Bertram Solutions LLC
1525 4th Street
Kirkland, WA 98033
(425) 616-2755
http://www.bertram.solutions
info@bertram.solutions

Travis Cook

RIDGELINE ASSET MANAGEMENT
5 Cowboys Way, Suite 300
Frisco, TX 75034

tcook@ridgelineam.com

Kirkland, August 25th, 2022

Hello Travis,

Please find our research regarding an ETF-trading mean-reversion strategy attached.

Thank you,
Best regards.

Felix Bertram

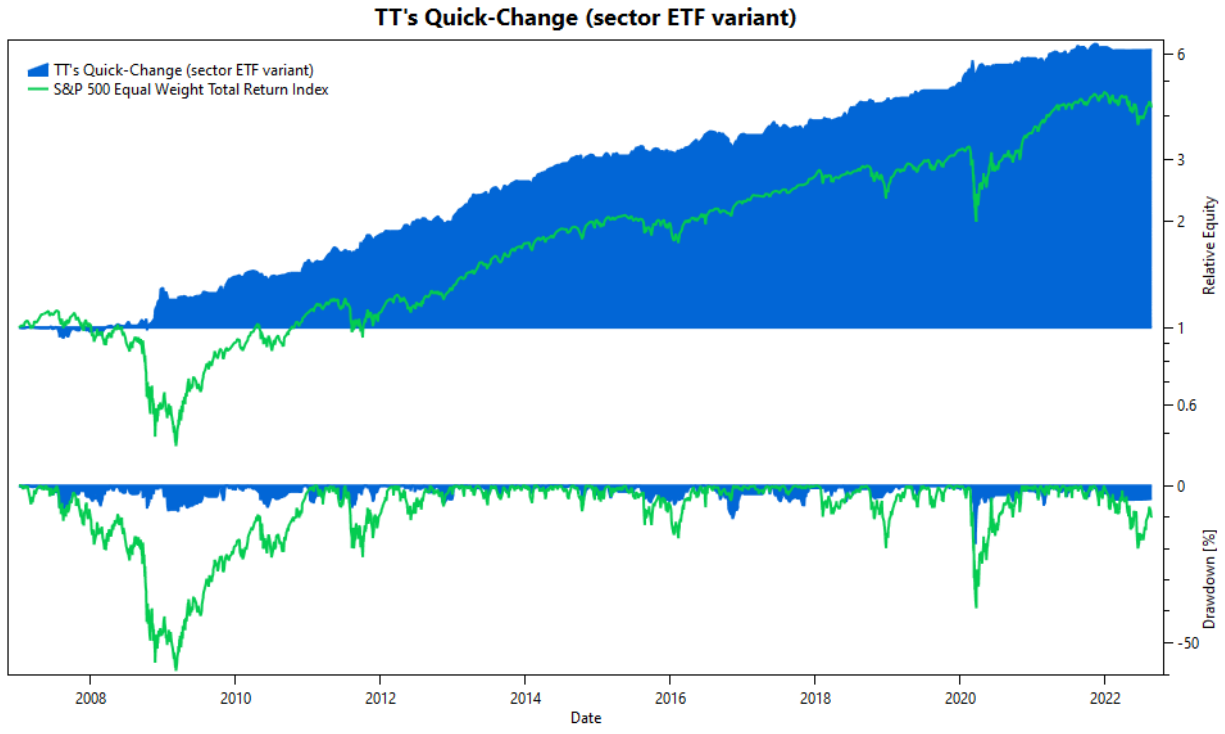
Sector ETFs

The first universe we are looking to trade are sector ETFs. In particular, we are looking at the following universe of equal-weighted S&P 500 sector ETFs:

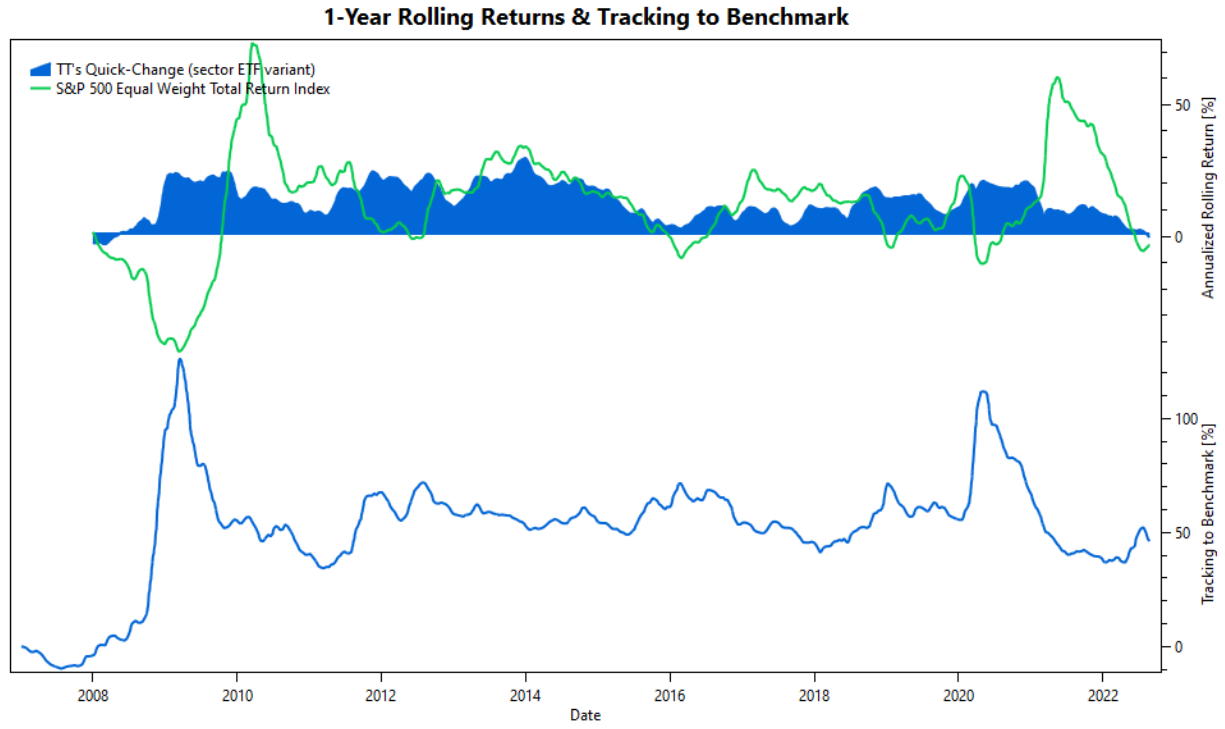
- XLB – Materials
- XLC – Communication Services
- XLE - Energy
- XLF - Financials
- XLI - Industrials
- XLK - Technology
- XLP – Consumper Staples
- XLRE – Real Estate
- XLU - Utilities
- XLV – Health Care
- XLY – Consumer Discretionary

We use the code-base from TuringTrader's Quick-Change, which is very close to the code base developed in phase #09 of this research project. However, Quick-Change uses slightly different parameters, and Buoy is its risk-off asset.

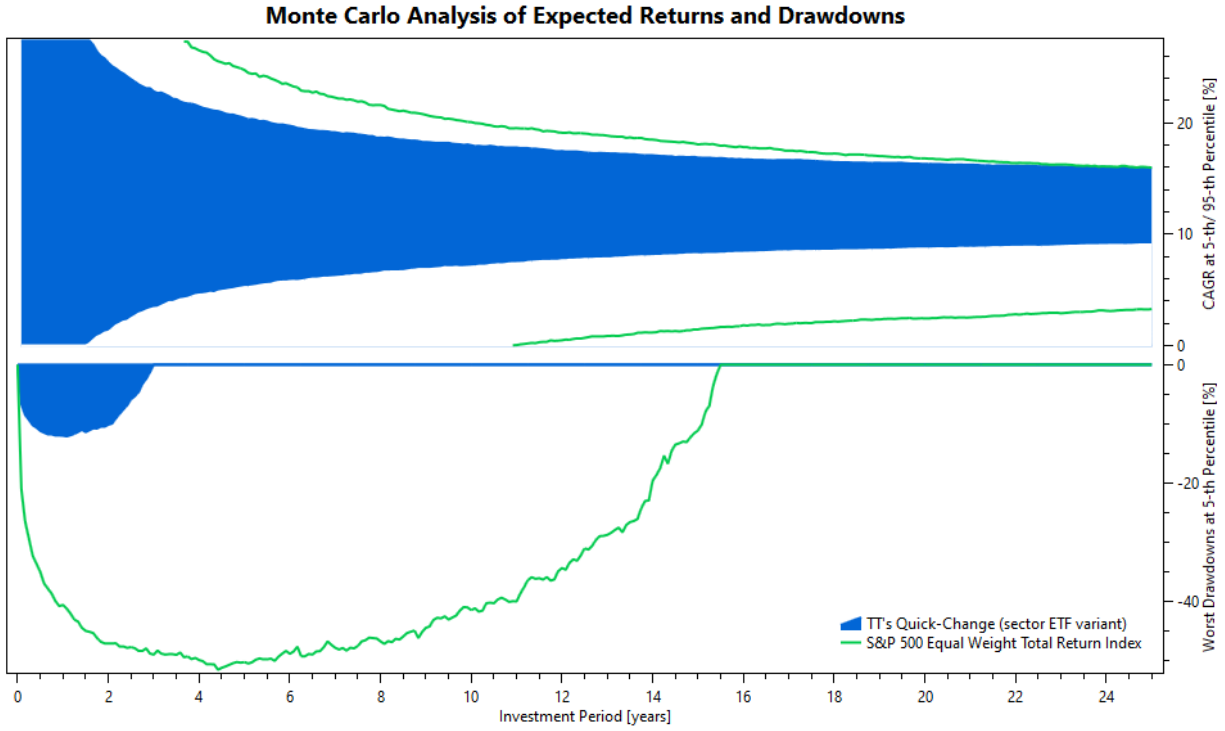
Because the universe is much smaller, we settled for holding only up to two ETFs at a time. Also, the pre-filtering is no longer applicable. All other parameters have been re-optimized for a good balance between risk and performance.



The equity-charge show smooth growth. Over the full economic cycle, the strategy beats the SPXEWTR benchmark. This is a good result, given that the strategy has very low drawdowns.



The rolling returns show how, outside recessions, the strategy keeps up with the benchmark.



The Monte Carlo simulation shows how the strategy significantly reduces volatility, drawdowns and time to recover.

Metric		TT's Quick-Change (sector ETF variant)	S&P 500 Equal Weight Total Return Index
Simulation Start	01/03/2007	$1,000.00	$1,000.00
Simulation End	08/25/2022	$6,144.89	$4,249.01
Simulation Period	15.6 years		
Compound Annual Growth Rate		12.31%	9.69%
Stdev of Returns (Monthly, Annualized)		9.20%	18.13%
Maximum Drawdown (Daily)		18.61%	59.47%
Maximum Flat Days		288.00 days	1281.00 days
Sharpe Ratio (Rf=T-Bill, Monthly, Annualizec		1.18	0.46
Beta (To Benchmark, Monthly)		0.13	- benchmark -
Ulcer Index		2.84%	13.50%
Ulcer Performance Index (Martin Ratio)		4.33	0.72

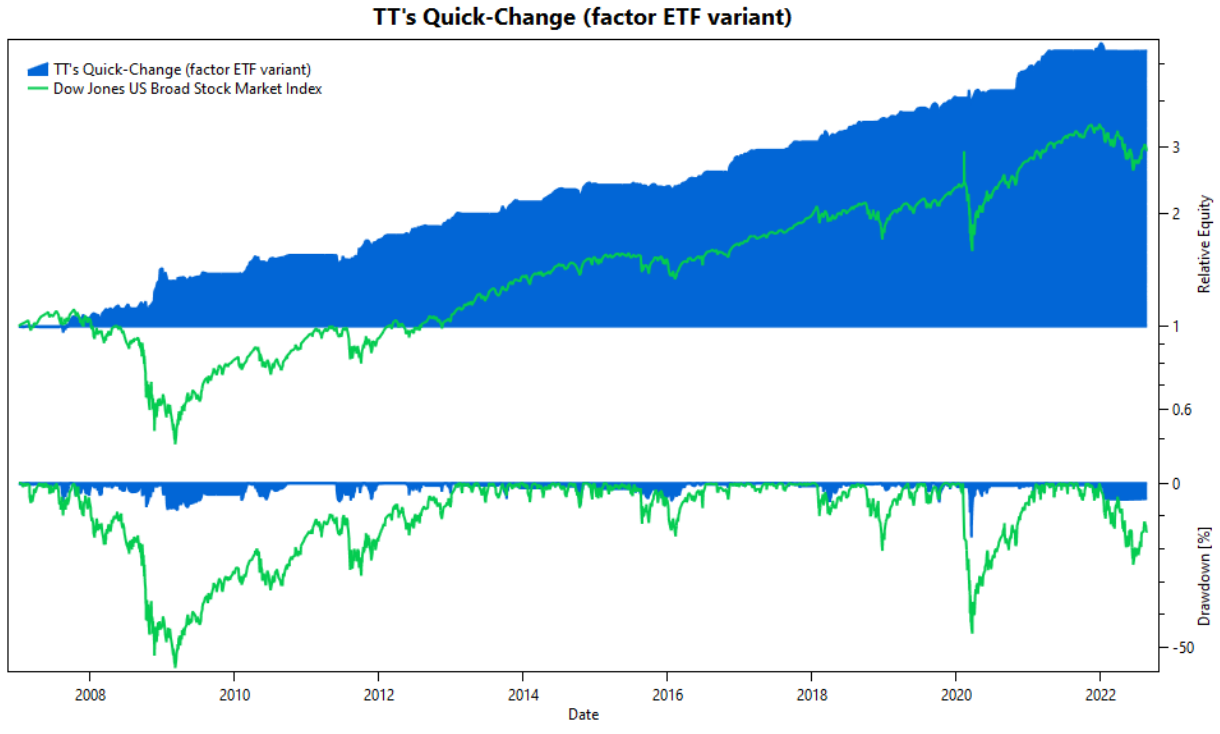
The metrics show higher returns at about half the volatility. The high Sharpe and Martin Ratios show the strategy's effectiveness in improving risk-adjusted returns. The low beta illustrates how this strategy is a welcome addition to any portfolio holding stocks for extended periods.

Factor ETFs

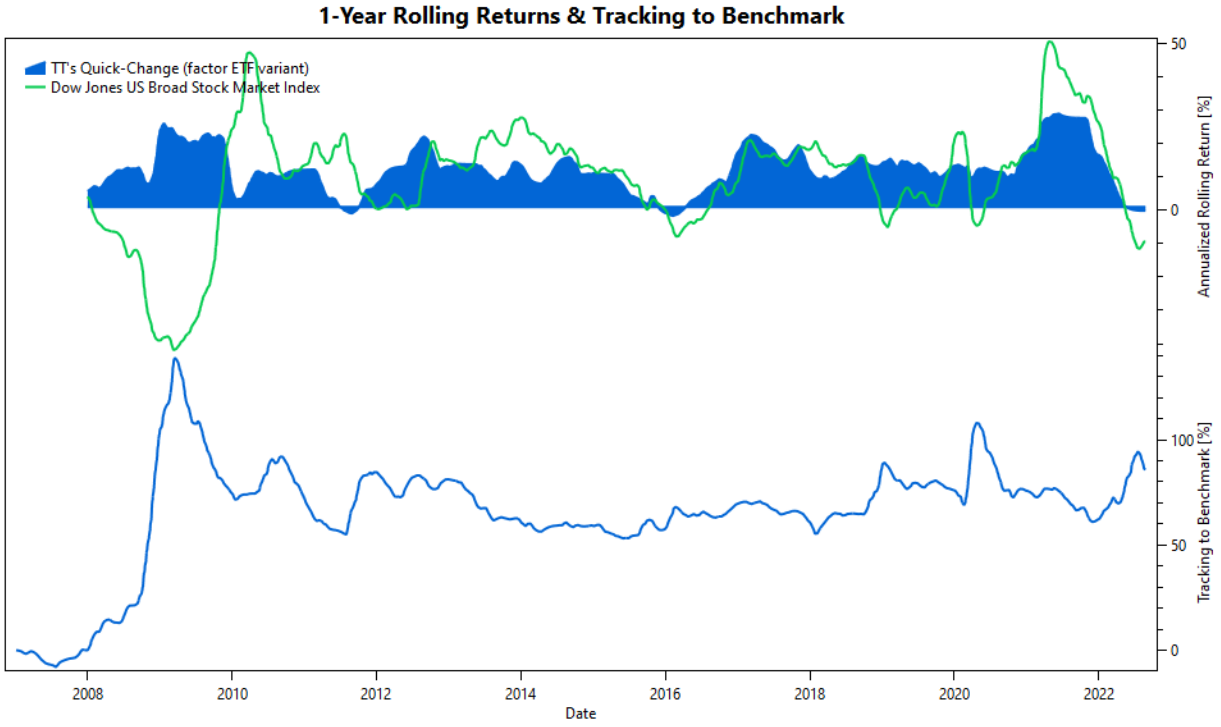
Next, we wanted to explore the strategy's performance with factor ETFs. In particular, we decided for the following universe:

- SPY – S&P 500
- SPYG – S&P 500 growth
- SPYV – S&P 500 value
- MDY – S&P MidCap 400
- MDYG – S&P MidCap 400 growth
- MDYV – S&P MidCap 400 value
- SLY – S&P SmallCap 600
- SLYG – S&P SmallCap 600 growth
- SLYV – S&P SmallCap 600 value
- RSP – S&P 500 equal-weight
- QQQ – Nasdaq 100
- DIA – Dow Jones Industrial Average
- IWD – Russell 1000
- IWM – Russell 2000

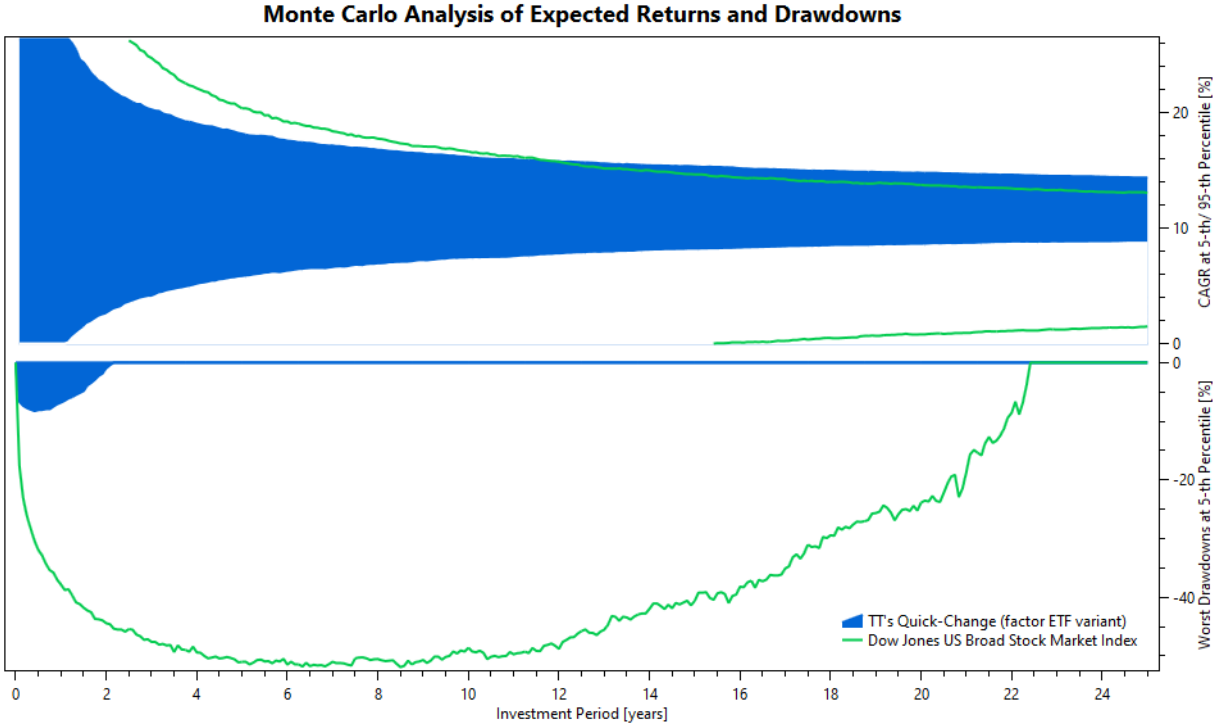
Similar to the previous universe, we are investing in up to two ETFs from this universe. Again, we re-optimized the strategy's parameters.



The equity chart shows how the strategy outperforms the DW25 benchmark at much reduced risk.



Again, the rolling returns show outperformance during recessions, and returns about on-par with the benchmark outside of recessions.



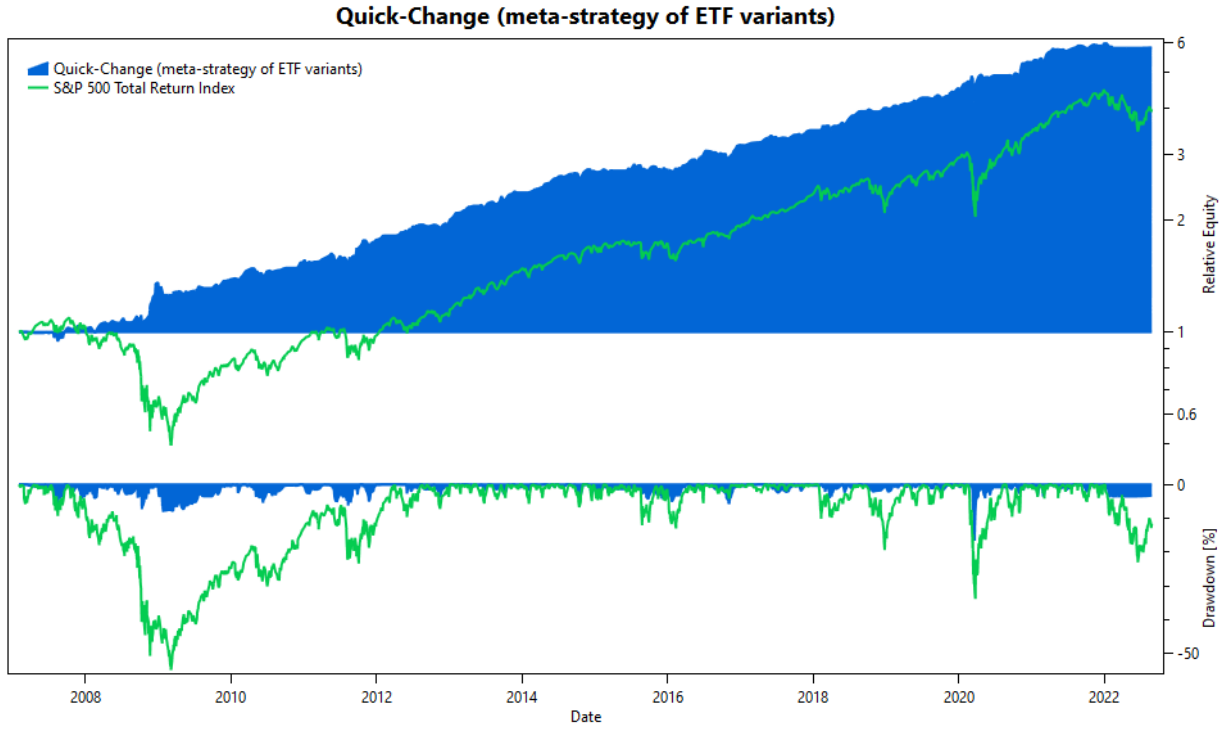
The Monte Carlo simulation demonstrates the strategy's much lower volatility, lower drawdowns, and faster recovery.

Metric		TT's Quick-Change (factor ETF variant)	Dow Jones US Broad Stock Market Index
Simulation Start	01/03/2007	$1,000.00	$1,000.00
Simulation End	08/25/2022	$5,425.31	$2,951.35
Simulation Period	15.6 years		
Compound Annual Growth Rate		11.42%	7.16%
Stdev of Returns (Monthly, Annualized)		7.75%	16.35%
Maximum Drawdown (Daily)		16.48%	56.69%
Maximum Flat Days		430.00 days	1942.00 days
Sharpe Ratio (Rf=T-Bill, Monthly, Annualizec		1.30	0.37
Beta (To Benchmark, Monthly)		0.11	- benchmark -
Ulcer Index		2.25%	15.82%
Ulcer Performance Index (Martin Ratio)		5.08	0.45

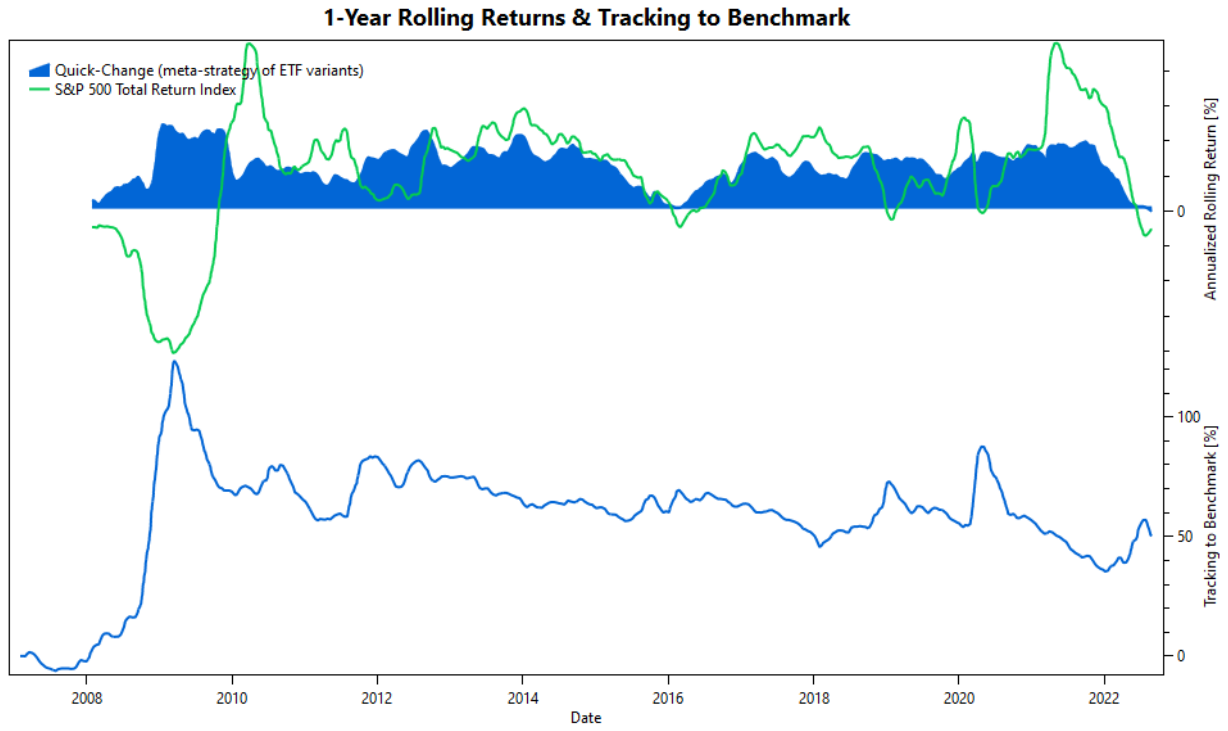
The metrics show solid growth and roughly half the volatility of the benchmark. Again, we see high Sharpe and Martin ratios and a very low beta. These properties make this strategy a useful complement to long stock market exposure.

Meta Strategy

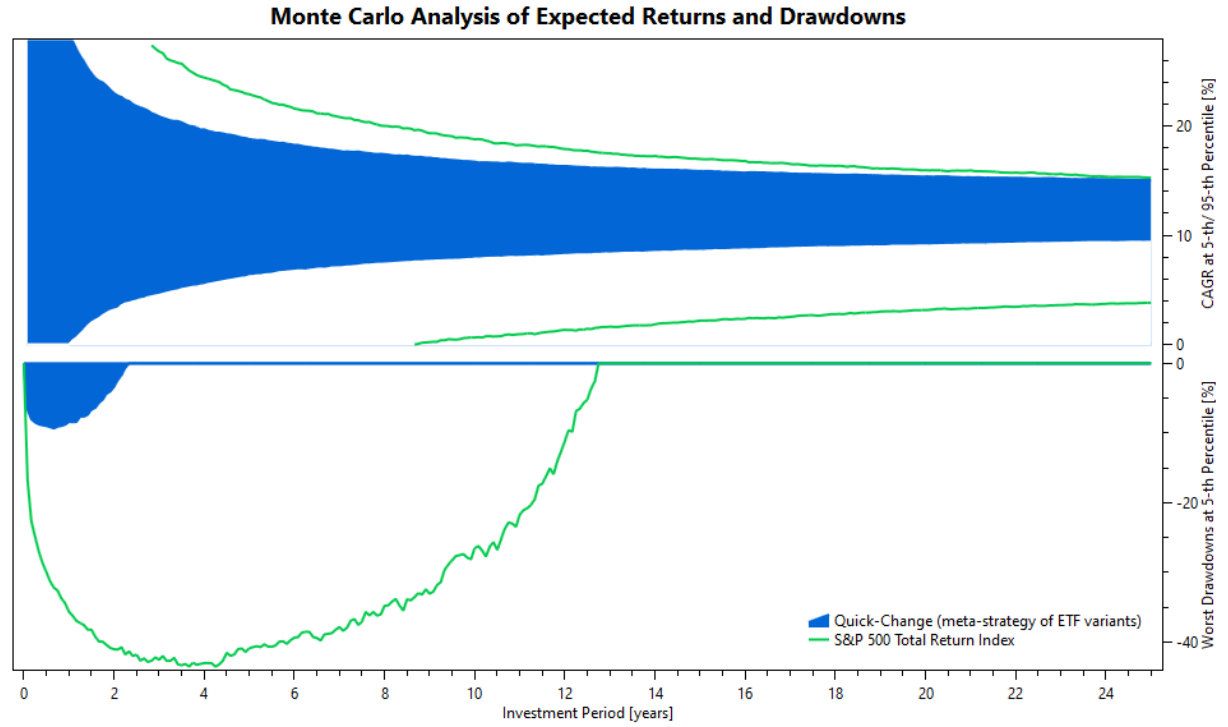
As last step, we combined the two sub-strategies trading sector and factor ETFs. The resulting meta-strategy will hold up to four ETFs: two sectors and two factors.



The equity curve shows how the combination of the two sub-strategies leads to even smoother growth.



The rolling returns show the strategy's even-keeled behavior. In recessions, the strategy gains over the SPXTR benchmark, while otherwise showing performance roughly on-par. This is a great result, given the strategy's low volatility.



The Monte Carlo simulation shows how the strategy dramatically reduces drawdowns and the time to recover. Performance trends toward the upper range of the benchmark's returns, while the variability of returns is greatly reduced.

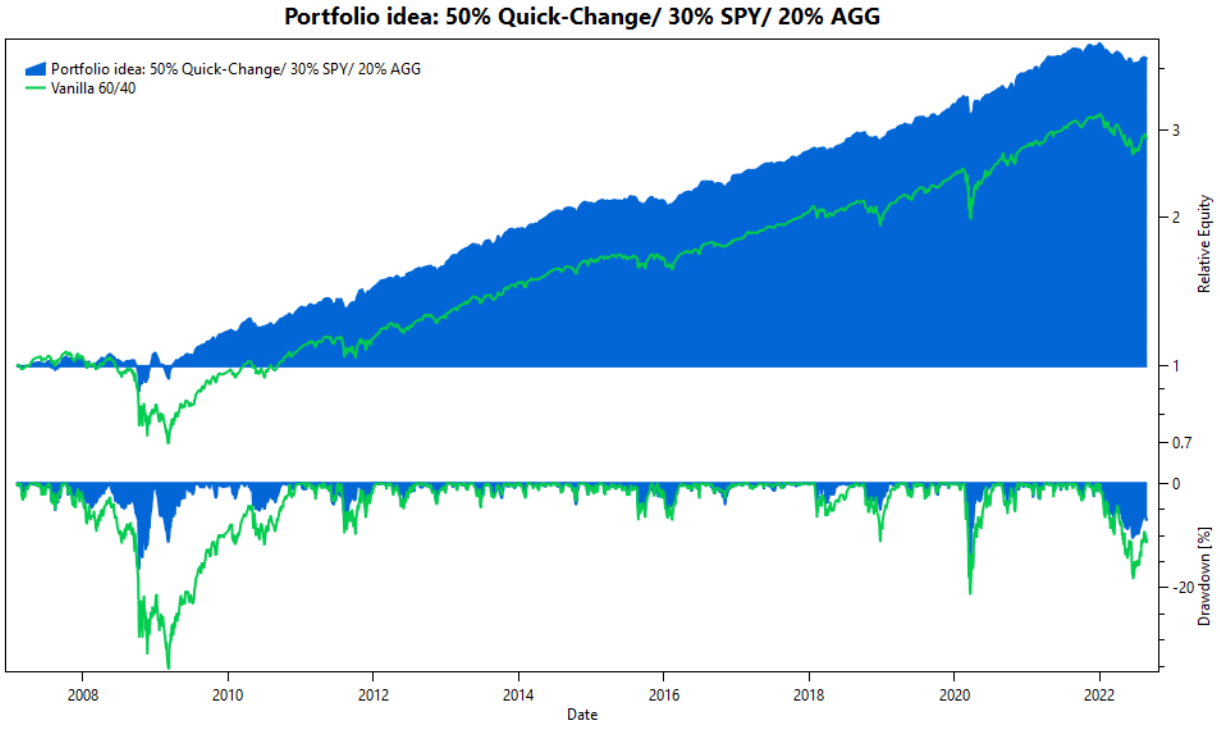
Metric		Quick-Change (meta-strategy of ETF varian	S&P 500 Total Return Index
Simulation Start	02/01/2007	$1,000.00	$1,000.00
Simulation End	08/25/2022	$5,841.38	$3,982.83
Simulation Period	15.6 years		
Compound Annual Growth Rate		12.01%	9.29%
Stdev of Returns (Monthly, Annualized)		7.63%	15.85%
Maximum Drawdown (Daily)		16.62%	55.25%
Maximum Flat Days		323.00 days	1637.00 days
Sharpe Ratio (Rf=T-Bill, Monthly, Annualizec		1.39	0.52
Beta (To Benchmark, Monthly)		0.14	- benchmark -
Ulcer Index		2.08%	13.85%
Ulcer Performance Index (Martin Ratio)		5.78	0.67

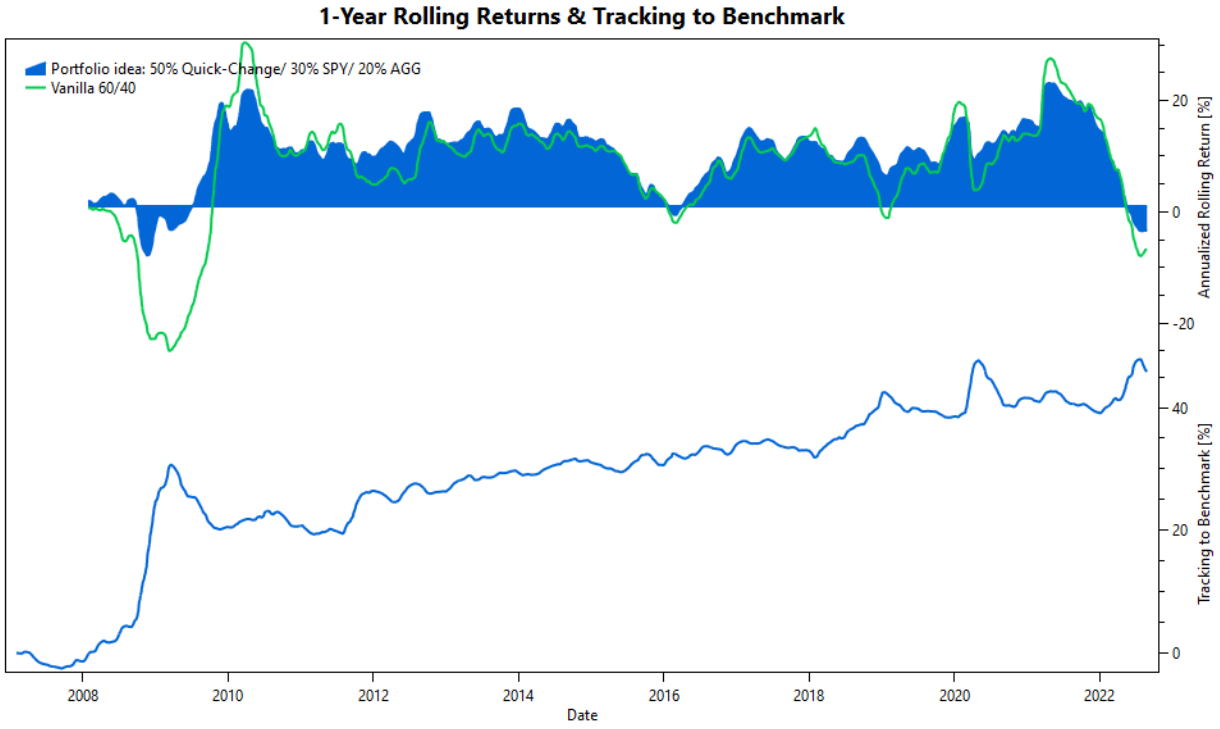
The metrics speak for themselves. In the long-run the strategy can beat its benchmark, while at the same time reducing volatility to about half. The Sharpe and Martin ratios show excellent risk-adjusted returns. The low beta shows how the strategy is a great complement to long stock exposure.

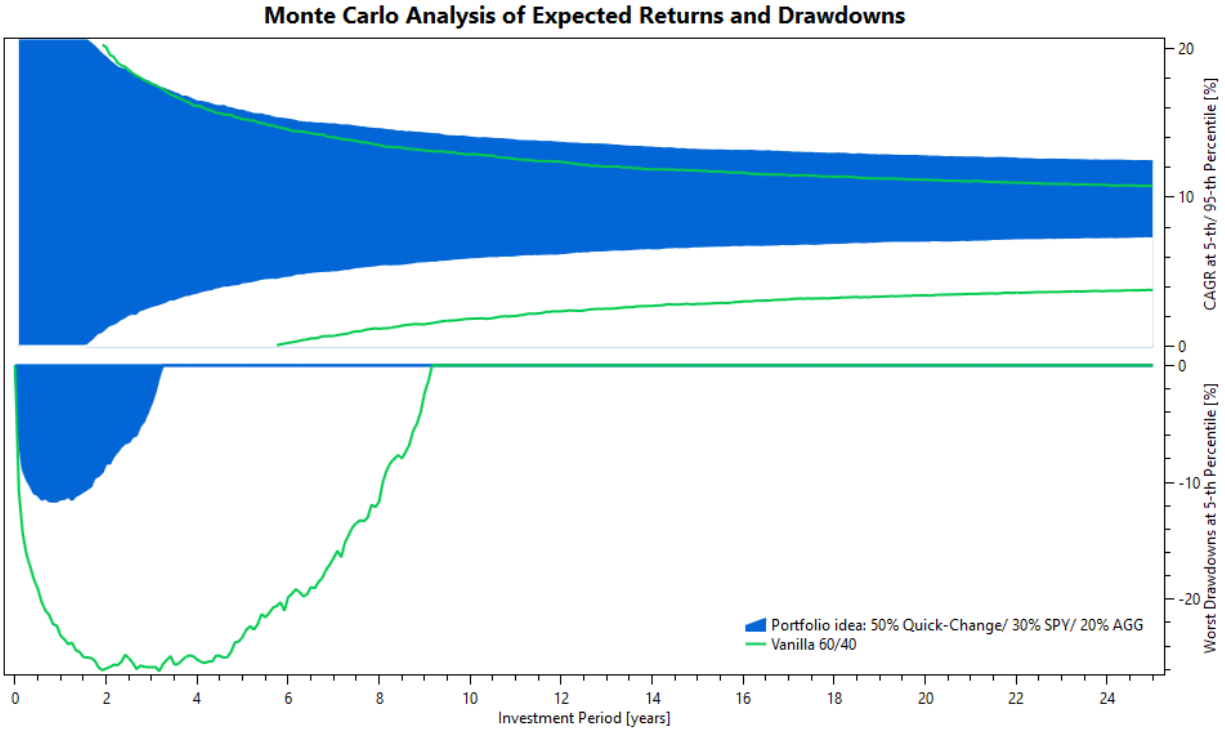
Portfolio Idea

While we believe tactical asset allocation to be the best answer to typical investment problems, not all investors share this opinion. One way to bridge this gap is to combine a buy-and-hold portfolio with a tactical portfolio.

With this setup, the asset allocation will stay in a more defined and familiar range, while at the same time delivering an upside over the pure buy-and-hold style. In this example, we are blending 50% of the ETF-based Quick-Change strategy with 50% of a passive 60/40. As a result, the total allocation to stocks will remain between 30% and 80%, a range that many investors will intuitively find acceptable.




1-Year Rolling Returns & Tracking to Benchmark
Portfolio idea: 50% Quick-Change/ 30% SPY/ 20% AGG
Vanilla 60/40
Annualized Rolling Return [%]
Tracking to Benchmark [%]
Date
2008
2010
2012
2014
2016
2018
2020
2022


Monte Carlo Analysis of Expected Returns and Drawdowns
CAGR at 5-th/ 95-th Percentile [%]
Worst Drawdowns at 5-th Percentile [%]
Portfolio idea: 50% Quick-Change/ 30% SPY/ 20% AGG
Vanilla 60/40
Investment Period [years]

Metric		Portfolio idea: 50% Quick-Change/ 30% SP\	Vanilla 60/40
Simulation Start	02/01/2007	$1,000.00	$1,000.00
Simulation End	08/25/2022	$4,206.92	$2,901.60
Simulation Period	15.6 years		
Compound Annual Growth Rate		9.67%	7.09%
Stdev of Returns (Monthly, Annualized)		7.21%	9.78%
Maximum Drawdown (Daily)		16.50%	35.62%
Maximum Flat Days		246.00 days	1165.00 days
Sharpe Ratio (Rf=T-Bill, Monthly, Annualizec		1.18	0.63
Beta (To Benchmark, Monthly)		0.64	- benchmark -
Ulcer Index		2.68%	7.34%
Ulcer Performance Index (Martin Ratio)		3.61	0.96

The charts above show how this blend of investment styles continuously outperforms the buy-and-hold portfolio, while at the same time leading to a meaningful reduction in investment risk.