered from this exact phenomenon in 2018 and 2020.

While the theory that motivated style premia strategies is well grounded, ReSolve's strategies no longer employ continuous volatility scaling. Instead, a 2-year cycle of research brought about major improvements to the way we approach both strategy and portfolio construction, which were deployed in October 2020.

<sup>1</sup> ReSolve here refers to research done while at ReSolve and then at ReSolve Global.

As discussed above, a majority of the risk budget in ReSolve's current alpha strategies is derived from models that are quite different from traditional style premia models. While the strategies still draw information from similar sources like trend, carry, relative value and others, the trading models are derived using a novel methodology – at least from the perspective of traditional finance.

ReSolve's Bespoke Models are built and tested using best practices from data science. Rather than making assumptions about how trend, carry, etc. should inform future returns based on theory, the tools of data science allow for the relationship between signals and future returns to emerge from the data itself. As a result, data science experiments produce much more realistic expectations, versus more traditional methods, of how these models are likely to behave in the future.

Since data science-based methods produce forecasts of expected returns for each market over the next few days, portfolio exposure expands and contracts in direct proportion to the strength of each day's forecasts of expected returns. And importantly, portfolios are designed to adapt much more quickly to changing conditions.

The concept of continuously re-leveraging the portfolio to hit a constant target volatility makes less sense in this paradigm. Rather, daily portfolio exposure expands and contracts in direct proportion to the strength of each day's forecasts of expected returns (ie the sum of its combined edges), which directly incorporate expected volatility.

Informed by best practices in data science, our novel simulation method ensures that the historical performance of new models are evaluated entirely on returns that occur outside of the time-window where the models were crafted. As such, we expect that the performance distribution we observe in simulation reflects what we should see in the future. Even better, by building models with a more appropriate, bespoke level of complexity and response function for each market, ReSolve's strategies may have an opportunity to substantially differentiate and deliver strong returns under a wider variety of market conditions.

Sincerely,

Adam Butler  
Chief Investment Officer

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