Eckhardt: Seeking Consistency Across Market Regimes
Accelerating innovation in shorter term trading

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The ages Eckhardt Systematic Short-Term UCITS Fund was one of the largest UCITS launches of 2020, raising more than $100 million of seed capital. The strategy has demonstrated a strong and differentiated return profile that is being recognized with substantial imminent inflows, including a substantial allocation from a large family office, and industry awards.

The fund has received *The Hedge Fund Journal's* CTA and Discretionary Trader award for best risk-adjusted returns in 2022, in the short-term trader category. Returns of nearly 13% in 2022 were achieved with a volatility of only 7.5%. Equalizing this volatility to a more typical CTA level of 15% would have generated returns of over 25%, and the strategy can indeed be accessed at higher volatility targets. The UCITS volatility is capped at 12% but the strategy is also being rolled out on a 2x or 3x leveraged basis on the Galaxy Plus platform. The UCITS program currently pursues an identical strategy mix to Eckhardt Trading Company's (ETC) Evolution program, which dates back to 1991 and has averaged volatility around 18% over more than 20 years. Evolution's latest incarnation, including a more diversified strategy mix, has been years in the making.

ETC founder and CTA veteran Bill Eckhardt is one of the most seasoned CTA traders, but his firm is very much still capable of reinvention, which proceeds in a measured, incremental and disciplined fashion with each tweak and larger change subject to careful scientific imprimatur. For several years ETC, having returned the bulk of its capital to investors, operated essentially as a family office managing Bill Eckhardt's own money together with that of a select group of clients. Then in 2020 after the firm was overhauled it relaunched Evolution Strategies including a new UCITS-compliant version.

The firm has certainly not abandoned the concept of trend following, applied via its distinctive volatility trend signals, which remain the biggest part of the risk budget. "But the mission is to deliver a more consistent, all weather return profile by balancing out trend with other diversifying models and systems. We are like a fisherman casting out many nets. We want to have as many as possible because we do not know where the volatility influx will come from," says Rob Sorrentino, President and COO.

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Stan Fiedor, Deputy Chief Research Scientist

Alpha half-lives have in some cases been getting shorter, which forces managers to add more systems to maintain or improve their risk-adjusted return profile. The challenge is to build systems that profit from dislocations, without diluting returns in more normal conditions, and ETC's short term strategy has outperformed most CTAs in key trend turnaround months such as November 2022 and March 2023. "The strategy performed well during these sharp reversals with the blend of systems preserving capital with almost no give-back on both occasions," clarifies Nick Bolton, Head of Business Development at ETC.

The E-Score and "the Gauntlet"
In Eckhardt's application of Utility theory, they want to achieve the best balance in use of risk budget and optimal (highest confidence) return expectations. The Gauntlet test regime is a rigorous multi-layer process through which every new idea, every existing system and the resultant interaction of each system within the portfolio is optimized. As part of their scientific approach, they use processes

akin to DNA mutation to test each individual permutation and combination which runs to many thousands of potential parameters.

A key stage in this "Gauntlet" process is assessment of the Eckhardt Composite Score, what they internally call their E-score. This comprises a series of thresholds which must be exceeded to give the team confidence they are running a balanced, non-conflicting, not over-optimized, robust and well diversified portfolio that is mathematically set back from the cliff-edge in a Utility curve. To achieve robustness Eckhardt will use large datasets that include as many Black Swan events for which they can source reliable data. Even harnessing elements of AI Eckhardt makes the point that you cannot predict market events with certainty but you can ensure the integrity of the portfolio and that it is well equipped for whatever in reality does occur. The principles and formulae within the E-score application are also evolutionary and remain in the process with added technological advances that allow analysis of more and more data and to

do so faster. As a Systematic process, the E-Score also importantly removes emotion from vetting ideas and subsequent portfolio construction. ETC is now becoming more open to sharing high level information about the criteria. "The E Score alone does not guarantee the inclusion of a model, because it might not be additive to the blend, for instance if it is too correlated. Some programs with a high E Score may collide with others, or have different trade duration or attribution characteristics," explains Sorrentino.

Accelerating innovation

Innovation has accelerated since 2016 because financial markets have morphed: "A single system could not have weathered the changing market dynamics and patterns of recent years," says Sorrentino. Prior to 2016, the only addition to volatility trend models was a countertrend system that was replaced by a trend neutral model. By 2019 and early 2020, following rigorous testing with real money live trading, ETC had built up the confidence to add more new systems – and make larger allocations to them.

Data types remain entirely technical and are generally driven by price or volatility or both. ETC includes sentiment in the technical category.

The objective of the strategy diversification is to provide clients with a product they can buy and hold, rather than being tempted to trade in and out of, with what can turn out to be bad timing. "Sometimes the aim is not how much you make but how well you can preserve capital," points out Bolton. ETC also expects to apply its discretionary risk reduction override – historically exercised only occasionally during black swan events when liquidity may be challenged – even less often now that the strategy mix is more diversified.

Decoupling from trend

ETC's correlation to trend followers has been steadily declining and is expected to fall further, even though some strategies are forms of trend following. "We have added more non-trend strategies, diversified the time frames for volatility trend, and also added some more traditional trend but with a reinforcement learning structure," says Sorrentino. The counter-trend strategy was retired because it had a lumpy return profile and consumed a disproportionate share of the risk budget. A re-engineered version that is more consistent and less lumpy, providing a higher score of fitness, is being phased in.

Exploiting volatility patterns

Post the QE era and Fed put roll-off, more normal volatility has now been unleashed and there was no need to adapt systems that were always built to thrive on volatility. They had sometimes struggled in the low volatility environment and now a sustained period of higher volatility is welcome. ETC expects that shorter and sharper spikes in volatility could bode well for the strategy, which can profit without the longer term and less interrupted trends that some other CTAs look for.

"Short term trading" is a broad church that can range from intra-second or multi-minute to intraday or multi-week. ETC's average holding period has been fairly steady around 8-10 days for some years and does not usually change by more than one or two days each year. However, the range has become wider: sentiment alpha has an average holding period of 28 days while volatility pattern recognition is at 5 days. A brand new short term momentum system, trading timeframes below 5 days, is already running live and will soon enter the program, which should further smooth out P&L. ETC does not envisage going longer than 30 days and conversely will not compete in the HFT "arms race".

Yet the volatility trend models remain the core strategy. They have been distinguished from price-based models during periods such as late 2018, when stocks and bonds dropped simultaneously and ETC captured the moves, which wrong-footed others. The Covid dislocation was also too sudden for most traditional medium and longer term trend type approaches. Eckhardt's volatility trend systems however aim to enter and exit a trend at an early stage and are adept at picking up faster moves.

Opportunistic asset weights and asset class specific models

ETC is selective about when and in which markets to follow trends. Asset class weights are variable and opportunistic, but some generalizations can be made. Commodity weights recently between 20% and 35% of the portfolio are higher than in many CTAs including some larger ones, though this is not set in stone. "Risk budget goes to where the opportunities are and commodity markets are cyclical, so at some point when inflation reduces other asset classes may pick-up capital," says Bolton.

"Eckhardt's E-score validation enables us to add fresh sources of Alpha without fear of corrupting the portfolio and its objectives."

– ROB SORRENTINO

ETC has capitalized on some of the same big moves as trend followers. Shorting fixed income has been profitable for many CTAs, including traditional trend followers, and ETC was no exception: "Having systems that can short bonds quickly has in recent times generated more returns than at any other time over the whole history of the fund," says Sorrentino. As a shorter term manager, ETC also had significant long positions in fixed income in several months in 2022 and has also captured some countertrend rallies.

Some models are tailored to asset classes, including commodities and some sector specific models in volatility trend. "Volatility select only applies to equities and fixed income, where many systematic approaches have a legacy long bias that was painful for some in 2022. The Gauntlet and Evolutionary Computing processes that ETC use help remove bias," says Sorrentino.

New markets
The aim is however to create universal systems where possible, that can also be generalized to newer markets with shorter data histories. "We expect that models optimized over a majority of markets and through as many extreme conditions as we have data for will work in new markets as well," says Stan Fiedor, Deputy Chief Research Scientist.

Carbon emissions is one example of a newer market added to the portfolio, whereas ETC is not currently trading cryptocurrencies, partly due to their high margin requirements.

In emerging markets, ETC has researched Chinese futures and found many of them traded like commodities in the 1970s or 2021. "Newer markets do not have quite the same tendency to become overcrowded and overcommitted," says Sorrentino.

Elsewhere in commodities, a customized portfolio trading various regional energy, oil, gas and electricity markets, is being developed as a specific client solution.

Reinforcement learning
However, a larger focus of innovation for ETC has been its models, and advanced machine learning techniques are now being applied directly to signal generation. "ETC has used machine learning in its legacy models for many years, with evolutionary computing and genetic optimization models deployed where standard optimizations had

"Deep reinforcement learning has given us a new horizon in research, using and training neural networks is creating new robust strategies with returns that are orthogonal to our legacy system blend."

– STAN FIEDOR

struggled to find more complex relationships and links," says Fiedor.

Now more modern learning techniques using neural networks are being applied. They are trained using reinforcement learning algorithms built in-house, which also benefited from Fiedor's secondment to a specialist AI firm. Though Covid unsettled some machine learning approaches, Fiedor's testing has performed well through it: "A back-test of the RL model did fairly well in March 2020, because its training history included some similar events and

episodes," confirms Fiedor. The techniques have also been developed using other tests such as a 100% mutation rate. "This introduces randomness into the optimization to explore what happens when models are not followed. The neural network is initially blind to the data and explores some random trades. The degree of randomness is varied: sometimes we need more and sometimes less," explains Fiedor.

Reinforcement learning paradigms go beyond unsupervised and supervised regimes and use a deep neural network. ETC is not yet using key 2023 buzzwords such as generative AI, large language models, or natural language processing, which are more often used for unstructured data such as images or newsfeeds – and can also handle billions of parameters. ETC's reinforcement learning models typically have thousands of parameters. "Adding more parameters can increase the risk of over-fitting, but ETC has developed checks, systems and safeguards against this to make sure that models are still statistically valid and catch more data," says Fiedor.

Though ETC has been researching non-linear links for years, neural networks are more adept at finding more complex non-linear relationships in all sorts of data. Many managers apply machine techniques to combine fundamental, alternative and technical data. ETC's current strategies are relatively parsimonious on the data front, in only using technical, price, price derivative and sentiment data, the neural networks still add a lot of value. "They find more complex relationships within it that are not captured by other models or humans," says Fiedor. The research program is, however, investigating other data types. Further data sources are under review and will be adopted at some point in the future.

Reinforcement learning is currently being used as a standalone model for sizing once markets are entered, and is not yet interacting with other strategies, or being applied to other models in the way that the other machine learning techniques were, though these applications might come later.

There is also some innovation in fee structures. The UCITS will soon offer a fee menu with scope for a higher management fee with no performance fee, or a higher performance fee with no management fee. **THFJ**