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Kirkland, May 20th, 2022

Hello Travis,

Please find our thoughts and observations regarding the weekly mean-reversion strategy.

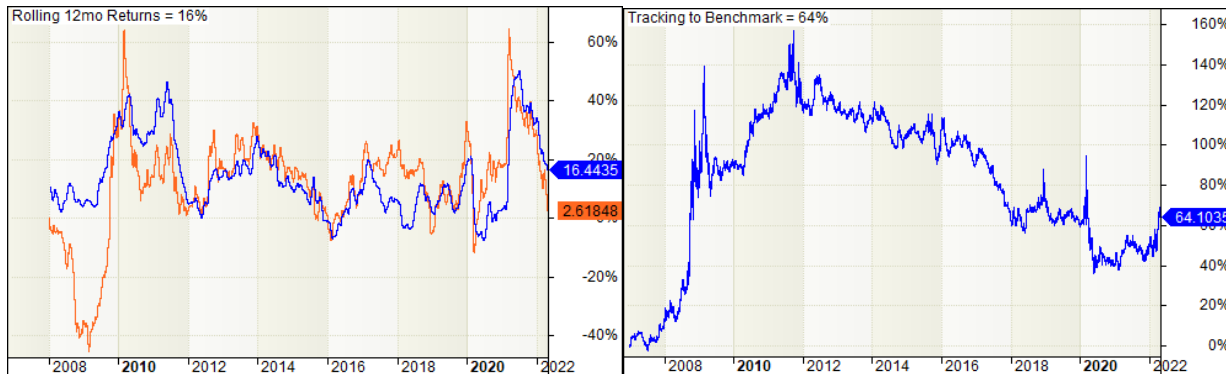
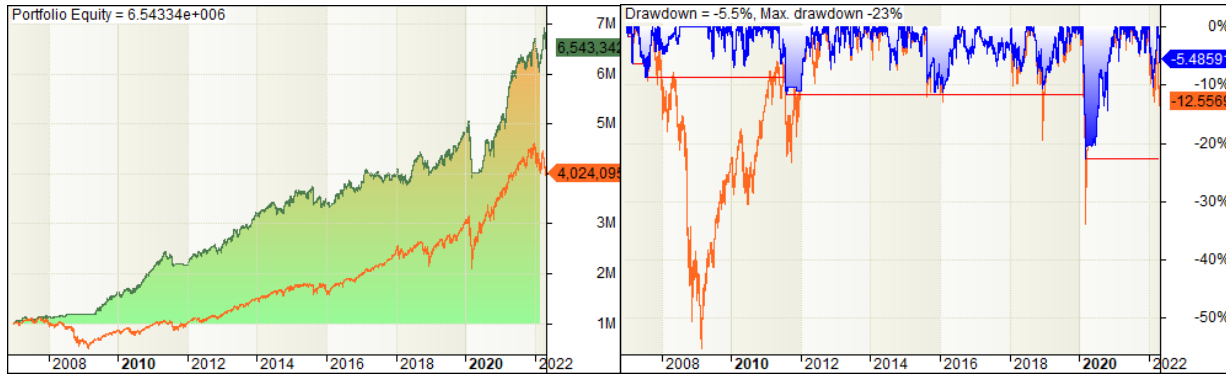
Thank you,
Best regards.

Felix Bertram

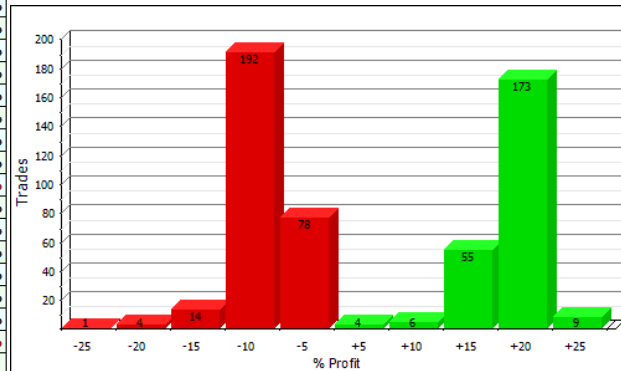
Recap

We received the ready-to-run strategy for AmiBroker. Here are the initial charts:

Main, S&P 500



Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr%
2007	5.8%	-1.1%	1.5%	5.3%	0.2%	-3.5%	-3.2%	3.8%	4.3%	1.2%	0.2%	-0.2%	15.0%
2008	-1.7%	-0.3%	1.9%	0.7%	1.4%	-2.0%	4.0%	0.1%	0.1%	0.1%	0.0%	0.0%	4.3%
2009	0.0%	0.0%	0.0%	0.0%	5.5%	4.7%	4.7%	1.3%	7.0%	-0.4%	3.0%	5.0%	35.1%
2010	-3.7%	2.0%	5.8%	1.6%	-4.0%	0.7%	5.1%	0.6%	7.4%	4.1%	1.3%	5.6%	29.2%
2011	3.6%	3.9%	1.1%	5.8%	2.3%	-4.0%	-3.0%	-3.7%	-0.0%	0.0%	-0.7%	0.0%	4.7%
2012	4.3%	3.8%	1.7%	1.9%	-1.5%	4.3%	-1.9%	1.0%	2.4%	-0.5%	-0.4%	-1.9%	13.5%
2013	7.1%	-1.2%	4.5%	1.0%	3.1%	-2.3%	5.3%	-0.5%	0.9%	0.5%	4.7%	4.3%	30.8%
2014	-1.5%	3.2%	0.2%	1.3%	1.3%	1.3%	-5.8%	2.3%	-1.5%	5.7%	-1.0%	2.9%	8.5%
2015	-2.2%	6.7%	-0.4%	-0.8%	-0.2%	-2.6%	5.3%	-6.9%	0.3%	2.4%	-3.8%	2.4%	-0.6%
2016	-1.4%	-2.3%	2.0%	4.8%	1.0%	0.8%	2.9%	1.8%	-0.7%	-3.7%	1.3%	-0.3%	6.1%
2017	4.3%	5.4%	-1.3%	-0.2%	-0.5%	0.9%	-2.4%	-1.1%	1.6%	-0.6%	1.8%	-0.6%	7.4%
2018	3.1%	-5.4%	1.2%	-1.4%	-0.9%	6.6%	5.2%	1.5%	0.7%	-4.8%	1.9%	-5.0%	1.9%
2019	2.2%	0.2%	1.4%	3.3%	-3.6%	5.2%	1.0%	0.2%	2.9%	0.4%	2.7%	1.8%	18.8%
2020	0.8%	-5.4%	-11.9%	0.0%	0.8%	0.4%	6.9%	7.2%	-4.2%	-2.0%	10.5%	2.1%	3.2%
2021	2.5%	-0.7%	9.7%	5.7%	3.2%	2.2%	1.6%	1.2%	-3.6%	3.1%	-1.5%	7.8%	34.9%
2022	-2.9%	-4.0%	5.2%	0.2%	-0.3%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-2.0%
Avg	1.3%	0.3%	1.4%	1.8%	0.5%	0.8%	1.7%	0.6%	1.2%	0.4%	1.3%	1.6%	



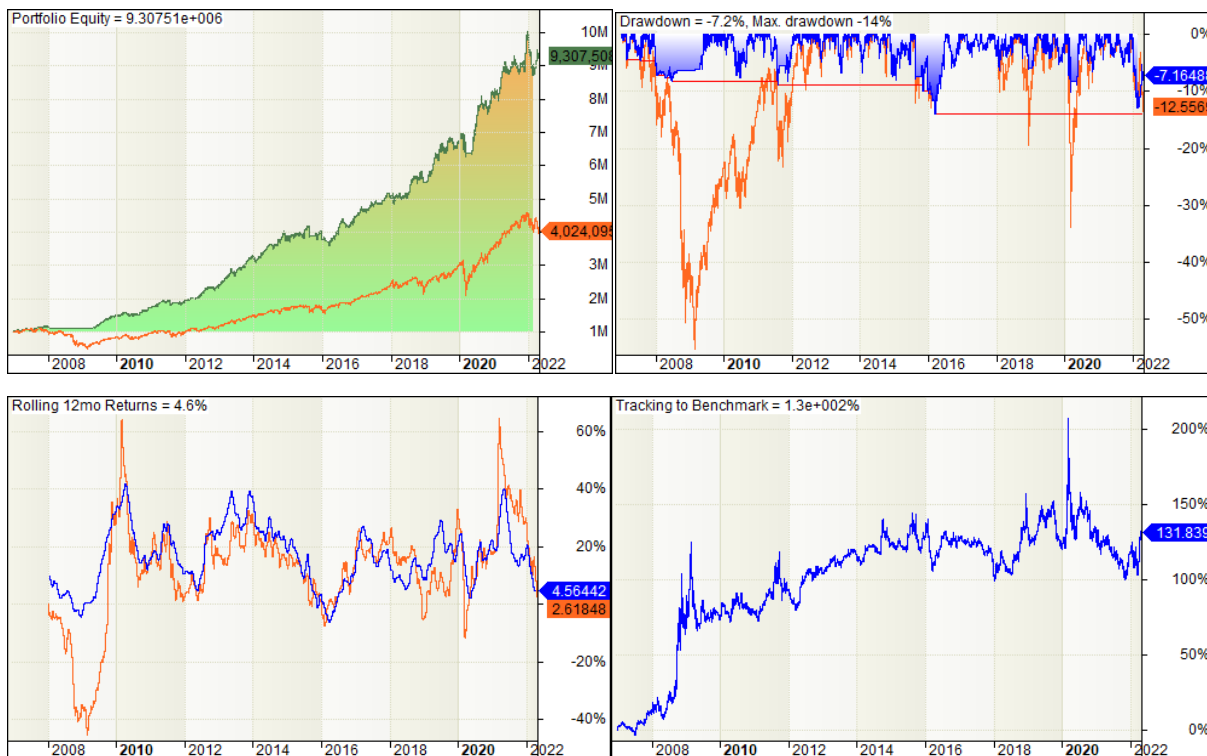
	All trades	Long trades	Short trades	Buy&Hold (\$SPXTR)
Initial capital	1000000.00	1000000.00	1000000.00	1000000.00
Ending capital	6543342.13	6504093.16	1000000.00	4024071.92
Net Profit	5543342.13	5504093.16	0.00	3024071.92
Net Profit %	554.33%	550.41%	0.00%	302.41%
Exposure %	80.34%	80.34%	0.00%	100.00%
Net Risk Adjusted Return %	689.98%	685.10%	N/A	302.41%
Annual Return %	13.03%	12.98%	0.00%	9.50%
Risk Adjusted Return %	16.21%	16.16%	N/A	9.50%
Total transaction costs	10666.40	10666.40	0.00	19.90

We make the following observations:

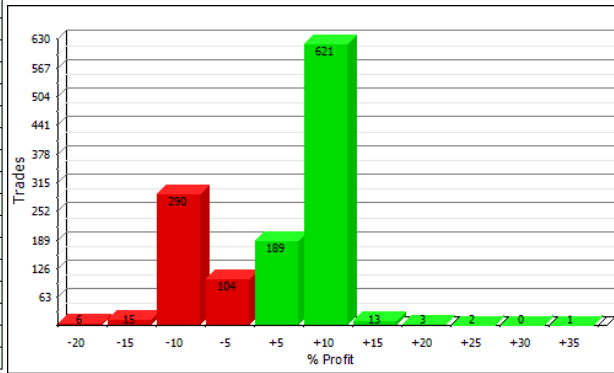
- Over the simulation period, the strategy beats buy & hold
- The upside versus the S&P 500 mostly stems from the period between 2008 and 2012. From 2012 to 2020, the strategy trailed buy & hold. From 2020 onward, the strategy is making some slight gains over the benchmark.
- The strategy managed the 2008 recession very well. However, it suffered a severe drawdown in 2020.
- Overall, the strategy seems to regularly show negative 12-months rolling returns. This is something that we wouldn't typically expect from a mean-reversion strategy.
- The distribution of returns looks surprising with two distinct peaks. This behavior can be explained by the strategy only closing positions when either hitting the profit target or the stop-loss.

Backup, S&P 500

We are not entirely clear what the intended purpose of the backup strategy is. It is our understanding that this variant is preferred by Ridgeline.



Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr%
2007	4.1%	0.7%	-0.3%	2.4%	2.5%	-2.5%	-1.9%	4.9%	4.5%	1.0%	1.4%	0.0%	17.9%
2008	-5.0%	0.1%	-0.0%	-0.8%	1.1%	-1.6%	1.3%	0.4%	0.1%	0.1%	0.0%	0.0%	-4.4%
2009	0.0%	0.0%	0.0%	0.0%	2.8%	6.7%	4.2%	4.1%	4.2%	1.2%	4.0%	1.0%	32.0%
2010	0.7%	1.4%	4.3%	-1.0%	-3.9%	-1.2%	3.8%	-1.7%	5.1%	3.7%	-1.2%	6.1%	16.6%
2011	2.0%	2.3%	2.0%	4.7%	1.9%	-1.0%	-2.6%	-1.2%	-0.0%	-0.4%	0.9%	1.5%	10.4%
2012	2.8%	1.5%	1.8%	0.3%	0.7%	5.6%	3.9%	2.4%	1.6%	0.8%	-0.8%	1.0%	23.7%
2013	4.9%	2.9%	3.8%	4.1%	0.7%	-1.0%	5.4%	-1.0%	3.1%	6.8%	1.9%	2.2%	39.4%
2014	-4.9%	3.0%	3.9%	2.2%	2.9%	2.6%	-2.9%	3.4%	3.2%	2.9%	2.4%	-2.4%	16.9%
2015	-3.3%	5.5%	-0.4%	-0.1%	0.8%	-2.6%	8.5%	-6.5%	0.0%	0.7%	0.1%	1.6%	3.5%
2016	-3.5%	-2.2%	-2.6%	4.0%	2.3%	6.6%	4.7%	-1.3%	-1.7%	0.7%	0.9%	4.4%	12.2%
2017	1.9%	3.0%	-0.5%	0.2%	2.1%	1.0%	2.7%	-1.7%	-0.4%	1.9%	4.6%	-1.5%	13.9%
2018	1.6%	-2.8%	1.6%	-1.4%	0.5%	-0.4%	6.9%	3.9%	0.8%	0.0%	2.8%	-5.2%	8.0%
2019	0.2%	5.1%	1.8%	8.0%	-3.1%	5.4%	-0.5%	0.9%	5.0%	-2.2%	-1.8%	2.5%	22.7%
2020	1.2%	-6.0%	-0.5%	0.0%	4.7%	5.8%	8.3%	5.4%	-2.8%	-3.6%	4.5%	3.8%	21.7%
2021	-1.1%	-1.7%	8.1%	3.0%	-0.0%	-0.7%	2.6%	0.5%	-3.4%	2.3%	-1.7%	12.5%	21.0%
2022	-4.7%	-6.5%	1.0%	3.1%	0.9%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-6.4%
Avg	-0.2%	0.4%	1.5%	1.8%	1.1%	1.5%	3.0%	0.8%	1.3%	1.1%	1.2%	1.8%	



	All trades	Long trades	Short trades	Buy&Hold (\$SPXTR)
Initial capital	1000000.00	1000000.00	1000000.00	1000000.00
Ending capital	9307508.46	9251119.23	1000000.00	4024071.92
Net Profit	8307508.46	8251119.23	0.00	3024071.92
Net Profit %	830.75%	825.11%	0.00%	302.41%
Exposure %	79.04%	79.04%	0.00%	100.00%
Net Risk Adjusted Return %	1051.09%	1043.96%	N/A	302.41%
Annual Return %	15.65%	15.61%	0.00%	9.50%
Risk Adjusted Return %	19.81%	19.75%	N/A	9.50%
Total transaction costs	24755.60	24755.60	0.00	19.90

We make the following observations:

- The strategy has overall higher returns and lower drawdowns
- The strategy reacts better to fast drawdowns and swift recoveries
- The strategy only shows negative 12-months rolling returns once, in 2016
- It has outperformed the benchmark from 2007 to 2020. However, it seems to be struggling from mid-2020 to today

Other Configurations

There should be other configurations trading the Nasdaq-100 and the Russell 2000. Unfortunately, we could not get these to work. However, this is probably not a concern right now as we assess the status quo.

Code Observations

While reviewing the strategy's code, we made the following observations:

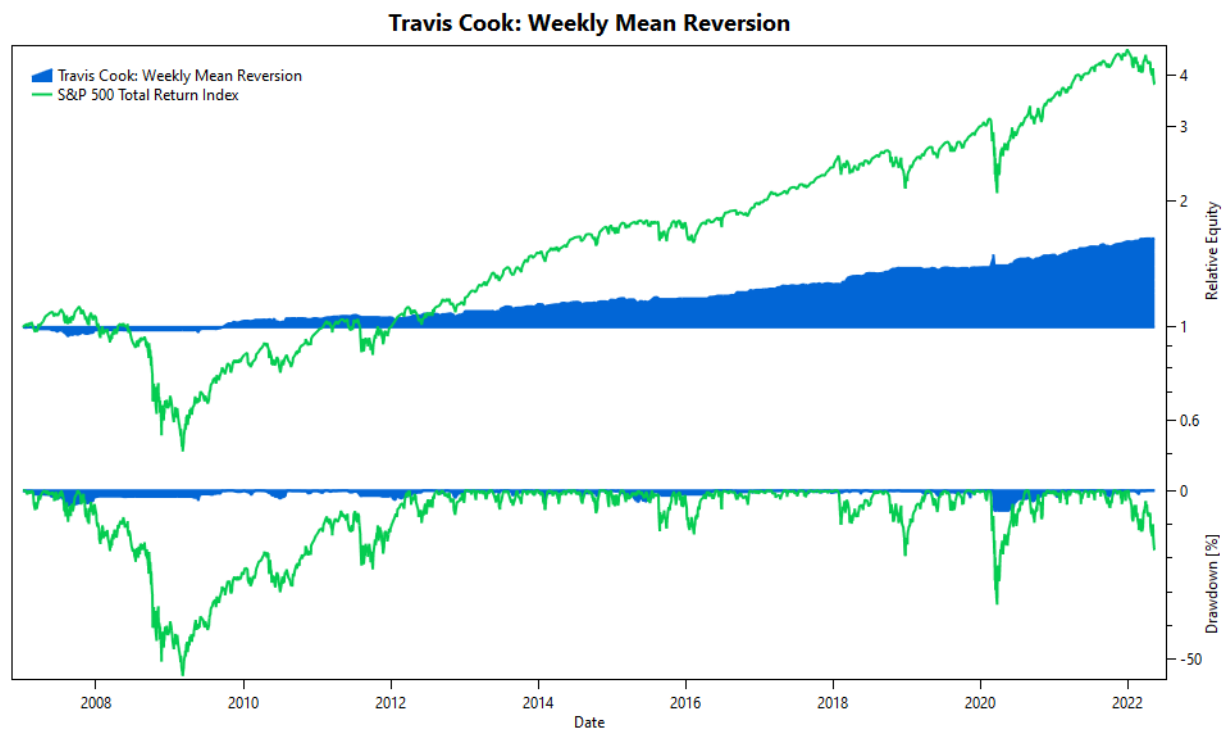
- The strategy assumes commission mode '\$ per trade', which is set to \$9.95. Also, the strategy assumes filling of orders at the average price ((O+H+L+C)/4). We find choices quite surprising.
- The strategy does not have a time-based stop. This might keep positions open for a long time when they just hover between the stop-loss and the profit target.
- The strategy's stop-loss is solely based on the entry price. This might not close out positions that have been in a trend for a while. We would certainly prefer a trailing stop.
- We noticed rules to filter out stocks trading below \$5. We believe these to be unnecessary if we make sure that all traded stocks are current members of the S&P 500.
- The strategy calculates volatility, the main ranking criterion, over 52 weeks. This seems very long, and we believe stock's characteristics might change faster than that.

Implementation for TuringTrader

We coded the strategy for TuringTrader in the hope of gaining additional insight. We assume the following rules:

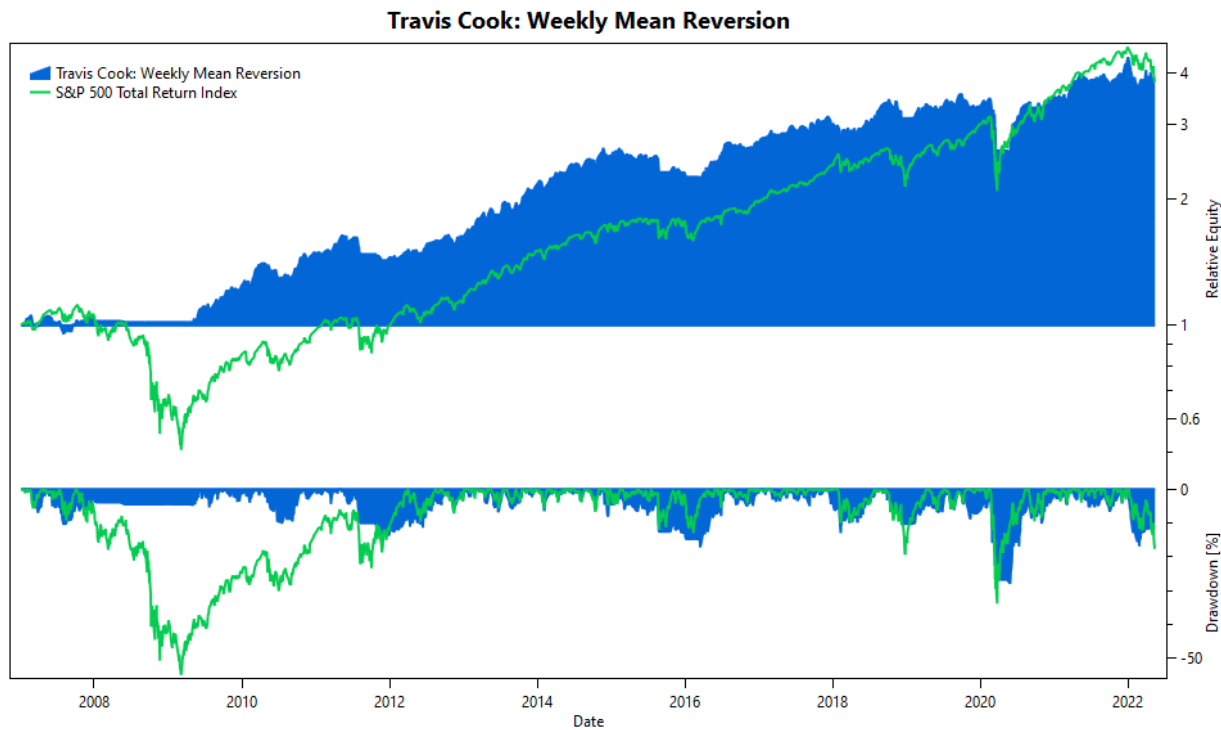
- Enter on Mondays at open, if
 - Weekly RSI(2) is below threshold
 - n-week returns have not been positive for x weeks
- Exit if stop-loss or profit target are met. These conditions are checked daily.
- Do not re-enter any stock earlier than one month after hitting a stop-loss or profit target for the same stock
- Rank possible entries with lowest weekly volatility at the top and limit the total number of concurrent entries to n
- Prohibit all entries, if S&P 500's price is below percent rank threshold.

We typically implement strategies like this in multiple phases, adding the rules step by step. We started by implementing the logic for the weekly bars, and skipping the stop-loss and profit-target rules. At this stage, we made a mistake and implemented the volatility ranking incorrectly. Instead of ranking all possible entries by volatility, we ranked all assets by volatility and picked the top 10, before even looking at the entry conditions. This led to an interesting result that we will probably circle back to later:



Metric		Travis Cook: Weekly Mean Reversion	S&P 500 Total Return Index
Simulation Start	01/03/2007	\$1,000.00	\$1,000.00
Simulation End	05/12/2022	\$1,626.24	\$3,790.45
Simulation Period	15.4 years		
Compound Annual Growth Rate		3.22%	9.07%
Stdev of Returns (Monthly, Annualized)		3.19%	18.34%
Maximum Drawdown (Daily)		6.18%	55.25%
Maximum Flat Days		966.00 days	1637.00 days
Sharpe Ratio (Rf=T-Bill, Monthly, Annualized)		0.75	0.45
Beta (To Benchmark, Monthly)		0.05	- benchmark -
Ulcer Index		1.43%	13.83%
Ulcer Performance Index (Martin Ratio)		2.25	0.66

What is worth noting here is that the exceptionally smooth equity curve, a Sharpe Ratio of 0.75, and a Martin Ratio of 2.25. All of this without the stop-loss or profit-taking rules. The low performance can likely be improved by increasing the position size. This is possible without margin, because currently of the 10 stocks picked by volatility only a few (less than half of them) meet the entry criteria.



Metric		Travis Cook: Weekly Mean Reversion	S&P 500 Total Return Index
Simulation Start	01/03/2007	\$1,000.00	\$1,000.00
Simulation End	05/12/2022	\$3,873.57	\$3,790.45
Simulation Period	15.4 years		
Compound Annual Growth Rate		9.22%	9.07%
Stdev of Returns (Monthly, Annualized)		12.97%	18.34%
Maximum Drawdown (Daily)		27.91%	55.25%
Maximum Flat Days		747.00 days	1637.00 days
Sharpe Ratio (Rf=T-Bill, Monthly, Annualized)		0.60	0.45
Beta (To Benchmark, Monthly)		0.38	- benchmark -
Ulcer Index		6.69%	13.83%
Ulcer Performance Index (Martin Ratio)		1.38	0.66

We fixed the coding error and found that performance improved – but risk-adjusted returns did not. This can be explained as follows: We certainly want to pick stocks with low volatility. By first applying the entry rules and then sorting by volatility, we might end up picking stocks with rather high volatility,

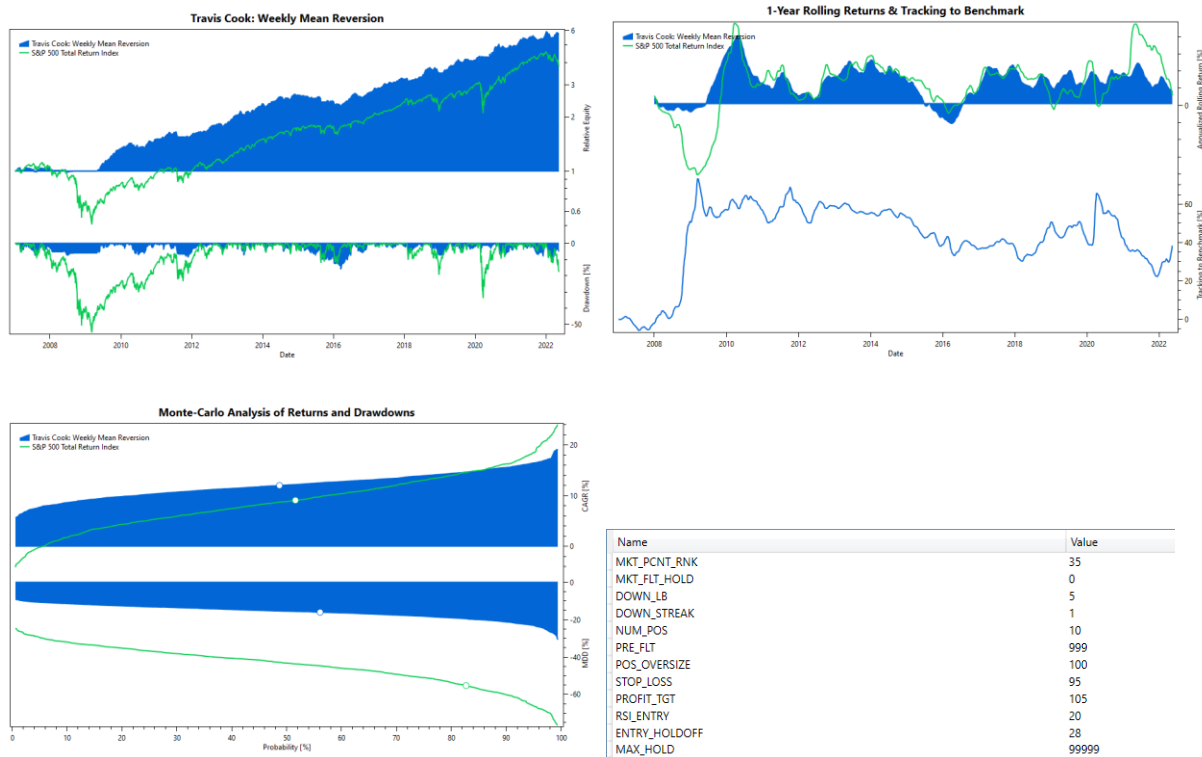
in case most of them don't meet the entry criteria. In contrast, ranking by volatility first helps pick good candidates, but we might not end up having enough to fill all position slots. This in turn leads to poor capital utilization and excessive idle cash. When trying to improve the strategy, we probably want to take a closer look at this phenomenon.

With all rules in place, our backtesting results did not match the AmiBroker results. Among other problems, we isolated issues with deviating rules for indicator calculation. After we spent considerable time trying to track down the remaining differences, we decided to stop this effort. Because we already made some – in our opinion useful and necessary – changes, we decided to work toward an improved version of the strategy.

In particular, our strategy has the following differences that require further investigation:

- Implementation of a max-hold time filter. This filter will limit the time any stock can be held without hitting the profit-target or stop-loss.
- Change the stop-loss to a trailing stop. This will make sure that the strategy does not hold on to positions that have gained significantly. This logic helps to decouple stop-losses from profit targets.
- Pre-filter the stocks for their volatility before checking the entry conditions.
- Allow positions to grow beyond the nominal 1/n position size. This is helpful in situations where not enough stocks meet the hold/ entry criteria.
- We are strictly filling orders at the next bar's opening price.

With the code instrumented for these tests (but using the configuration closest to the original strategy), we achieved the following results:

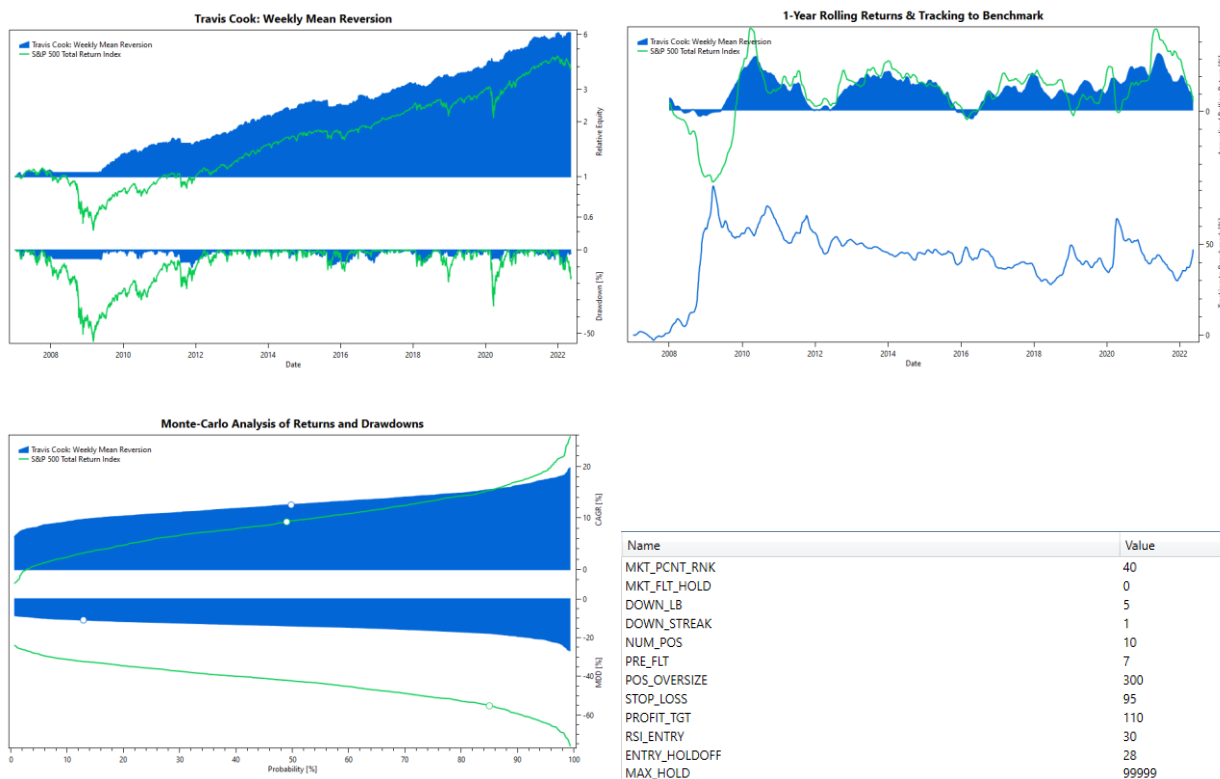


Metric		Travis Cook: Weekly Mean Reversion	S&P 500 Total Return Index
Simulation Start	01/03/2007	\$1,000.00	\$1,000.00
Simulation End	05/12/2022	\$5,691.14	\$3,790.45
Simulation Period	15.4 years		
Compound Annual Growth Rate		11.99%	9.07%
Stdev of Returns (Monthly, Annualized)		9.18%	18.34%
Maximum Drawdown (Daily)		16.01%	55.25%
Maximum Flat Days		618.00 days	1637.00 days
Sharpe Ratio (Rf=T-Bill, Monthly, Annualized)		1.14	0.45
Beta (To Benchmark, Monthly)		0.25	- benchmark -
Ulcer Index		4.11%	13.83%
Ulcer Performance Index (Martin Ratio)		2.91	0.66

We notice the following:

- The strategy has lower returns (but also slightly lower drawdowns) than the AmiBroker implementation
- The strategy is relatively consistent in roughly keeping up with the S&P 500. However, the rolling returns of the new strategy seem more even-keeled than those of the AmiBroker implementation.
- Compared to buying and holding the S&P 500, the strategy more than doubles the risk-adjusted metrics.

We started optimizing the strategy parameters. After slightly adjusting the market-filter, the RSI-to-entry, stop-loss, and profit-target values, we quickly arrived at a better result:



Metric		Travis Cook: Weekly Mean Reversion	S&P 500 Total Return Index
Simulation Start	01/03/2007	\$1,000.00	\$1,000.00
Simulation End	05/13/2022	\$6,111.50	\$3,881.36
Simulation Period	15.4 years		
Compound Annual Growth Rate		12.51%	9.23%
Stdev of Returns (Monthly, Annualized)		8.81%	18.34%
Maximum Drawdown (Daily)		10.84%	55.25%
Maximum Flat Days		609.00 days	1637.00 days
Sharpe Ratio (Rf=T-Bill, Monthly, Annualized)		1.22	0.45
Beta (To Benchmark, Monthly)		0.23	- benchmark -
Ulcer Index		3.35%	13.83%
Ulcer Performance Index (Martin Ratio)		3.74	0.67

A review of the position log, sorted by hold time, shows that some positions are held for over a year:

entry date	exit date	days held	Symbol	Quantity	% Profit	Exit
08/12/2013	07/23/2014	345	MCD	2625	1.24	stop loss
02/13/2017	10/03/2017	232	APD	2213	9.86	profit target
03/24/2014	11/03/2014	224	SRCL	1929	10.61	profit target
08/02/2010	03/04/2011	214	K	4093	9.24	profit target
08/02/2010	02/28/2011	210	K	6	8.19	
10/10/2016	05/01/2017	203	OMC	3607	1.19	stop loss
01/17/2012	07/30/2012	195	D	4522	10.19	profit target
11/01/2010	05/13/2011	193	KMB	3492	10.22	profit target
01/17/2012	07/27/2012	192	ED	3855	10.82	profit target
01/27/2014	08/06/2014	191	PX-201810	1856	0.89	stop loss
10/25/2010	05/04/2011	191	LLY	5900	10.37	profit target
11/14/2011	05/21/2012	189	CAG	9964	3.44	stop loss
10/25/2010	05/02/2011	189	LLY	18	7.82	
07/23/2007	01/28/2008	189	HET-200801	1209	6.84	delisted
05/03/2021	11/04/2021	185	PG	3981	7.91	profit target
09/16/2013	03/17/2014	182	SCG-201812	5212	9.86	profit target
02/13/2017	08/14/2017	182	XOM	4411	-3.19	stop loss
07/16/2007	01/14/2008	182	KMB	2608	1.98	stop loss
10/25/2010	04/25/2011	182	LLY	37	5.01	
12/28/2009	06/28/2010	182	PG	3047	-1.01	stop loss
04/16/2018	10/11/2018	178	COL-201811	2270	0.42	stop loss
05/01/2017	10/24/2017	176	PG	3753	1.53	stop loss
10/31/2011	04/18/2012	170	HSY	3169	10.22	profit target
09/17/2012	03/05/2013	169	PEP	3177	10.72	profit target
11/15/2010	05/03/2011	169	PGN-201207	3510	10.75	profit target
06/24/2013	12/09/2013	168	SIAL-201511	2404	11.74	profit target
05/03/2021	10/18/2021	168	PG	41	7.78	
11/15/2010	05/02/2011	168	PGN-201207	6	10.44	
08/19/2019	01/29/2020	163	AJG	4314	10.1	profit target
07/31/2017	01/10/2018	163	JNJ	2525	10	profit target
09/16/2013	02/24/2014	161	SCG-201812	102	7.18	

It sticks out that many of those positions did not hit the 10% profit target, but the stop-loss instead. With a little experimentation we noticed that the strategy is very sensitive to any changes to the exit parameters. This confirms our suspicion that the strategy's exit is not well-defined. Holding positions for this long is neither very profitable, nor in line with the strategy's objective of trading mean-reversion.

We already designed a time-based exit for the strategy. However, our testing showed that it doesn't work very well. We went back to the drawing board and designed a new exit, based on a stop parameter, that is adjusted over time. Starting at the initial stop-loss (~5% below entry), we adjust the stop-price upwards for every day a position is held. The initial expectation of this adjustment is ~0.25% per day, which would force an unprofitable position to exit after about one month.

Backtesting the strategy with the SPX universe turned out to be a drag on productivity. We switched to the OEX universe to be able to speed up progress. This step seems to be in line with selecting stocks with the lowest volatility.

With the smaller universe, we've been able to try and test many different configurations. Specifically, we experimented with:

- Implementing an RSI-based weekly exit
- Implementing a volatility-based daily exit
- Multiple variants of trailing stops and performance-based stops
- Applying the market-filter to weekly exits as well

entry date	exit date	days held	Symbol	Quantity	% Profit	Exit
02/11/2013	10/04/2013	235	LMT	3436	44.71	trailing stop
06/01/2010	01/19/2011	232	VZ	10742	41.52	trailing stop
02/11/2013	09/30/2013	231	LMT	45	50.51	
06/01/2010	01/10/2011	223	VZ	190	49.93	
11/12/2012	06/21/2013	221	BRK.B	2943	31.89	performance stop
02/11/2013	09/16/2013	217	LMT	17	50.66	
06/01/2010	01/03/2011	216	VZ	103	46	
03/08/2021	10/05/2021	211	COST	2461	38.39	trailing stop
11/12/2012	06/10/2013	210	BRK.B	19	35.32	
06/01/2010	12/27/2010	209	VZ	282	43.57	
11/12/2012	06/03/2013	203	BRK.B	22	34.38	
03/08/2021	09/27/2021	203	COST	40	46.57	
06/01/2010	12/20/2010	202	VZ	72	41.35	
02/11/2013	08/26/2013	196	LMT	109	46.68	
06/01/2010	12/13/2010	195	VZ	40	38.75	
03/08/2021	09/13/2021	189	COST	60	47.04	
02/11/2013	08/19/2013	189	LMT	12	41.93	
03/08/2021	09/07/2021	183	COST	25	45.61	
02/11/2013	08/12/2013	182	LMT	38	44.17	
05/07/2012	11/05/2012	182	WMT	4426	25.62	trailing stop
10/20/2014	04/16/2015	178	COST	3281	23.73	performance stop
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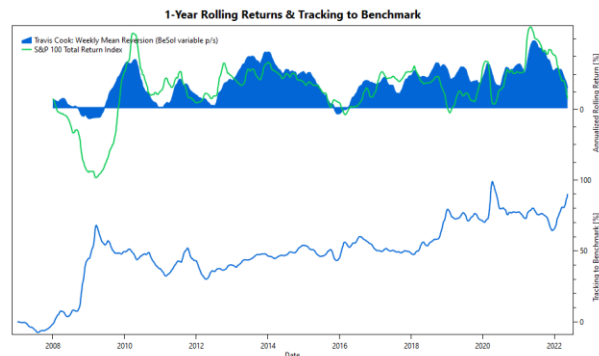
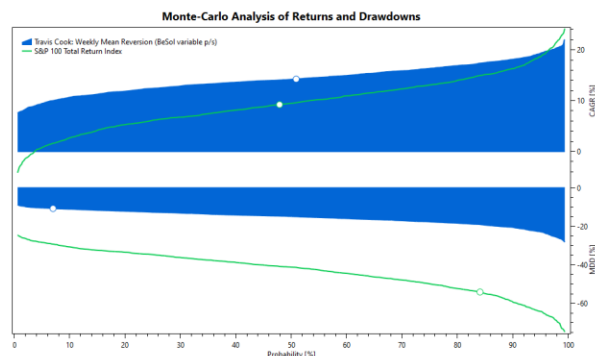
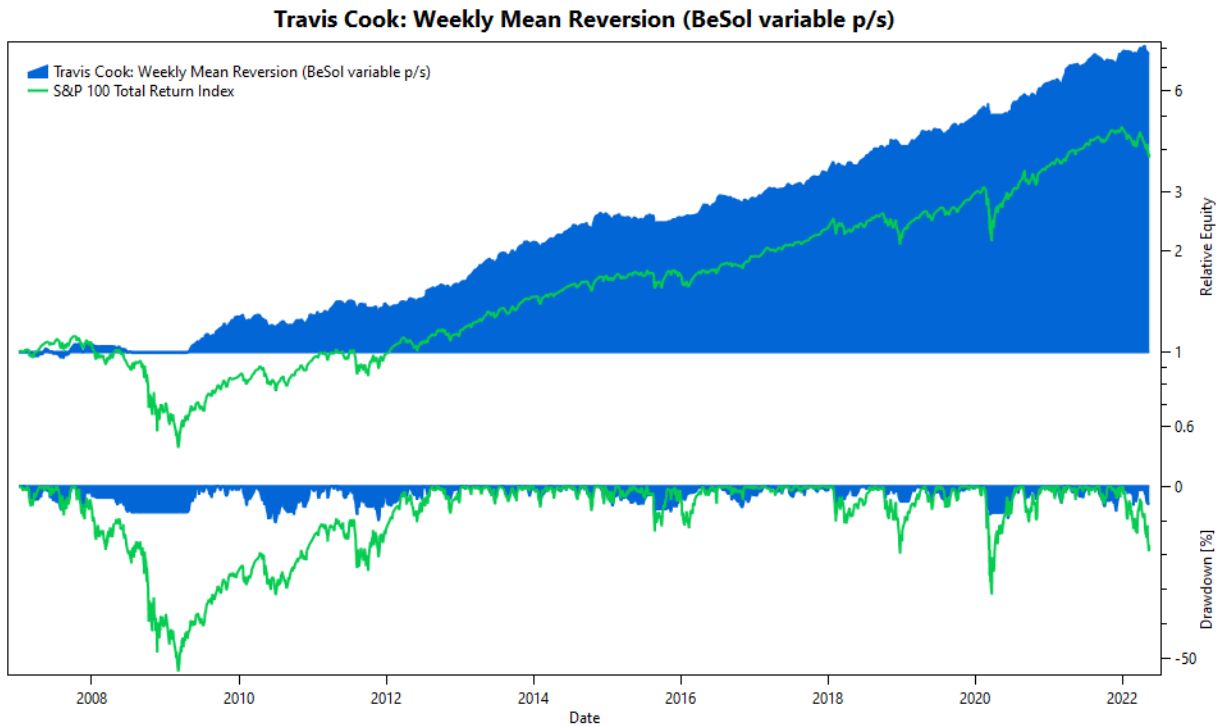
The most influential aspect of the strategy seem to be the exits. The newly developed performance-based exit lets trending stocks ride, while at the trailing stop makes sure that we can swiftly exit. We can see that the strategy keeps some positions for more than 200 days – and that those positions have been very profitable. With this feature the strategy is a unique cross between mean-reversion and trend-following.



We noticed that the market filter is noisy. Cleaning this up by applying a simple lowest-4-week filter allowed us to adjust the market-filter to lower values, further improving returns.

We further added a feature to dynamically size positions, based on the recent average true range. This feature had only minor impact on the strategy, resulting in slightly improved returns and Sharpe Ratio. However, we believe that this feature is very helpful in managing the strategy's risk, especially when market conditions rapidly change.

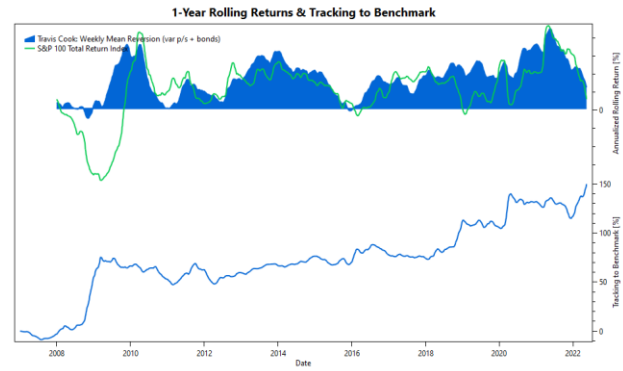
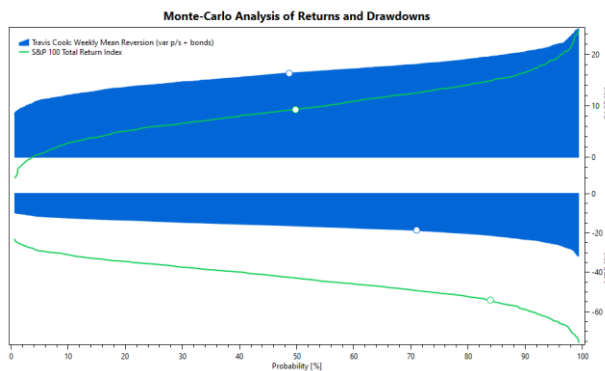
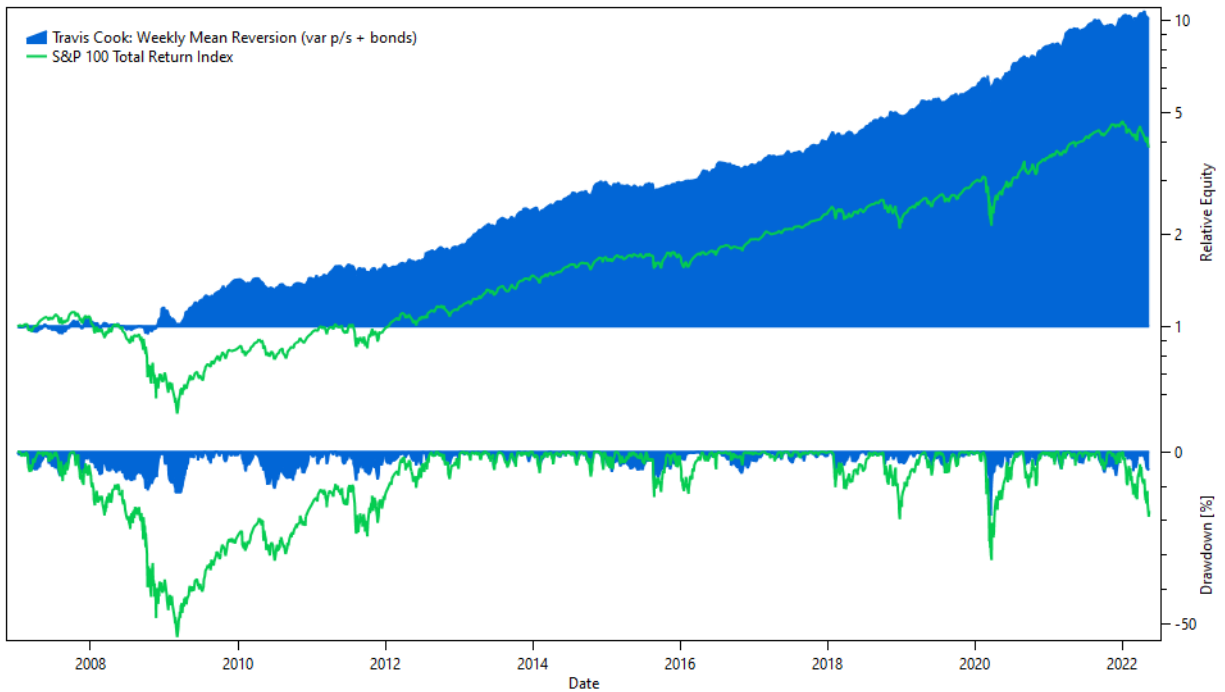
Results



Metric		Travis Cook: Weekly Mean Reversion (BeSol)	S&P 100 Total Return Index
Simulation Start	01/03/2007	\$1,000.00	\$1,000.00
Simulation End	05/13/2022	\$7,727.98	\$3,880.50
Simulation Period	15.4 years		
Compound Annual Growth Rate		14.24%	9.23%
Stdev of Returns (Monthly, Annualized)		9.41%	17.86%
Maximum Drawdown (Daily)		10.70%	54.08%
Maximum Flat Days		540.00 days	1773.00 days
Sharpe Ratio (Rf=T-Bill, Monthly, Annualized)		1.35	0.46
Beta (To Benchmark, Monthly)		0.29	- benchmark -
Ulcer Index		3.47%	14.00%
Ulcer Performance Index (Martin Ratio)		4.11	0.66

The results of this strategy are very pleasing. The strategy delivers consistent returns, slowly but steadily outperforming the S&P 500. At the same time, the strategy has less than half of the downside risk. We believe that this strategy will pair very well with momentum strategies, and a bond strategy to fill in the risk-off periods.

Travis Cook: Weekly Mean Reversion (var p/s + bonds)



Metric		Travis Cook: Weekly Mean Reversion (var p/s + bonds)	S&P 100 Total Return Index
Simulation Start	01/03/2007	\$1,000.00	\$1,000.00
Simulation End	05/13/2022	\$10,157.97	\$3,880.50
Simulation Period	15.4 years		
Compound Annual Growth Rate		16.30%	9.23%
Stdev of Returns (Monthly, Annualized)		10.07%	17.89%
Maximum Drawdown (Daily)		18.50%	54.08%
Maximum Flat Days		383.00 days	1773.00 days
Sharpe Ratio (Rf=T-Bill, Monthly, Annualized)		1.43	0.46
Beta (To Benchmark, Monthly)		0.35	- benchmark -
Ulcer Index		3.27%	13.93%
Ulcer Performance Index (Martin Ratio)		4.98	0.66

The charts above show how the additional bond strategy (see research on bond strategies) further improves returns and risk metrics. This strategy seems very well suited for a wide range of investment objectives.

Final Thoughts

At the end of the project, we need to put our achievement in context and compare it to the original strategy.

- Compared to the 'main' version of the original strategy, our newly developed version has higher returns. Also, while the original strategy did not outperform its benchmark after 2012, our new strategy continues to do so. There is no question that the new strategy is preferable over the original version.
- Compared to the 'backup' version of the original strategy, our newly developed version only has higher returns, when integrating it with the bond strategy. However, the new strategy seems more even-keeled and tracks better to its benchmark, especially in recent years.
- The original strategy traded stocks from the S&P 500, while the new strategy trades S&P 100 constituents. Because a mean-reversion strategy trades often, we feel that the smaller universe is preferable, as we can assume higher liquidity and lower slippage.
- The Sharpe Ratio of the new strategy beats the readings of the original strategy. However, this statement has to be taken with some caution. TuringTrader calculates the Sharpe Ratio based on monthly returns, and uses the T-bill rate for the risk-free return. As far as we understand the AmiBroker code, this matches the method implemented in the custom backtest procedure. However, there might still be some subtleties leading to different results.
- Our new strategy aims to control the total portfolio risk. Even though in our testing this did not make much of a difference, we believe that this may be an important failsafe. After all, mean-reversion strategies aim to catch a falling knife.
- A major criticism of the original strategy was the exit. We believe that there should be a defined method of exiting positions and that lingering positions should be avoided. The new strategy solves this by adding a minimum profit requirement for every open position, which is increased over time. This method makes sure open positions continue to be valuable, without forcing an exit on profitable positions. It seems that this mechanism works quite well, and keeps winners running with qualities similar to trend-following.