

# The Arthur Hill ETF Trading Methods

Ron Gadoth

11 - 11 - 2023

### **What does an investor need to know:**

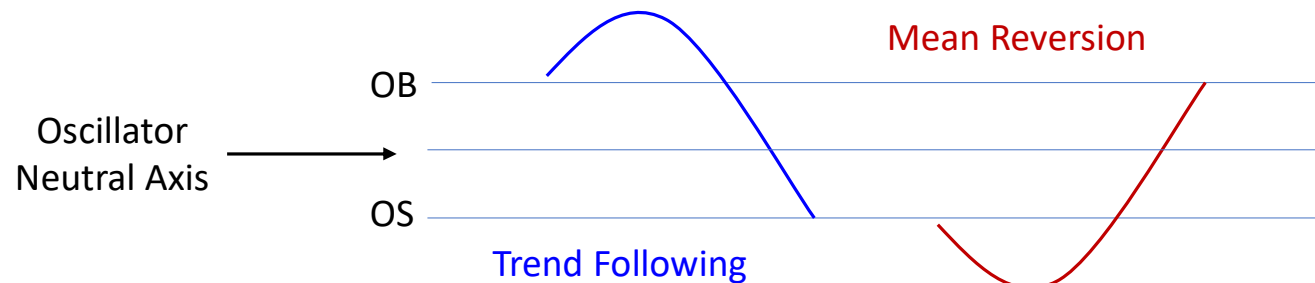
- Investment Climate
  - Is the market in a bull or bear trend
  - Is the sector / Industry in a bull or bear trend
  - Is the ETF/stock in a bull or bear trend
- Ranking –
  - Decide on a common indicator that operates on a normalized scale
  - Use the indicator to measure the entire universe's ETFs performances
  - Rank the ETFs
  - Decide which to buy, retain, sell or replace

### **Presentation Outline**

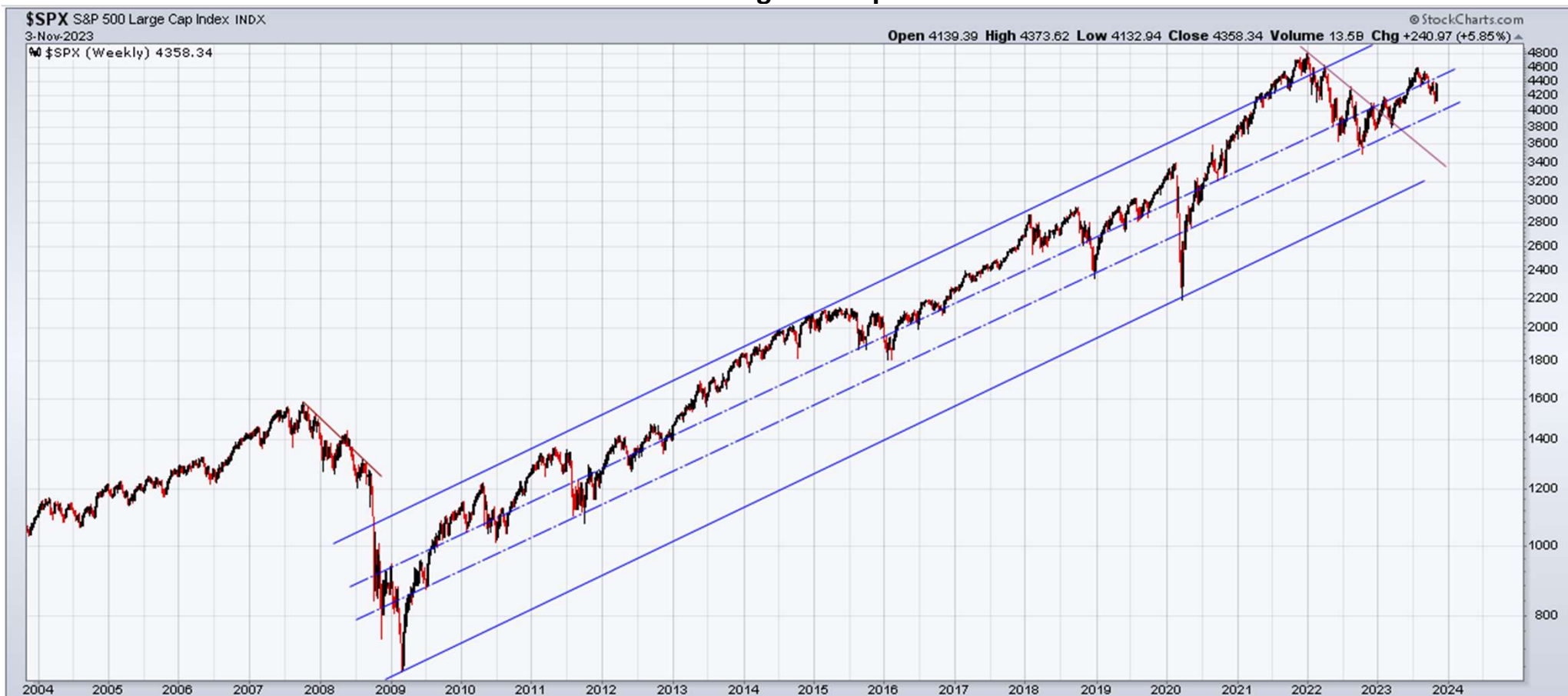
- [Market Regime](#) (Bull/Bear) – the Composite Breadth Model (CBM)
- [Base ETF Strategy](#) – S&P500 + Nasdaq Momentum Rotation Weekly Strategies
- [74 Stock](#) ETF Trend Momentum & Profit Target Daily/Weekly Strategy
- [Mean Reversion](#) ETF Strategy

## Terminology

- Impulse Signal – **Binary** Bull / Bear Market Regime or Trend Composite Signal
- In-State Signal – Generated by a **Ranking Indicator** upon reaching a pre-set Trigger Value
- Stock ETF – An Equity ETF (not invested in bonds, commodities, crypto or currency)
- All Weather Portfolio – A Ray Dalio style, Curated 50 ETFs (36 stock, 14 alternatives)
- Trading Systems –
  - Trend Following (6 weeks - 12 months, 6 months optimum)
  - Mean Reversion (1-20 days or > 18 months)

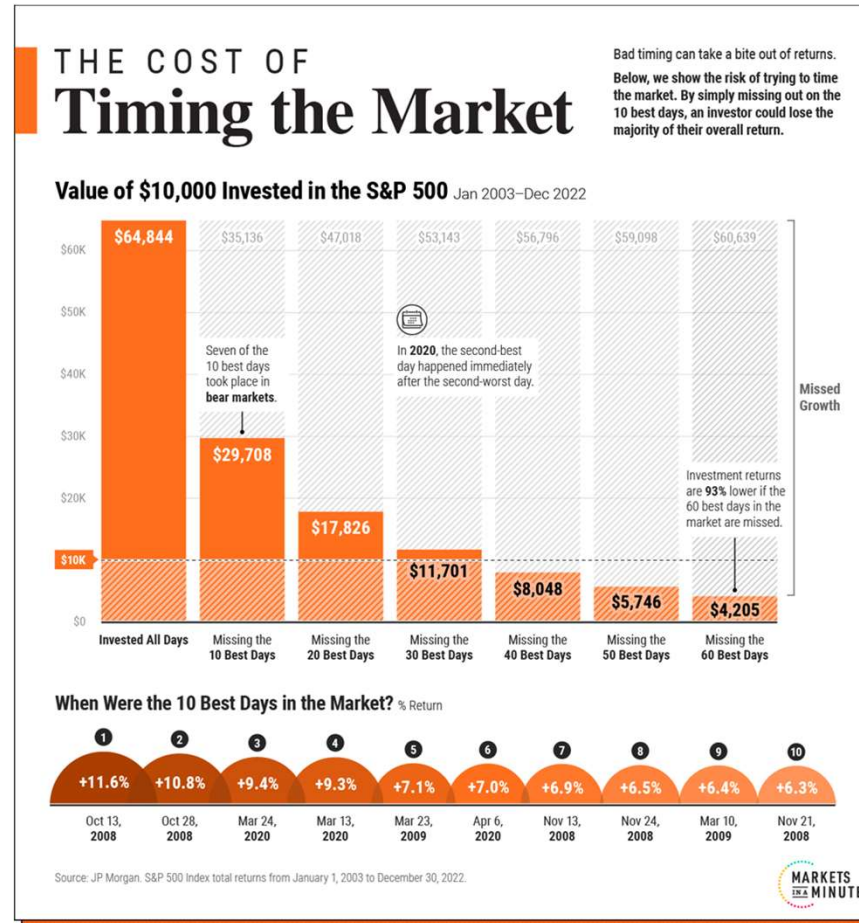


## The Bear Market Challenge – Compressed Time Frames





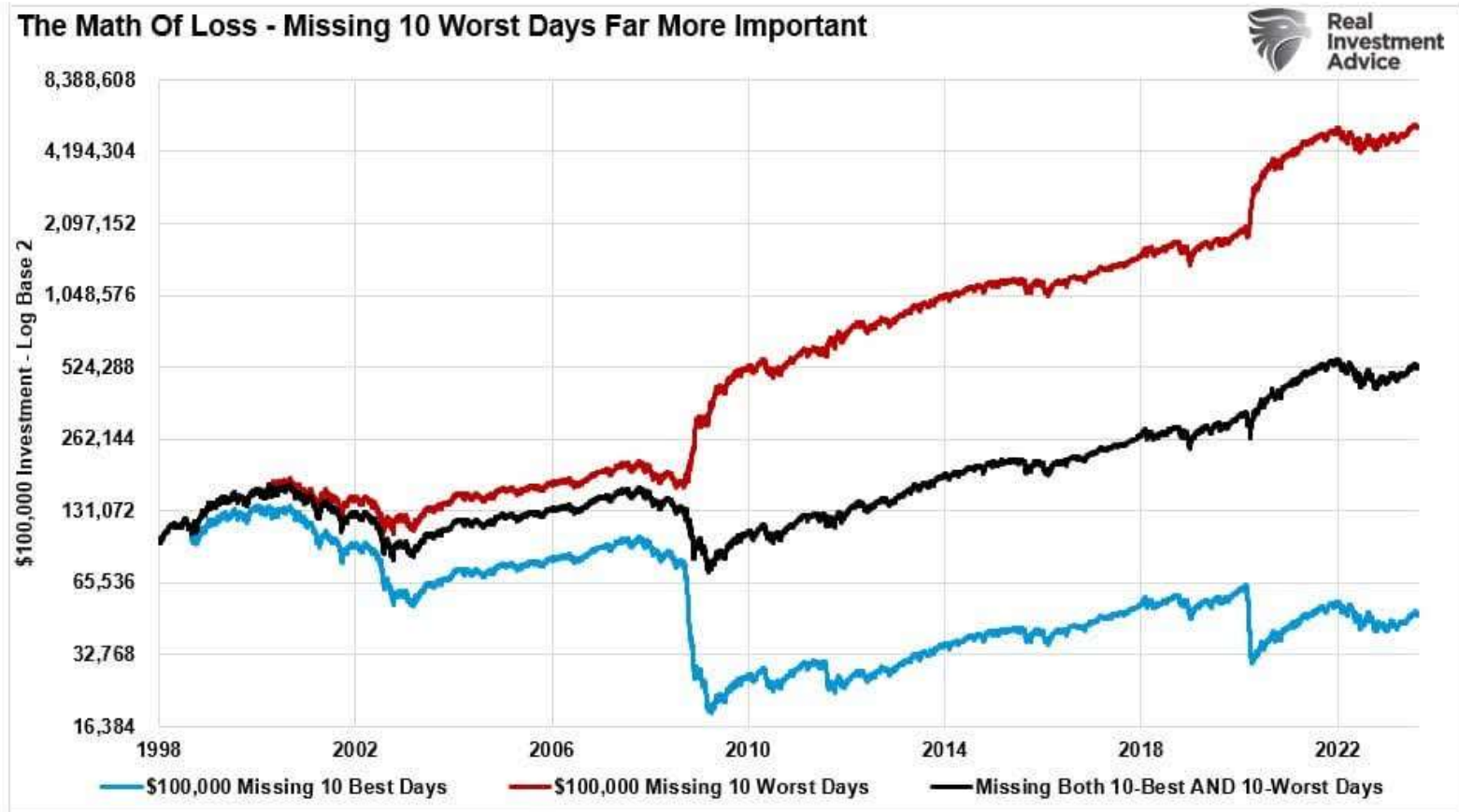
## Market Timing Basics (1/5)



RESEARCH • WRITING Dorothy Neufeld | DESIGN Miranda Smith



## Market Timing Basics (2/5)



## Market Timing Basics (3/5)

### [10 Best Days - A Meme For Every Bull Market](#) Lance Roberts

Avoiding significant drawdowns in the market is critical to long-term investment success. **Obviously, if you are not spending the bulk of your time making up previous losses, more time is spent compounding invested dollars towards long-term goals.**

Brett Arends once penned:

"In other words, it's something of a wash. **The cost of being in the market just before a crash, is at least as great as being out of the market just before a big jump and may be greater. Funny how the finance industry doesn't bother to tell you that.**"

The finance industry doesn't tell you the other half of the story because **it is not profitable for them**. The finance industry makes money when you are invested, not in cash.

RDG – The best days in the market are in the thick of a bear market, bouncing back off the worst drops

## Market Timing Basics (4/5)

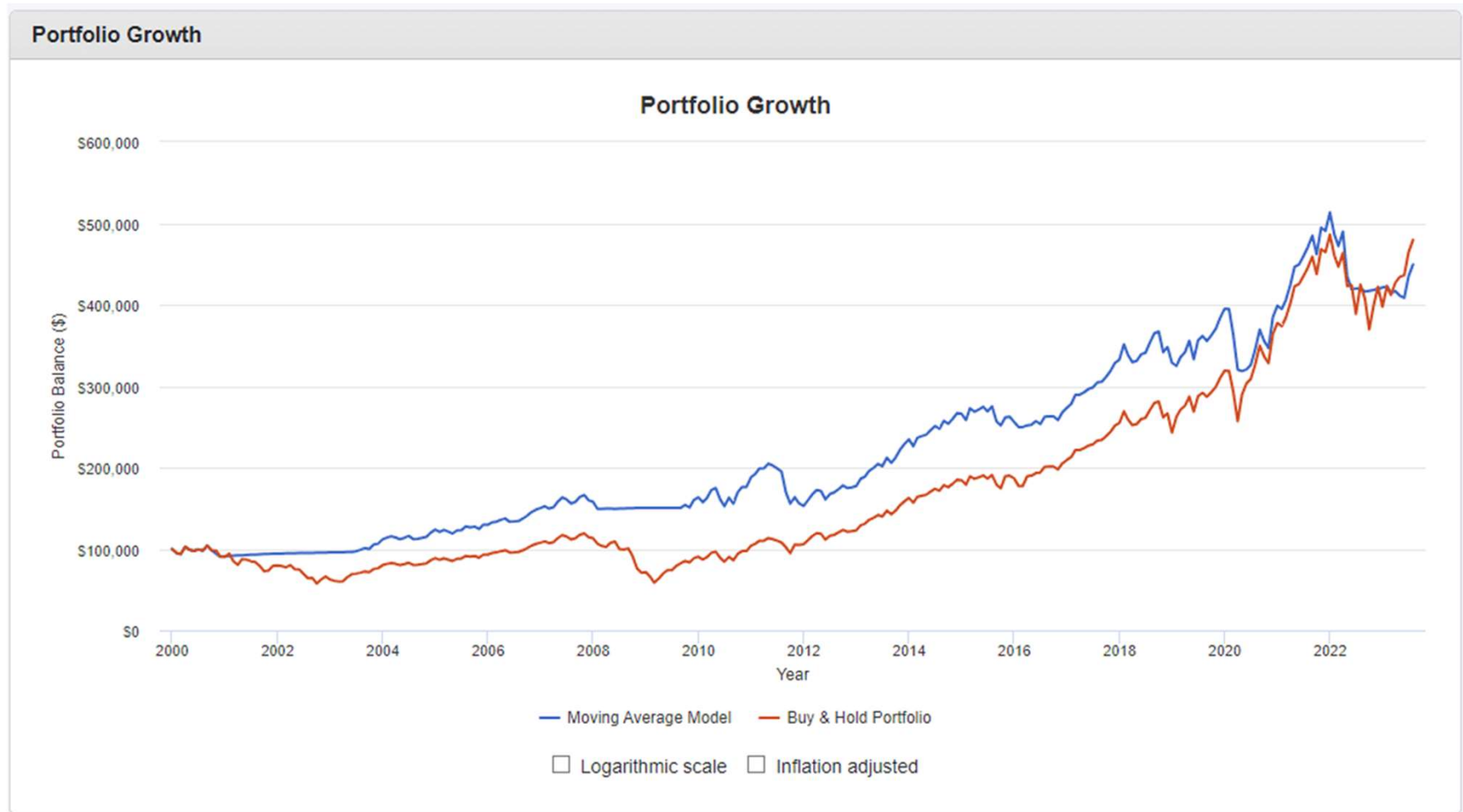
However, you do have options.

- *Use Moving Averages (i.e., 18 months) to generate sell signals*
- *Trim back winning positions to original portfolio weights: **Investment Rule: Let Winners Run***
- *Sell positions that are not working (if the position was not working in a rising market, it likely won't be in a declining market.) **Investment Rule: Cut Losers Short***
- *Hold the cash raised from these activities until the next buying opportunity occurs. **Investment Rule: Buy Low***
- *The most sensible rebalancing method is performance-based: rebalance when positions exceed the original allocations by a set amount (i.e., 15%).*

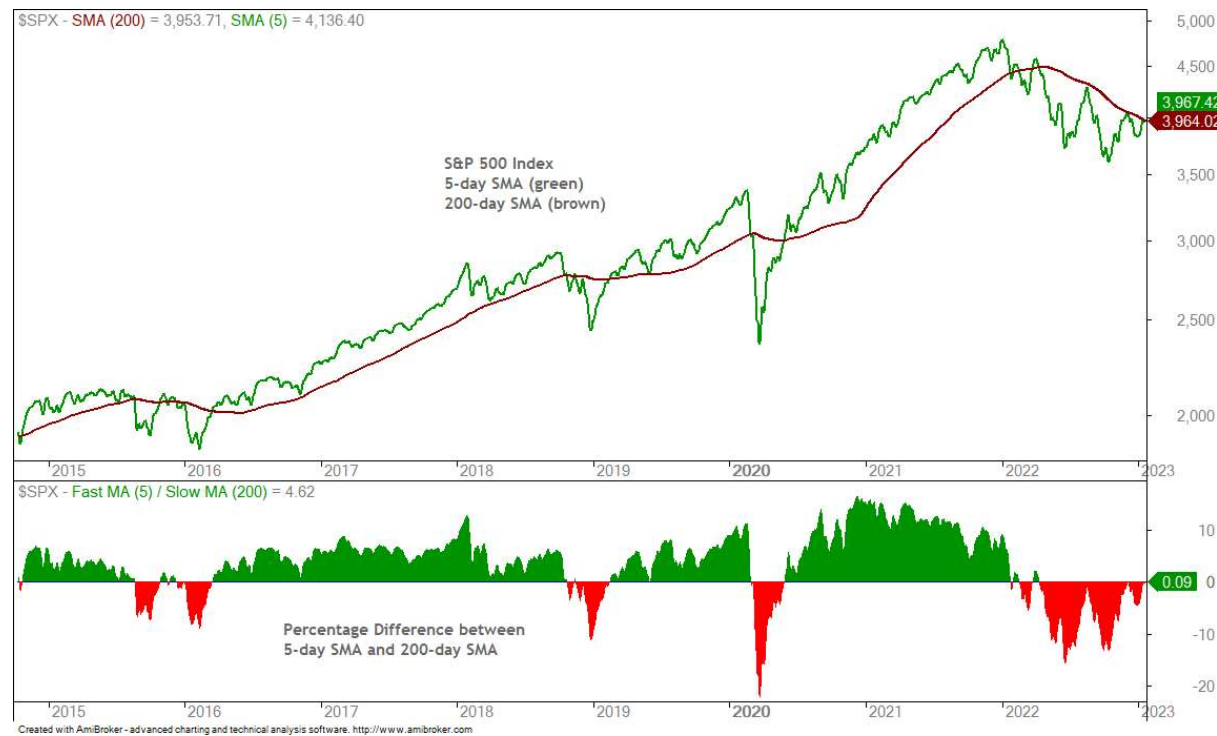
### Performance Summary

Portfolio	Initial Balance	Final Balance	CAGR	Stdev	Best Year	Worst Year	Max. Drawdown	Sharpe Ratio	Sortino Ratio	Market Correlation
Moving Average Model	\$100,000	\$449,215	6.58%	11.27%	32.31%	-18.66%	-25.35% ⓘ	0.48	0.70	0.69
Buy & Hold Portfolio	\$100,000	\$479,571	6.87%	15.40%	32.31%	-36.81%	-50.80% ⓘ	0.40	0.58	0.99

## Market Timing Basics (5/5)

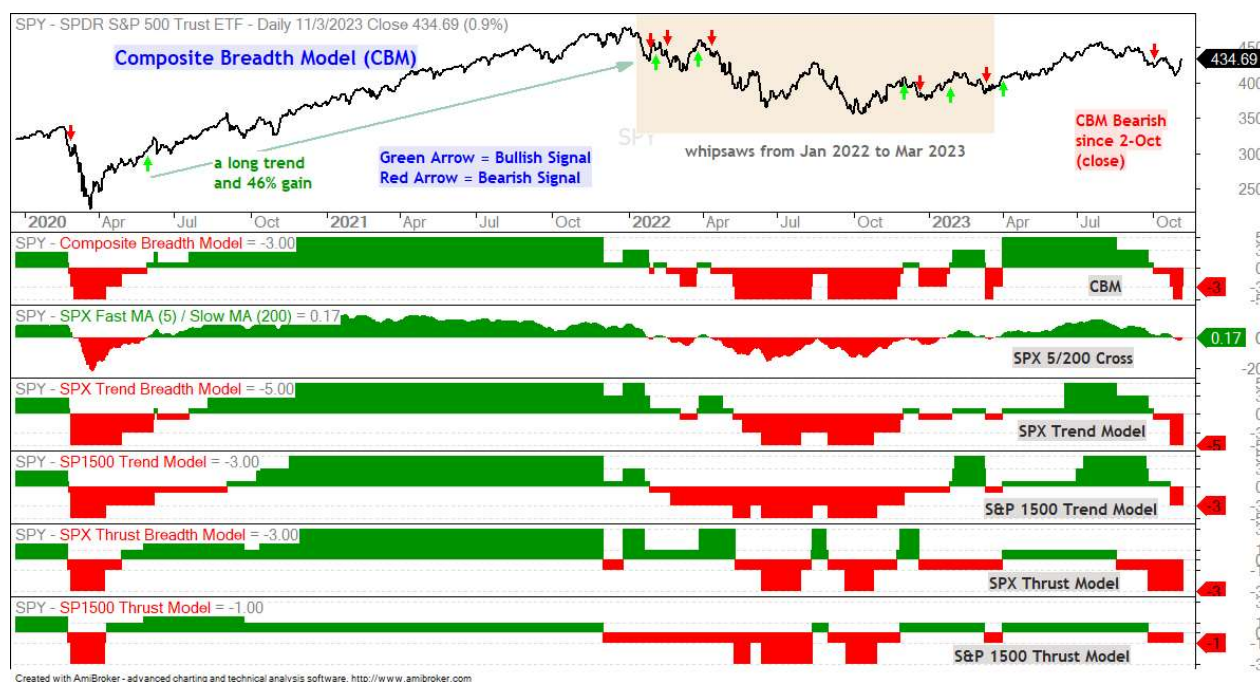


## Determining the Market Regime Using the 5/200 SMA



SPY 1/1/2000 to 9/21/2022 Signals on Close. Buy/Sell next Open. No commissions or Slippage. Dividends included.	Expo sure	Compound Annual Return (CAR)	Maximum Drawdown (MDD)	Average of Top 5 Draw-downs	Total Trades	Win Rate	Average Gain	Average Loss	Gain /Loss Ratio	Avg Bars Gain	Avg Bars Loss
SPY Buy and Hold	100%	6.22%	-55.15%	35.70%	1	100%	294.79%				
SPY Buy/Sell SPX 5/200 Cross	69%	6.65%	-20.62%	16.93%	32	44%	15.20%	-2.25%	6.76	253	26

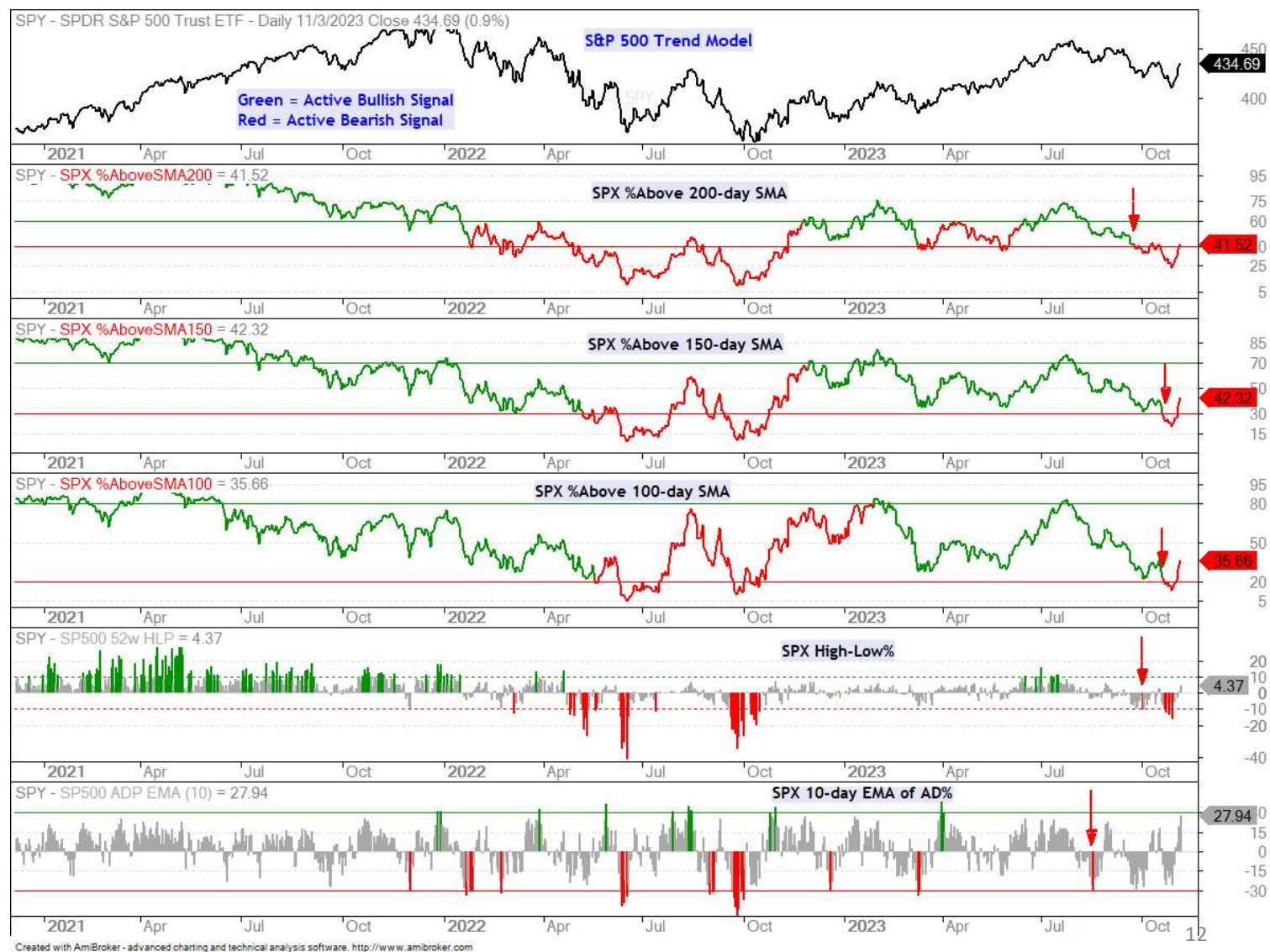
## Determining the Market Regime Using the *Composite Breadth Model (CBM)*



SPY 1/1/2003 to 9/21/2022 Signals on Close. Buy/Sell next Open. No commissions or Slippage. Dividends included.	Expo sure	Compound Annual Return (CAR)	Maximum Drawdown (MDD)	Average of Top 5 Draw- downs	Total Trades	Win Rate	Average Gain	Average Loss	Gain /Loss Ratio	Avg Bars Gain	Avg Bars Loss
SPY Buy-and-hold	100%	9.79%	-55.18%	29.00%	1	100%	531.60%				
SPY Buy/Sell SPX 5/200 Cross	77%	7.90%	-20.62%	16.93%	29	45%	16.34%	-2.28%	7.17	266	24
SPY Buy/Sell CBM Signals	75%	9.35%	-15.07%	12.80%	15	60%	24.19%	-1.87%	12.94	386	43

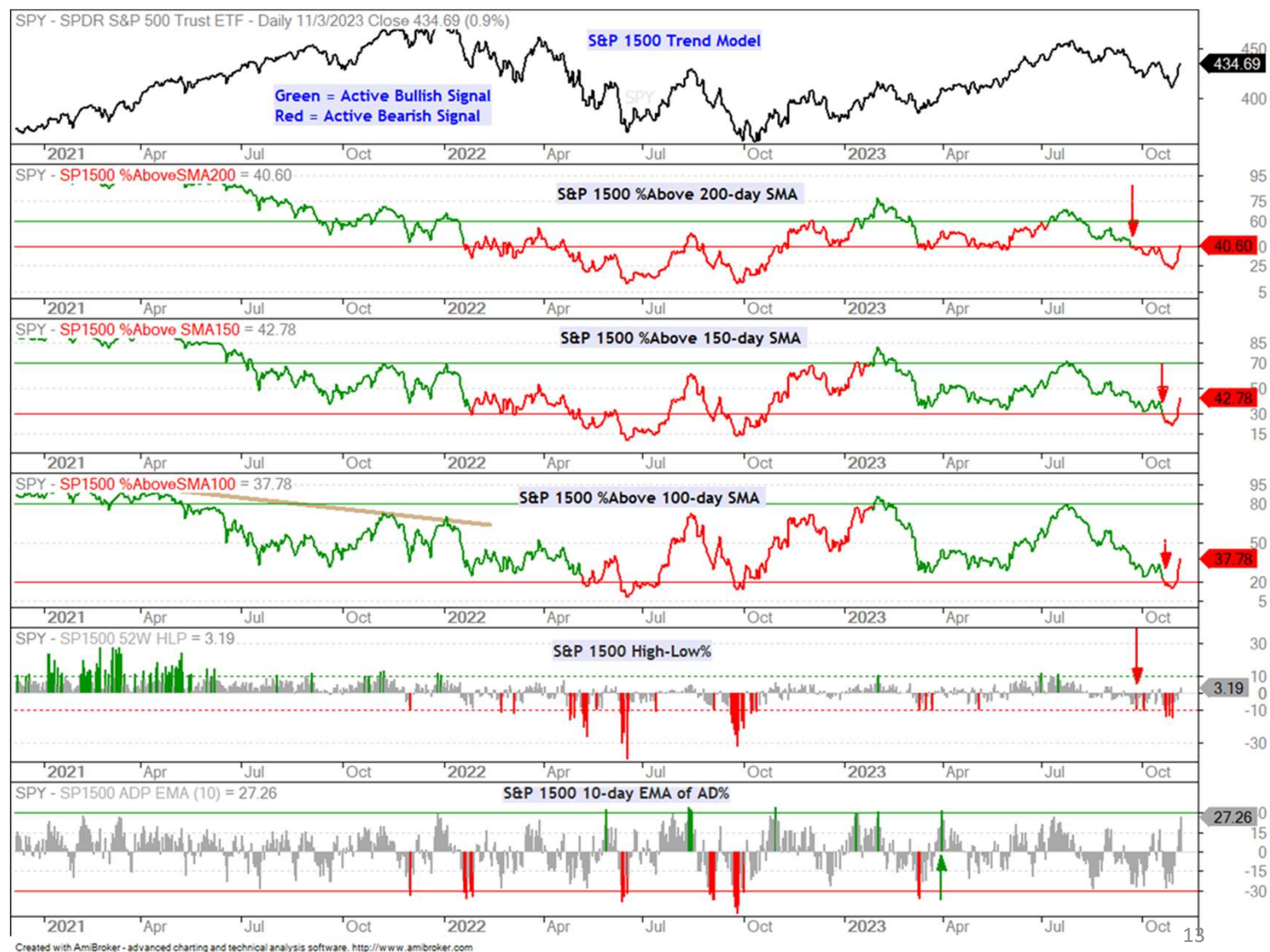


## The SPX Trend Model





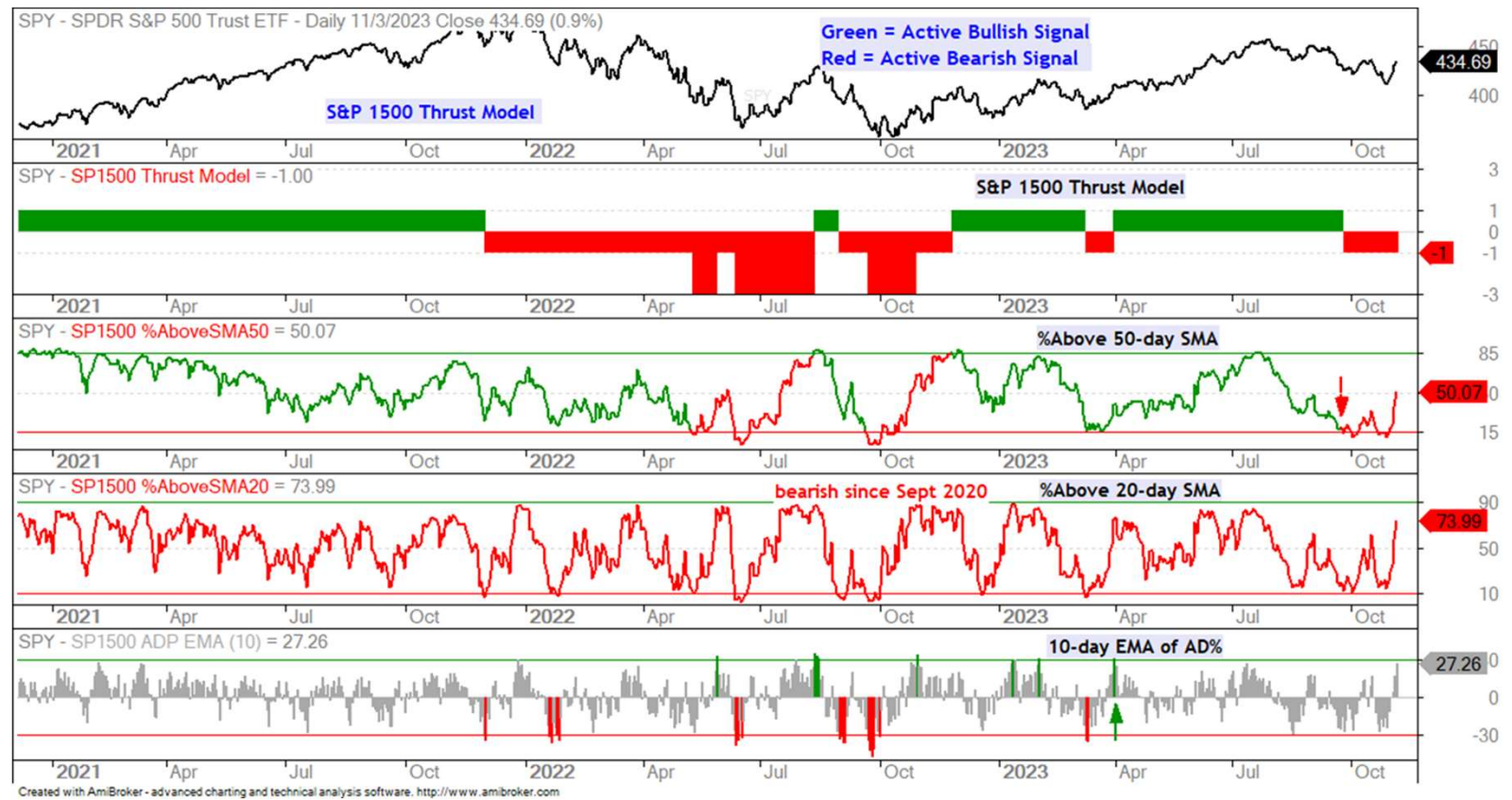
## The SP1500 Trend Model



## The SPX Thrust Model



## The SP1500 Thrust Model





## CBM Variations of Bull / Bear Filters

ST variables = timely signals, more whipsaws; LT variables = lagging signals, fewer whipsaws

Buy&hold - 5/200 Cross - CBM Signals 1/1/2007 to 3/22/2022 - <b>w/o Dividends</b> Signals on Close - Buy/Sell Next Open \$2 Commission - 2.5 bps Slippage	Expo- sure	Compound Annual Return (CAR)	Maximum Drawdown (MDD)	Average of Top 5 Drawdowns	CAR/ AvgDD5 Ratio	Win Rate	Avg Gain	Avg Loss	Gain /Loss	Profit Factor
SPY Buy and Hold (no dividends)	100%	6.44%	-56.40%	30.07%	0.21					
SPY Buy/Sell 5/200 Cross	74%	5.95%	-20.17%	17.53%	0.34	33%	21.76%	-2.77%	7.86	3.50
SPY Buy/Sell CBM Signals →	71%	7.52%	-22.56%	14.54%	0.52	58%	22.79%	-3.91%	5.83	4.72

US Stock ETFs with Data to 2007 (74) 1/1/2007 to 3/22/2022 - <b>w/o Dividends</b> 14 Equal Weight Positions Signals on Close - Buy/Sell Next Open \$2 Commission - 2.5 bps Slippage	Expo- sure	Compound Annual Return (CAR)	Maximum Drawdown (MDD)	Average of Top 5 Drawdowns	CAR/ AvgDD5 Ratio	Win Rate	Avg Gain	Avg Loss	Gain /Loss	Profit Factor
Trend ROCMomo w/ CBM Filter (+1, -1)	70%	10.21%	-17.81%	14.22%	0.72	58%	8.89%	-4.91%	1.81	2.18
Trend ROCMomo w/ CBM Filter (+3, -3)	61%	7.92%	-21.31%	15.76%	0.50	61%	9.37%	-6.31%	1.48	2.15
Trend ROCMomo w/ CBM Filter (+3 -1)	61%	8.33%	-21.39%	15.24%	0.55	63%	9.45%	-6.39%	1.48	2.29

US Stock ETFs with Data to 2007 (74) 1/1/2007 to 3/22/2022 - <b>w/o Dividends</b> 14 Equal Weight Positions Signals on Close - Buy/Sell Next Open \$2 Commission - 2.5 bps Slippage	Expo- sure	Compound Annual Return (CAR)	Maximum Drawdown (MDD)	Average of Top 5 Drawdowns	CAR/ AvgDD5 Ratio	Win Rate	Avg Gain	Avg Loss	Gain /Loss	Profit Factor
Trend ROCMomo w/ SPX 5/200 Filter	73%	7.68%	-21.57%	18.09%	0.42	50%	8.49%	-4.59%	1.85	1.87
Trend ROCMomo w/ SPX 5/125 Filter	71%	6.80%	-22.08%	17.19%	0.40	46%	7.77%	-3.79%	2.05	1.60

## Back Testing of the ETF Base Strategy w/ Variations

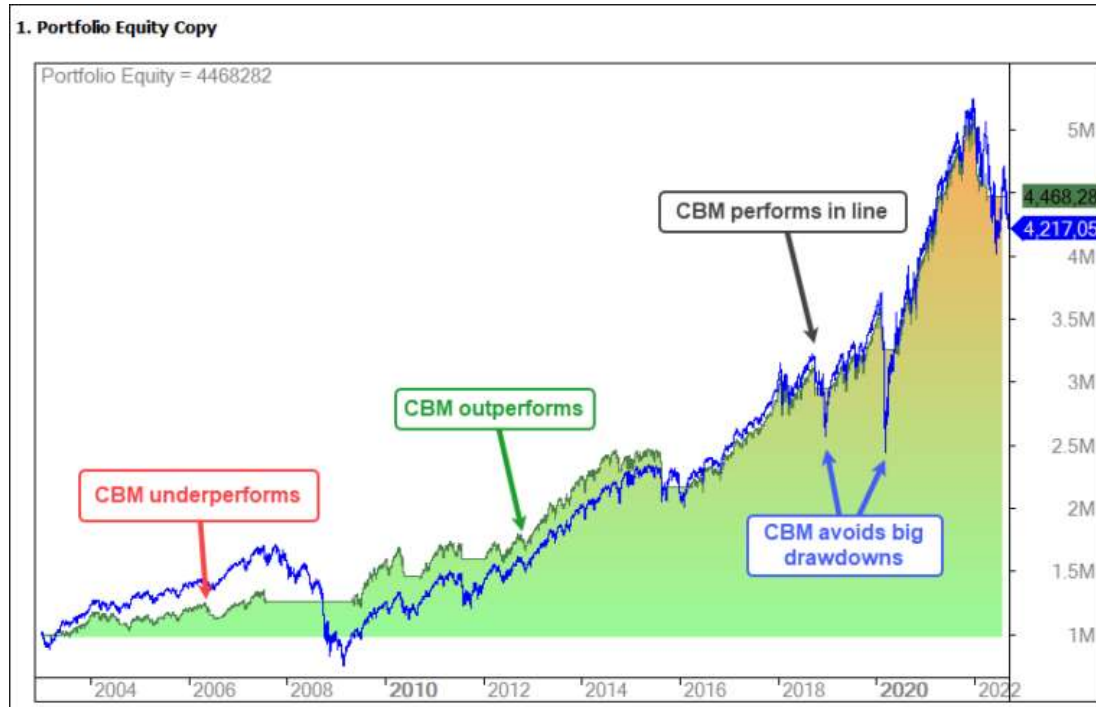
- Base Strategy
- 20% Profit Factor Exit
- 20% Profit Factor Exit & StochClose < 50 Exit

All Weather ETF List (50) 1/1/2007 to 2/8/2023 - No Dividends 14 Equal Weight Positions Signals on Close - Buy/Sell Next Open \$2 Commission - 2.5 bps Slippage											
	Compound Annual Return (CAR)	Exposure (time invested)	Maximum Drawdown (MDD)	Average of Top 5 Drawdowns (ADD)	Total Trades	Win Rate	Avg Gain	Avg Loss	Gain/ Loss Ratio	Profit Factor	Total Return
Base Strategy	9.70%	88%	-17.87%	-13.89%	287	56%	18.91%	-4.32%	4.38	4.29	344.36%
Base Strategy w/ 20% Profit Target	9.26%	86%	-14.08%	-11.07%	440	55%	13.75%	-5.61%	2.45	2.60	316.57%
Base Strategy w/ 20% Target & StochClose Exit	9.22%	85%	-12.39%	-11.31%	569	51%	12.27%	-4.96%	2.47	2.41	313.90%

My Conclusions: *Let Winners Run, Place Trailing Loss Stops*

## The CBM signals work with any index ETF

SPY 1/1/2003 to 9/21/2022 Signals on Close. Buy/Sell next Open. No commissions or Slippage. Dividends included.											
	Expo sure	Compound Annual Return (CAR)	Maximum Drawdown (MDD)	Average of Top 5 Draw- downs	Total Trades	Win Rate	Average Gain	Average Loss	Gain /Loss Ratio	Avg Bars Gain	Avg Bars Loss
Buy/Sell SPY with CBM Signals	75%	9.35%	-15.07%	12.80%	15	60%	24.19%	-1.87%	12.94	386	43
Buy/Sell SPY, QQQ, MDY, IJR	75%	11.35%	-16.45%	13.42%	60	73%	23.70%	-2.69%	8.81	330	26



SPY Performance 1/1/2003 to 1/1/2023 Long Only (only buy signals considered) Signals on Close. Buy/Sell Next Open. <b>NO DIVIDENDS.</b> No Commissions/Slippage	Compound Annual Return (CAR)	Exposure (time invested)	Maximum Drawdown (MDD)	Wins	Losses	Win%	Average Gain	Average Loss
SPY Buy and Hold	7.58%	100%	-56.45%				331.70%	
Buy/Sell SPY using SPX 5/200 SMA Cross	6.53%	76%	-20.17%	13	15	46%	14.42%	-2.58%
Buy/Sell SPY using Composite Breadth Model	7.36%	74%	-19.04%	9	7	56%	20.66%	-2.89%
Buy/Sell SPY using CBM (cash=3mo Tbill yield)	7.72%	74%	-17.77%	9	7	56%	20.66%	-2.89%

## Trading Individual ETFs

### The Composite **Trend** Model

Analogous to the *Index Trend* Model

Criterion	%B (125,1,0)	%Kelt(125,2.0,125)	CCI(125)	PPO(125,5,0)	StochClose(125,5,1)
Limits	-100 / 100	-100 / 100	-100 / 100	-0.25 / 0.25	60 / 40

### The Composite **Momentum** Model

Analogous to the *Index Thrust* Model

Criterion	RSI(10)	StochClose(20,1,0)	CCI(20)	%B(20,2)	ROC(20) / ATR(20)
Limits	30 / 70	5 / 95	-200 / +200	0 / 1	-3 / +3



## The ETF Composite Trend Model

SPY SPDR S&P 500 ETF NYSE + BATS

@ StockCharts.com



## The ETF Composite Momentum Model



## My Arthur Hill Chart Style – Index Case



## My Arthur Hill Chart Style – ETF Case





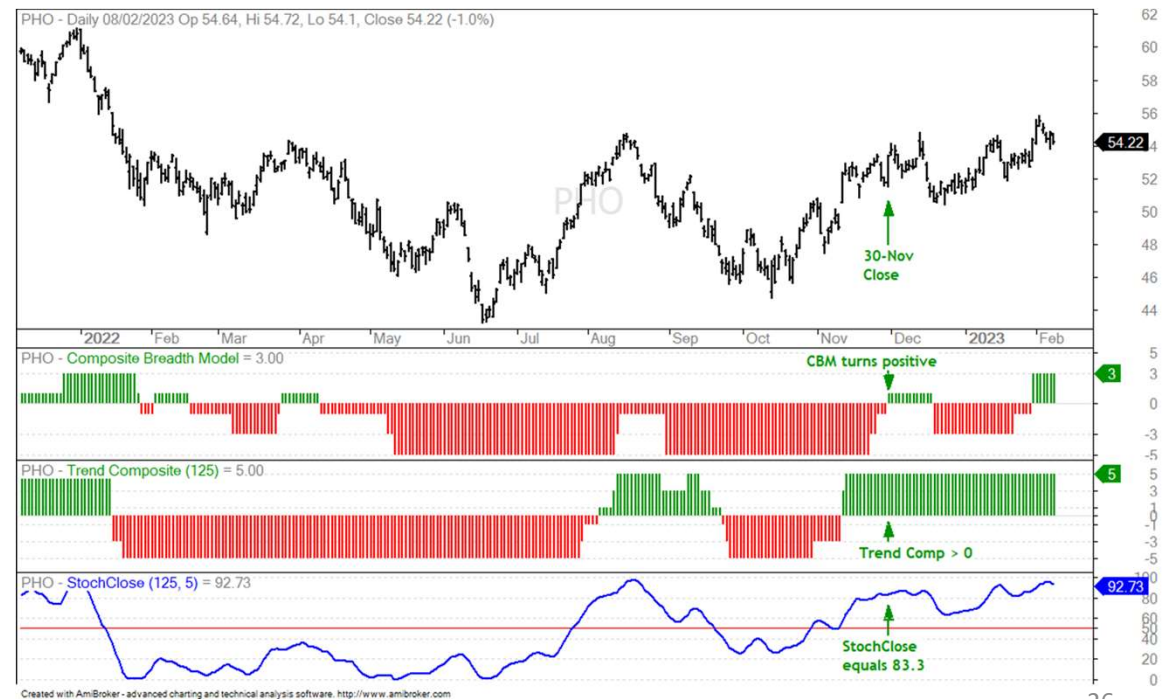
## My Arthur Hill Chart Style – Stock Case



# The ETF Base Strategy – ETF Trend Composite & StochClose Ranking

Used on the Ray Dalio All Weather Portfolio

- 50 ETFs: 36 stock-based, 14 non-stock based
- The 36 Stock Based ETFs: SPY, RSP, MDY, IJR, IWC, QQQ, DVY, XLK, XLY, XLF, XLI, XLC, XLV, XLP, XLE, XLB, XLU, IYR, FDN, SOXX, IGV, ITB, XRT, KIE, KRE, ITA, PBW, IBB, IHF, IHI, XES, XOP, GDX, XME, PHO, PBJ
- The 14 non-stock-based: AGG, IEI, IEF, TLT, LQD, HYG, GLD, SLV, DBE, DBB, DBA, FXE, FXY, UUP
- To qualify a trade in a stock-based ETF
  - Composite Breadth Model  $> 0$
  - ETF Trend Composite  $> 0$
  - StochClose  $> 50$
- A **non**-stock-based ETF qualifies
  - At **any** CBM condition
  - ETF Trend Composite  $> 0$
  - StochClose  $> 50$
- Sell when the Trend Model  $< 0$
- Replace with the highest StochClose ranking ETF w/ its Trend Composite  $> 0$ 
  - any ETF when bull market
  - non-stock ETF when bear market



## Using StochClose as the Ranking Criterion

- Using stochastics provides several advantages as the Ranking Criterion
  - It ***normalizes the readings*** into the same scale enabling comparisons between asset classes with completely different volatility regimes can be compared (i.e., bonds & crypto)
  - It is a bounded indicator (unlike CCI)
  - No lags in the data readings (unlike MAs)
  - Indicates internal strength (like 52wk highs)

	AllW	Name (Last Close: 30-Nov-2022)	Sym	StochClose (125,5)	Trend Comp	Trend
1	AllW	3060 CS Food & Beverage ETF	PBJ	99.4	5	UPtrend
2	AllW	3030 FI Insurance SPDR	KIE	97.3	5	UPtrend
3	AllW	2060 Healthcare SPDR	XLV	97.2	5	UPtrend
4	AllW	2040 Industrials SPDR	XLI	96.7	5	UPtrend
5	AllW	2030 Financial SPDR	XLF	96.5	5	UPtrend
6	AllW	3060 HC Biotech ETF	IBB	94.6	5	UPtrend
7	AllW	3040 IN Aerospace & Defense ETF	ITA	92.2	5	UPtrend
8	AllW	2070 Consumer Staples SPDR	XLP	91.4	5	UPtrend
9	AllW	2080 Energy SPDR	XLE	88.6	5	UPtrend
10	AllW	3095 UT Water Resources ETF	PHO	83.3	5	UPtrend
11	AllW	3080 EN Oil&Gas Equip&Serv SPDR	XES	82.5	3	UPtrend
12	AllW	5020 PM Silver Trust ETF	SLV	80.5	3	UPtrend
13	AllW	1012 S&P 400 MidCap SPDR	MDY	78.9	5	UPtrend
14	AllW	3020 CD Home Construction ETF	ITB	78.0	1	UPtrend

# SPY SPDR S&P 500 ETF NYSE + BATS

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Open: 426.62 Ask: 425.82 P/E: Options: yes  
 High: 428.60 Ask Size: 200 EPS: Annual Dividend: 6.50914  
 Low: 425.50 Bid: 425.81 Mkt Cap: 396.9B Yield: 1.53%  
 Prev Close: 427.48 Bid Size: 458 Last Size: SCTR (ETF): 73.0

Monday 2-Oct-2023 12:01 pm

Chg: -0.37%

Last: 425.88

Volume: 30,028,984

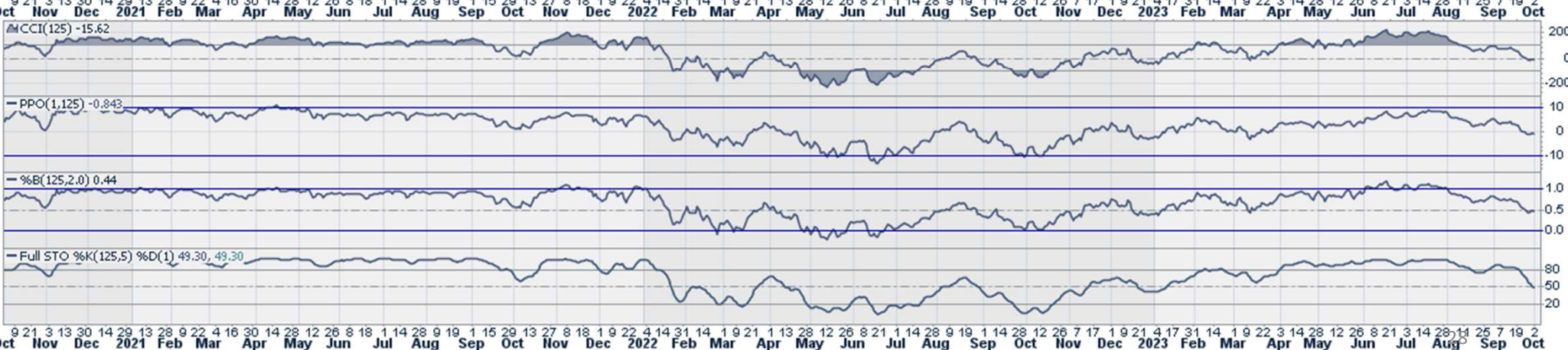
SPY (Daily, Heikin-Ashi) 426.65

CHAN(90) 406.93 - 432.38 - 457.82

AKELT(120,1.0,180) 424.28 - 430.91 - 437.53

AKELT(120,2.0,180) 417.65 - 430.91 - 444.16

AKELT(120,3.0,180) 411.03 - 430.91 - 450.78





## Recap for the Base Strategy

### Bull Market Scenario

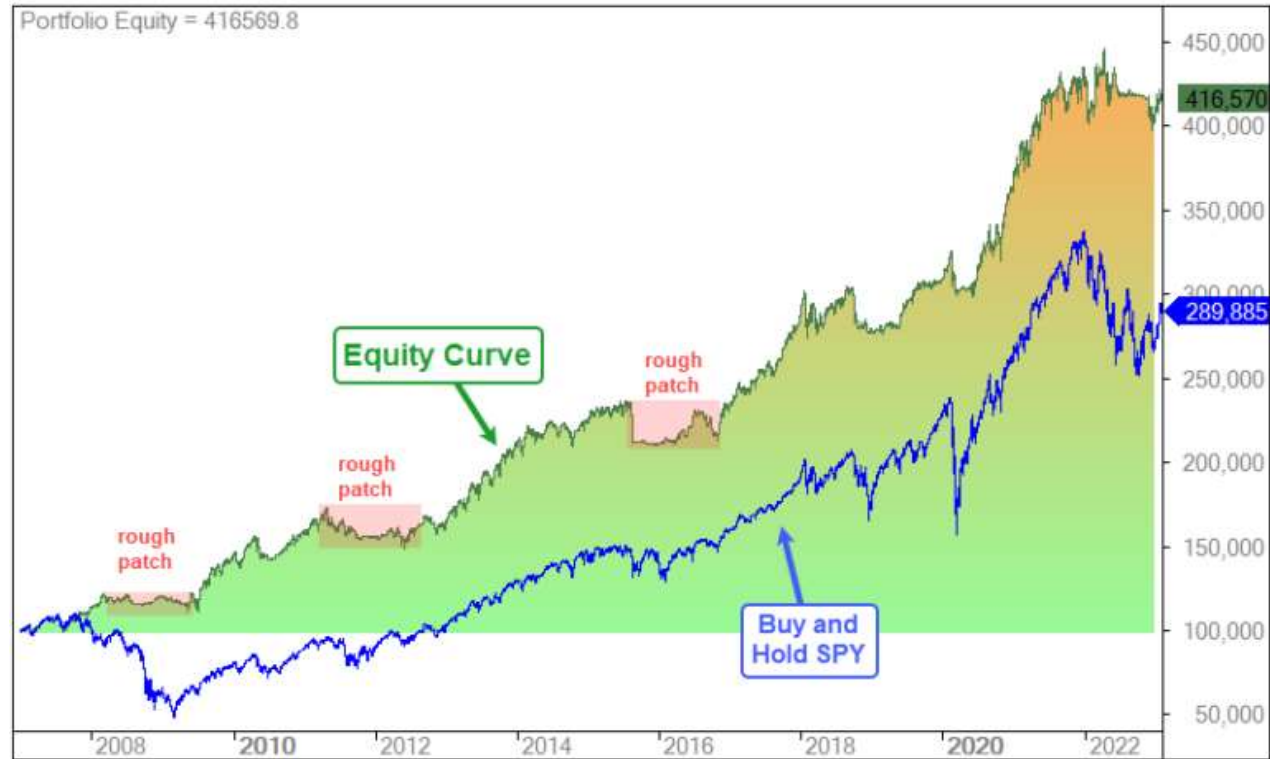
- Composite Breadth Model  $> 0$
- Select stock and non-stock ETFs that are in uptrends (ETF Trend Composite  $> 0$ )
- Buy the ETFs with the highest StochClose values
- Sell when the Trend Composite turns negative

### Bear Market Scenario

- Composite Breadth Model  $< 0$
- Stock-based ETFs are *ineligible* to buy
- Select non-stock ETFs that are in uptrends (ETF Trend Composite  $> 0$ )
- Buy ETFs with the highest StochClose values
- Sell when Trend Composite turns negative

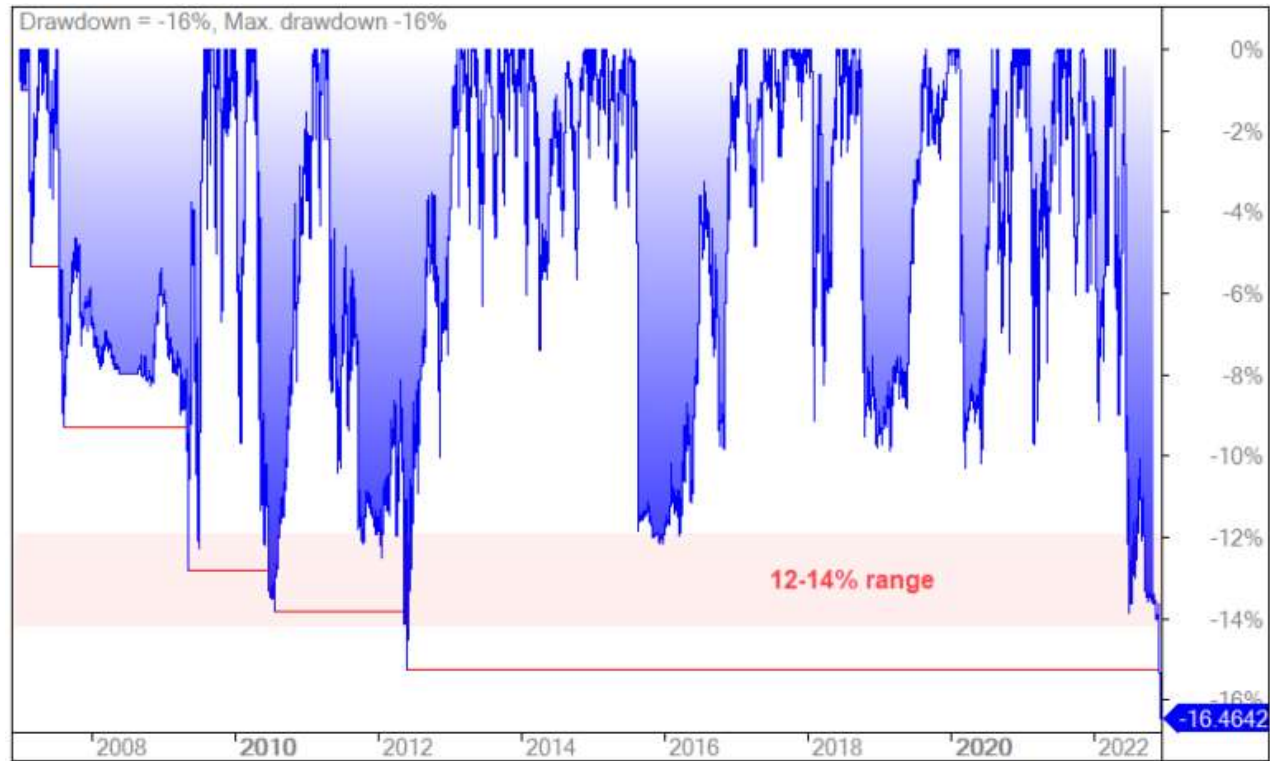
## Back Testing of the ETF Base Strategy (1/4)

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## Back Testing of the ETF Base Strategy (2/4)

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## Back Testing of the ETF Base Strategy (3/4)

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Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr%
2007	1.7%	-0.6%	0.7%	3.4%	3.1%	-1.5%	-2.2%	-1.5%	4.0%	2.4%	0.3%	2.3%	12.4%
2008	3.1%	4.2%	-2.0%	-0.5%	0.0%	2.6%	-2.4%	-1.4%	-0.3%	0.7%	1.8%	1.5%	7.3%
2009	-1.1%	-1.3%	0.1%	-1.9%	3.4%	-1.6%	7.6%	2.6%	5.5%	-2.8%	5.6%	1.6%	18.5%
2010	-2.4%	2.8%	5.1%	2.3%	-5.3%	-1.3%	-0.3%	2.2%	1.7%	3.5%	-0.3%	3.3%	11.4%
2011	-0.2%	4.8%	1.3%	3.1%	-3.3%	-3.6%	1.0%	-2.1%	-2.4%	-0.2%	0.2%	-0.1%	-1.8%
2012	-0.3%	1.4%	1.5%	0.4%	-4.1%	3.3%	0.9%	2.0%	1.5%	-1.2%	-0.5%	-0.5%	4.2%
2013	4.8%	0.6%	4.0%	0.7%	2.8%	-0.6%	5.7%	-3.7%	5.6%	3.1%	2.7%	2.0%	30.9%
2014	-1.7%	5.1%	-0.7%	-0.2%	0.9%	2.2%	-3.2%	3.1%	-2.3%	0.2%	1.9%	0.0%	5.2%
2015	2.4%	1.4%	-0.7%	-0.9%	2.0%	-1.4%	2.6%	-9.9%	0.2%	-0.3%	-0.3%	-0.2%	-5.6%
2016	0.6%	0.6%	0.0%	2.7%	-1.4%	5.2%	1.8%	-2.6%	0.0%	-3.6%	5.6%	0.4%	9.2%
2017	3.4%	2.4%	0.2%	1.6%	1.2%	0.7%	1.6%	0.9%	1.7%	4.2%	2.5%	0.7%	23.1%
2018	4.9%	-3.6%	-1.6%	-0.4%	3.4%	-0.6%	1.8%	3.9%	-0.4%	-7.8%	1.4%	-2.4%	-2.0%
2019	0.8%	-0.1%	1.0%	0.2%	-0.5%	4.3%	1.2%	2.9%	0.5%	-0.1%	0.5%	-0.3%	10.7%
2020	2.1%	-2.7%	-1.3%	0.6%	0.5%	1.5%	5.3%	3.4%	-1.9%	-3.2%	10.5%	2.7%	18.0%
2021	1.9%	2.8%	1.1%	4.4%	1.9%	2.3%	0.2%	2.2%	-4.3%	3.1%	-1.3%	3.8%	19.4%
2022	-6.7%	2.9%	3.4%	-2.0%	1.2%	-1.6%	-0.1%	0.1%	-0.3%	0.0%	-0.2%	-2.7%	-6.3%
2023	3.5%	-0.8%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.6%
Avg	1.0%	1.2%	0.8%	0.8%	0.4%	0.6%	1.3%	0.1%	0.5%	-0.1%	1.9%	0.8%	

## Back Testing of the ETF Base Strategy (4/4)

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Trend-StochClose Bull-Bear All Weater ETF Trading Strategy with 20% Profit Target									Last Close: 8-Feb-23
Trend-Momo Bull-Bear ETF Strategy trading the 50 ETFs in the All Weather List									
Last Price = Last Close or Exit Price (if sold). Entry/Exit Price = Open with 2.5bps slippage									
Symbol	Entry Date	Entry Price	Exit Date	Last Price	Change	Bars	Exit Signal	20% Target	Symbol
1 FXE	14-Dec-22	98.21	Open	98.88	0.68%	39	Open	117.86	FXE
2 MDY	01-Dec-22	473.08	Open	486.06	2.74%	48	Open	567.69	MDY
3 XES	01-Dec-22	79.51	Open	89.47	12.53%	48	Open	95.41	XES
4 PHO	01-Dec-22	53.60	Open	54.22	1.15%	48	Open	64.32	PHO
5 XLE	01-Dec-22	91.81	Open	87.56	-4.63%	48	Open	110.18	XLE
6 XLP	01-Dec-22	77.07	Open	72.62	-5.77%	48	Open	92.48	XLP
7 ITA	01-Dec-22	112.03	Open	114.80	2.5%	48	Open	134.43	ITA
8 IBB	01-Dec-22	136.56	Open	133.33	-2.37%	48	Open	163.88	IBB
9 XLF	01-Dec-22	36.49	Open	36.78	0.79%	48	Open	43.79	XLF
10 XLI	01-Dec-22	102.13	Open	102.34	0.21%	48	Open	122.55	XLI
11 XLV	01-Dec-22	139.86	Open	132.41	-5.32%	48	Open	167.83	XLV
12 KIE	01-Dec-22	42.75	Open	43.81	2.48%	48	Open	51.30	KIE
13 PBJ	01-Dec-22	48.54	Open	45.49	-6.29%	48	Open	58.25	PBJ
14 SLV	10-Nov-22	19.98	Open	20.48	2.50%	62	Open	23.98	SLV

## Base ETF Strategy Rank & Signal Table Options

Column visibility	Copy	CSV	Excel	PDF	Print					
Show	300	entries						Search:	Allw	
Allw	Name	Symbol	StochClose (125,5)	Trend Comp	Trend	Recent Signal	Signal Date	Signal Days	Signal %Change	52-wk Range
Allw	2030 Financial SPDR	XLF	77.5	5	UPtrend		2020/8/28	366	61.80	96
Allw	2070 Consumer Staples SPDR	XLP	84.8	5	UPtrend		2021/11/2	69	6.30	91
Allw	2080 Energy SPDR	XLE	97.4	5	UPtrend		2021/9/30	92	32.20	96
Allw	2100 Utilities SPDR	XLU	63.0	5	UPtrend		2021/12/6	46	0.40	78
Allw	3030 FI Banks Regional SPDR	KRE	71.8	5	UPtrend		2021/9/29	93	9.30	80
Allw	3030 FI Insurance SPDR	KIE	83.9	5	UPtrend		2021/12/29	30	2.20	98
Allw	3060 CS Food & Beverage ETF	PBJ	75.7	5	UPtrend		2020/7/21	394	37.40	91
Allw	3060 HC HealthCare Providers ETF	IHF	55.4	1	UPtrend	NewUp	2022/2/9	1	0.00	78
Allw	3080 EN Oil&Gas Equip&Serv SPDR	XES	86.2	5	UPtrend		2022/1/11	21	2.00	64



## Base ETF Strategy Rank & Signal Table Options

Column visibility

Copy

CSV

Excel

Sorted by StochClose to put leaders at the top

Show 

300

 entries

Search:

AllW	Name	Symbol	StochClose (125,5)	Trend Comp	Trend	Recent Signal	Signal Date	Signal Days	Signal %Change	52-wk Range	Chart Link
AllW	5040 AG Agriculture ETF	DBA	99.8	5	UPtrend		2020/8/25	369	46.10	100	<a href="#">DBA</a>
	5010 CM Commodity ETF	DBC	99.2	5	UPtrend		2020/8/6	382	71.60	100	<a href="#">DBC</a>
	5040 AG Soybeans	SOYB	98.7	5	UPtrend		2021/12/27	32	13.90	100	<a href="#">SOYB</a>
	5050 AG Livestock	COW	98.3	5	UPtrend		2022/1/19	16	7.40	100	<a href="#">COW</a>
	3085 EN MLP ETF	AML	98.2	5	UPtrend		2022/1/10	22	8.90	96	<a href="#">AML</a>
	3090 BM Natural Resources ETF	IGE	97.8	5	UPtrend		2021/10/5	89	17.90	100	<a href="#">IGE</a>
	2200 EW Energy ETF	RYE	97.8	5	UPtrend		2021/9/27	95	29.50	98	<a href="#">RYE</a>
AllW	5010 EN Energy ETF	DBE	97.6	5	UPtrend		2020/8/25	369	91.40	97	<a href="#">DBE</a>
	6010 EU Greece ETF	GREK	97.6	5	UPtrend		2022/1/12	20	4.20	96	<a href="#">GREK</a>

## Base ETF Strategy Rank & Signal Table Options

AllW	Name	Symbol	StochClose (125,5)	Trend Comp	Trend	Recent Signal	Signal Date	Signal Days	Signal %Change	52-wk Range
	6010 Asia Thailand Investable ETF	THD	79.9	5	UPtrend	NewUp	2022/2/7	3	2.50	74
	3090 BM Agribusiness ETF	MOO	70.0	5	UPtrend	NewUp	2022/2/8	2	1.60	100
AllW	3090 BM Metals & Mining SPDR	XME	68.6	5	UPtrend	NewUp			2.20	97
	6010 NA Mexico ETF	EWV	65.8	1	UPtrend	NewUp			0.00	90
	5020 PM Platinum ETF	PLTM	63.8	1	UPtrend	NewUp	2022/2/4	4	1.20	32
AllW	3060 HC HealthCare Providers ETF	IHF	55.4	1	UPtrend	NewUp	2022/2/9	1	0.00	78
AllW	5040 AG Agriculture ETF	DBA	99.8	5	UPtrend		2020/8/25	369	46.10	100

Sorted by Recent Signal

AllW	Name	Symbol	StochClose (125,5)	Trend Comp	Trend	Recent Signal	Signal Date	Signal Days	Signal %Change	52-wk Range
	3090 BM Agribusiness ETF	MOO	70.0	5	UPtrend	NewUp	2022/2/8	2	1.60	100
	5050 AG Livestock	COW	98.3	5	UPtrend		2022/1/19	16	7.40	100
	6010 EU Euro Financials ETF	EUFN	92.7	5	UPtrend				5.40	100
	6010 EU United Kingdom ETF	EWU	91.9	5	UPtrend				3.70	100
	5040 AG Soybeans	SOYB	98.7	5	UPtrend		2021/12/27	32	13.90	100
	3090 BM Natural Resources ETF	IGE	97.8	5	UPtrend		2021/10/5	89	17.90	100
	5040 AG Coffee	JO	92.8	5	UPtrend		2020/11/17	310	100.30	100

Sorted by 52-week High (100 = 52-wk High)



## Base ETF Strategy Rank & Signal Table Options

AIW	Name	Symbol	StochClose (125,5)	Trend Comp	Trend	Recent Signal	Signal Date	Signal Days	Signal %Change	52-wk Range
	6010 NA Mexico ETF	EWV	65.8	1	UPtrend	NewUp	2022/2/9	1	0.00	90
AIW	3060 HC HealthCare Providers ETF	IHF	58.4	1	UPtrend	NewUp	2022/2/9	1	0.00	78
AIW	3090 BM Metals & Mining SPDR	XME	55.5	5	UPtrend	NewUp	2022/2/8	2		97
	3090 BM Agribusiness ETF	MOO	70.0	5	UPtrend	NewUp	2022/2/8	2	1.60	100
	6010 Asia Thailand Investable ETF	THD	79.9	5	UPtrend	NewUp	2022/2/7	3	2.50	74
	5020 PM Platinum ETF	PLTM	63.8	1	UPtrend	NewUp	2022/2/4	4	1.20	32
	5020 PM Palladium ETF	PALL	64.7	3	UPtrend		2022/1/28	9	-4.00	48
	5050 AG Livestock	COW	98.3	5	UPtrend		2022/1/19	16	7.40	100
	6010 Asia China Sector Financials ETF	CHIX	80.8	5	UPtrend		2022/1/19	16	3.00	49

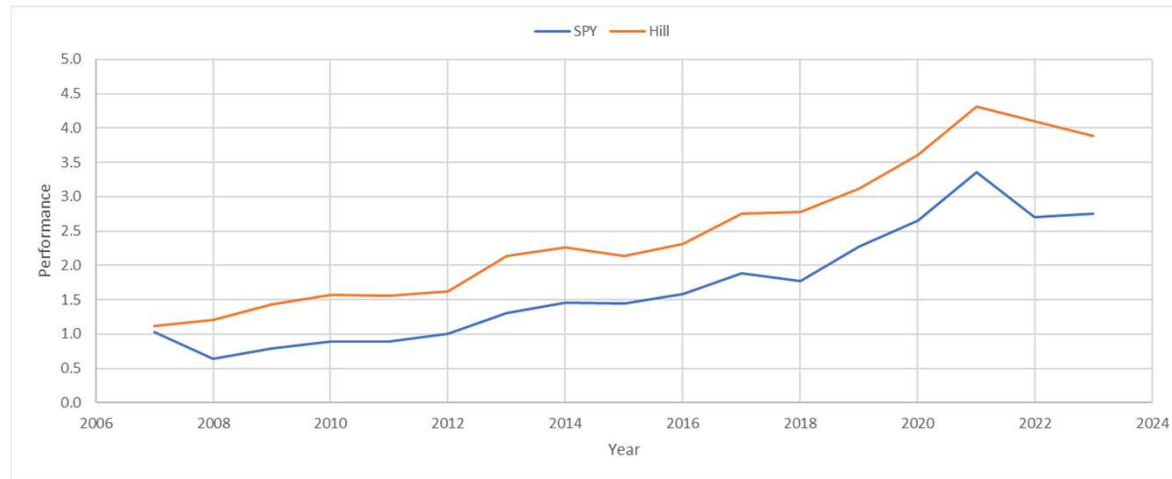
Show 50 entries Only 50 ETFs Search:

AIW	Name	Symbol	StochClose (125,5)	Trend Comp	Trend	Recent Signal	Signal Date	Signal Days	Signal %Change	52-wk Range
AIW	5040 AG Agriculture ETF	DBA	99.8	5	UPtrend		2020/8/25	369	46.10	100
	5010 CM Commodity ETF	DBC	99.2	5	UPtrend		2020/8/6	382	71.60	100
	5040 AG Soybeans		98.7	5	UPtrend		2021/12/27	32	13.90	100
	5050 AG Livestock		98.3	5	UPtrend		2022/1/19	16	7.40	100
	3085 EN MLP ETF	AML	98.2	5	UPtrend		2022/1/10	22	8.90	96
	2200 EW Energy ETF	RYE	97.8	5	UPtrend		2021/9/27	95	29.50	98
	3090 BM Natural Resources ETF	IGE	97.8	5	UPtrend		2021/10/5	89	17.90	100
AIW	5010 EN Energy ETF	DBE	97.6	5	UPtrend		2020/8/25	369	91.40	97

## Monthly and Year Return Breakdown Jan 2007 – 16 Mar 2023

ETF sell rules: Trend Composite < 0 **or** 20% Gain Cutoff

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023 AVG	Median	STD	
SPY	3.4%	-38.2%	23.4%	12.8%	-0.2%	13.5%	29.6%	11.3%	-0.8%	9.6%	19.4%	-6.3%	28.8%	16.2%	27.0%	-19.5%	1.8%	7.8%	11.3%	17.3%
Hill	12.3%	6.8%	18.9%	9.9%	-0.6%	4.2%	31.9%	5.8%	-5.5%	8.1%	19.2%	0.8%	11.9%	16.1%	19.5%	-5.0%	-5.2%	8.8%	8.1%	10.0%



All Weather ETF List (50 ETFs) 1-Jan-2007 to 15-Mar-2022 - No Dividends 14 Equal Weight Positions Signals on Close - Buy/Sell Next Open \$2 Commission - 2.5 bps Slippage											Compound Annual Return (CAR)	Exposure (time invested)	Maximum Drawdown (MDD)	Average of Top 5 Drawdowns	Total Trades	Win Rate	Avg Gain	Avg Loss	Gain/ Loss Ratio	Profit Factor
Buy and Hold SPY (no dividends)											6.40%	100%	-56.40%	30.07%	1					
Trend-StochClose-20%Profit Strategy											8.71%	86%	-14.65%	-11.75%	433	53%	14.38%	-5.91%	2.43	2.31

Profit Factor = Total Dollar Profits/Total Dollar Losses. This is the ex-post reward-to-risk ratio (above 2 is good).

## ETF Strategy – Composite Trend & ATR-Normalized ROC Ranking

A system devised to rank and sell based on the ETF trend *direction*

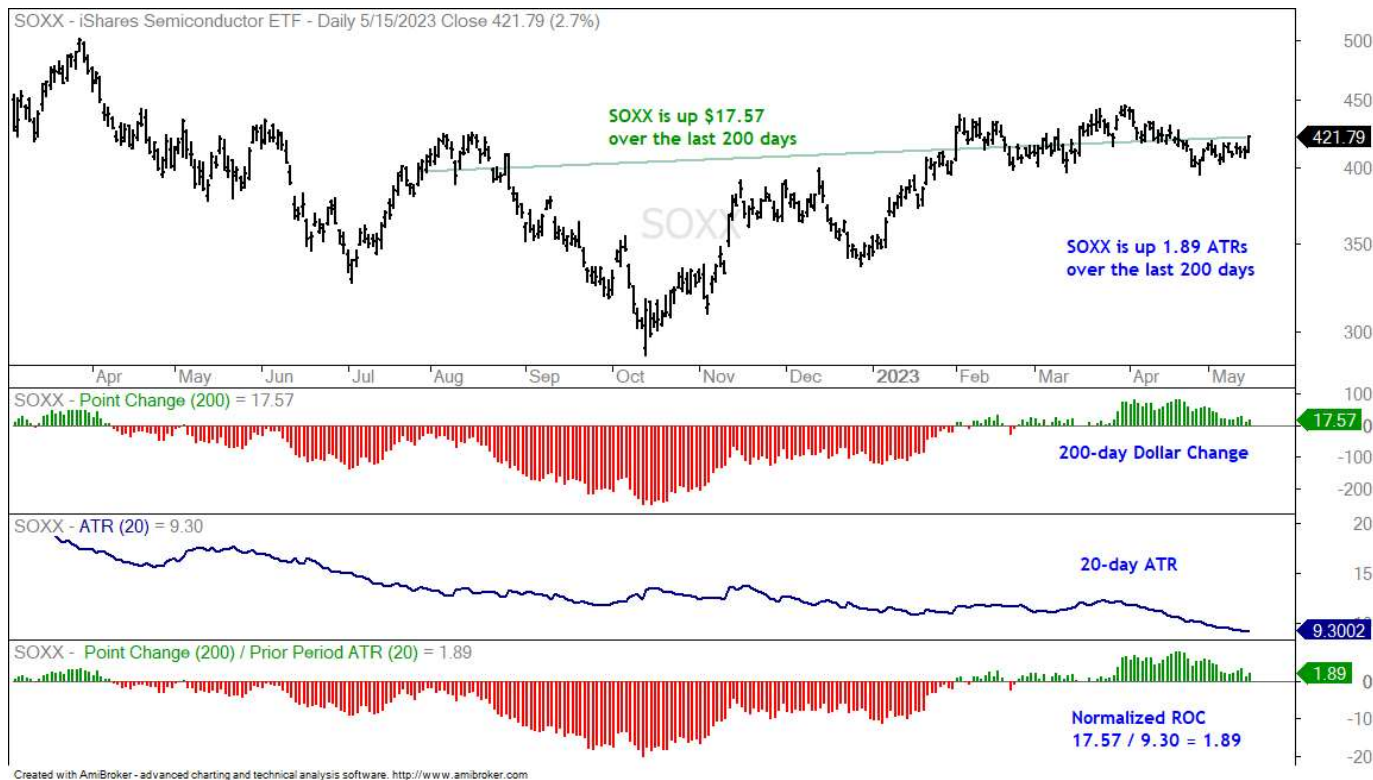
Using on a curated 74 equity ETF universe

[Page Link](#) 7 June 2023

8	11	18	34		3
Index	Style	Sector	Industry		Dividend
SPY	SPHQ	XLK	FDN	QCLN	VIG
RSP	IWF	XLV	IGN	IYT	SDY
MDY	IWD	XLF	SOXX	PBJ	DVY
IJR	IWO	XLI	XSD	IBB	
IWM	IWN	XLV	IGV	XBI	
QQQ	IVW	XLP	ITB	IHF	
DIA	IVE	XLE	XHB	IHI	
IWC	IJK	XLB	XRT	FCG	
	IJJ	XLU	KBE	XES	
	IJT	RCD	KRE	XOP	
	IJS	RHS	KIE	MOO	
		RYE	REM	GDX	
		RYF	IYR	XME	
		RYH	REZ	IGE	
		RGI	ITA	PHO	
		RTM	PPA	IYZ	
		RYT	PBW	SUSA	
		RYU			

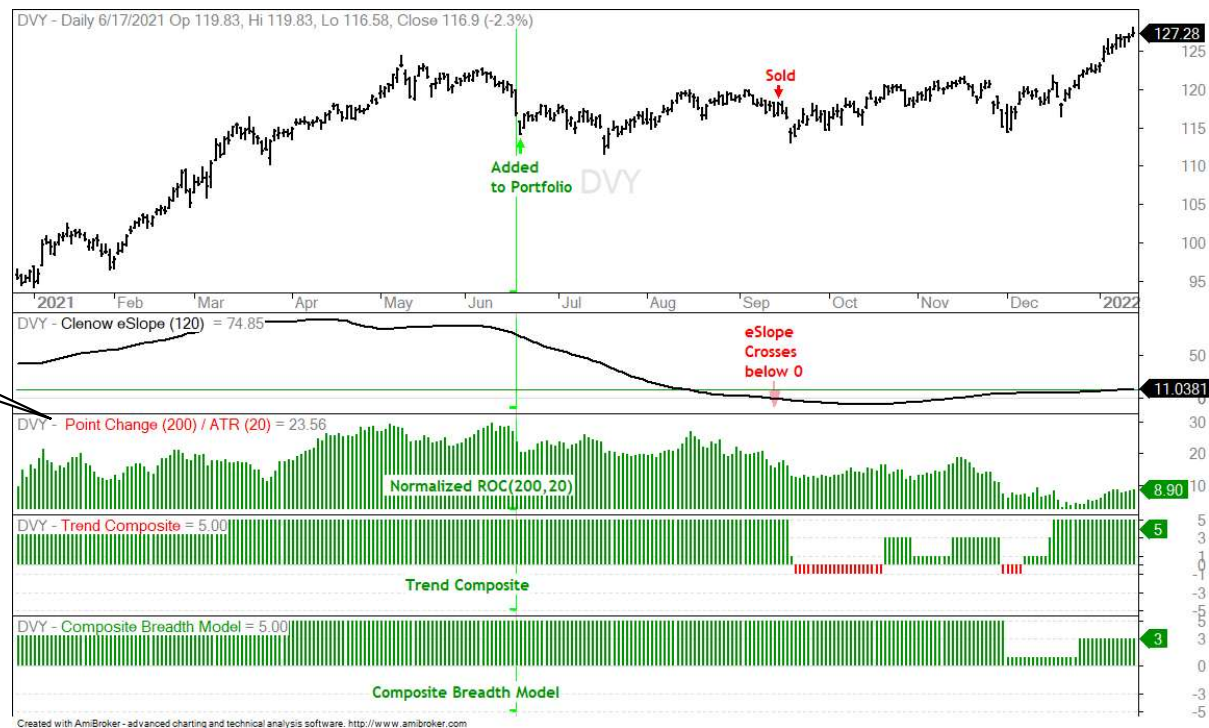
## Normalized ROC = ROC(200) / ATR(20)

- AmiBroker & Optima ROC = (Close - Close n periods ago) is a raw, price-dependent number, expressed in \$
- StockCharts ROC = [(Close - Close n periods ago) / (Close n periods ago)] \* 100 is already normalized, expressed in %
- Arthur Hill's Normalized ATR = ATR / Close = StockCharts' ATRP (in ACP only)
- StockCharts' ATR-Normalized ROC = Absolute ROC / Absolute ATR ≈ StockCharts' ROC / StockCharts' ATRP
- ATR-Normalized ROC turned out to be the best ranking indicator for ETFs, after testing 50+ indicators.



## Momentum Measurement with eSlope

- Defined in **Stocks on the Move: Beating the Market with Hedge Fund Momentum Strategies** Andreas Clenow 2015
- The eSlope is the annualized linear regression of log prices over 120 days, expressed as a magnified oscillator around zero
  - $\text{LinRegSlope}(\ln(\text{Close}), \text{Periods})$
  - $(\exp(\text{LinRegSlope}(\ln(C), \text{Periods}))^{252})$
  - $((\exp(\text{LinRegSlope}(\ln(C), \text{Periods}))^{252}) - 1) * 100$
- Uptrend = eSlope > 0, Buy = eSlope > 10, Sell = eSlope < 0



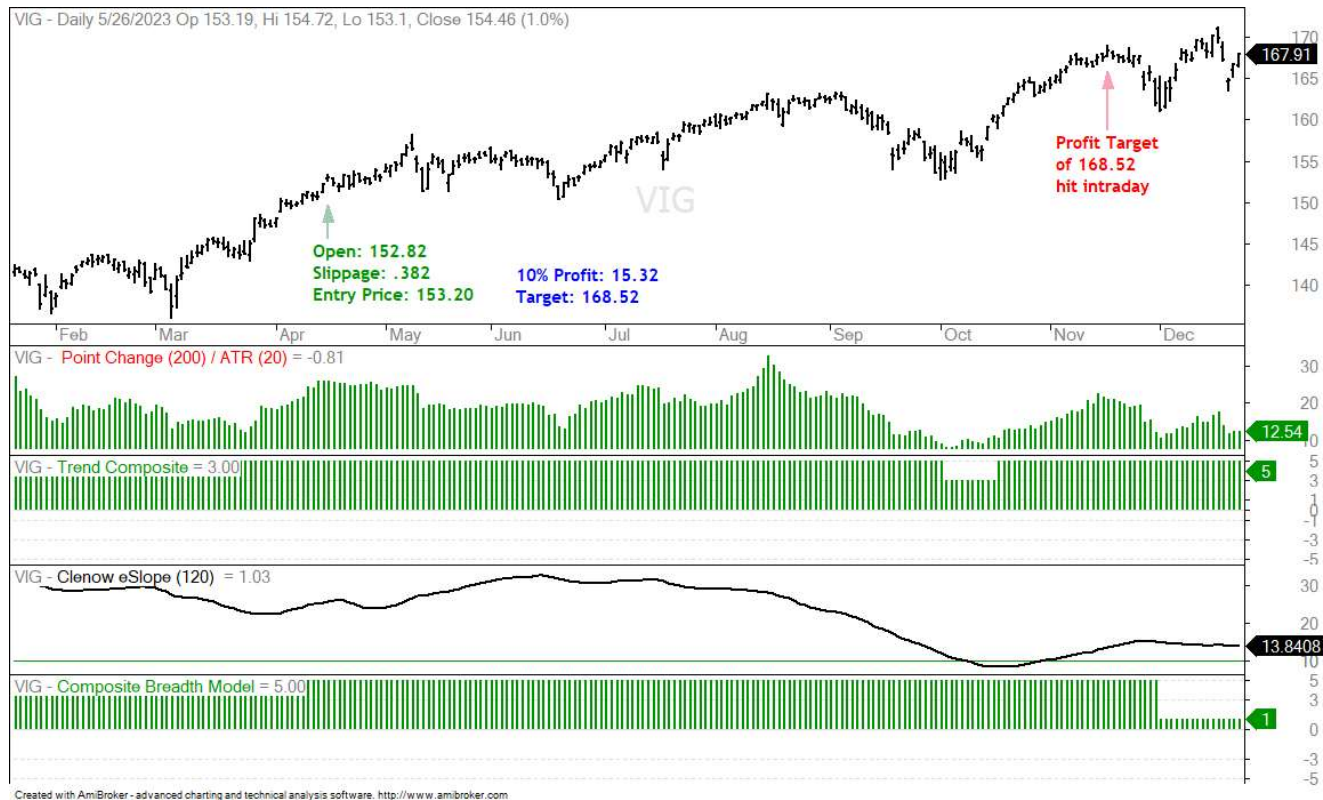


## eSlope Norm ROC entry example



## Introducing a Price Target

- Using a price target improves the win / loss ratio but lowers the average win
- Arthur Hill uses a 10% price target above purchase price



## System Buy / Hold / Sell rules **May 2023** NormROC w/ eSlope, 74 US equity

- Buy signal requires **all** conditions
  - Composite Breadth Model > 0 (bull market)
  - ETF Trend Composite > 0
  - eSlope(120) > 10
  - Buy the best Norm ROC(200,ATR(20))
- Hold as long as
  - The price is below the price target < 110%
  - Is in the top 10 ETFs
- Sell when **any** of the conditions occurs
  - Composite Breadth Model < 0 (bear market)
  - The Price Target is hit (10%)
  - ETF Trend Composite < 0
  - eSlope(120) < 0
  - Drops below the 10<sup>th</sup> position



### Trend Comp, eSlope and Normalized ROC

Portfolio Test - 74 Stock-Based ETFs  
10 Equal Weight Positions  
1-Jan-2007 to 1-May-2023 - No Dividends  
Signals on Close - Buy/Sell Next Open  
Scaling Commissions - 25bps Slippage

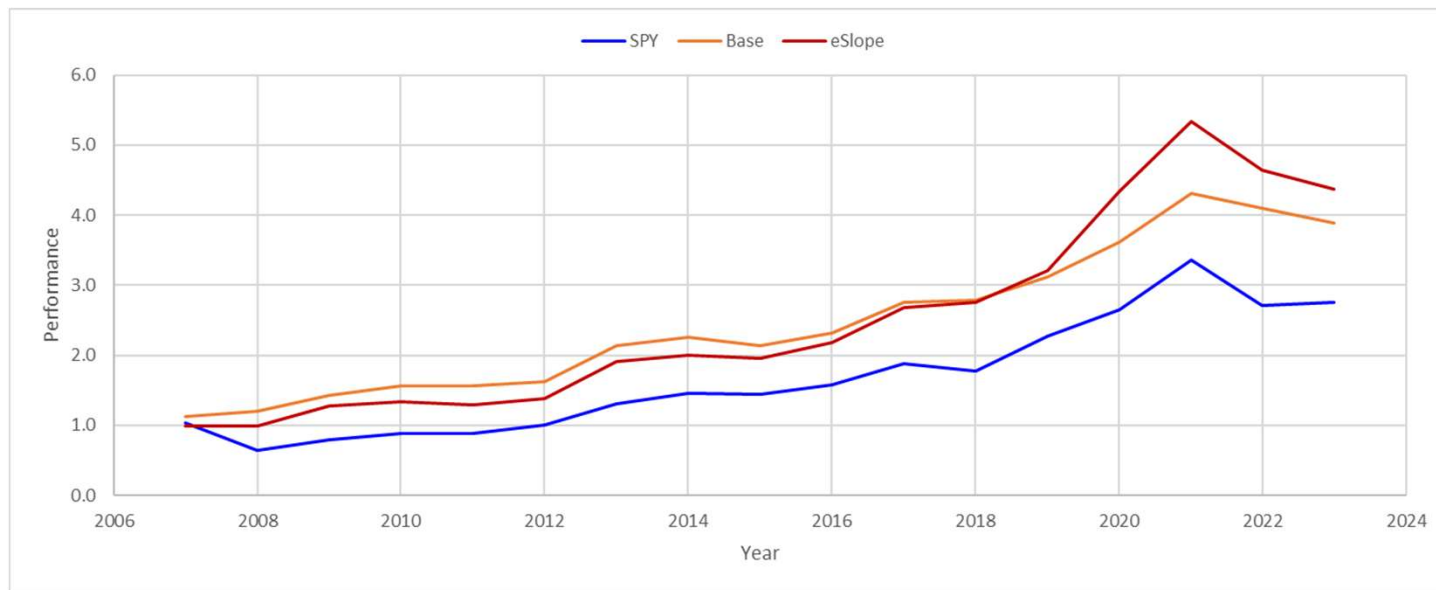
	Compound Annual Return (CAR)	Maximum Drawdown (MDD)	Average of Top 5 Drawdowns	CAR/AverageDD Ratio	Total Trades	Win Rate	Average Gain	Average Loss	Profit Factor
TrendComp, eSlope, Normalized-ROC	9.42%	-21.04%	14.37%	0.66	459	61.4%	9.06%	-5.34%	2.29

**TrendComp, eSlope and Normalized-ROC Strategy with 10% Profit Target**
**Yearly**

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr%
2007	1.2%	-0.4%	0.4%	3.7%	3.3%	-2.4%	-4.1%	-2.1%	0.0%	0.0%	0.0%	0.0%	-0.6%
2008	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2009	0.0%	0.0%	0.0%	0.0%	2.3%	-1.3%	9.8%	1.4%	6.4%	-3.2%	5.4%	5.1%	28.1%
2010	-3.9%	4.3%	6.2%	3.3%	-11.1%	0.0%	0.0%	0.0%	-0.7%	3.5%	0.0%	4.3%	4.7%
2011	0.5%	2.8%	1.4%	3.5%	-0.8%	-2.4%	-3.4%	-4.4%	0.0%	0.0%	0.0%	0.0%	-3.0%
2012	-0.2%	3.1%	2.8%	0.4%	-3.3%	3.5%	0.5%	1.4%	1.7%	-3.2%	-0.2%	0.4%	6.8%
2013	7.5%	0.8%	5.1%	0.8%	3.2%	-0.9%	5.6%	-2.9%	4.5%	3.8%	3.7%	1.8%	38.0%
2014	-1.8%	5.5%	-1.4%	-1.2%	2.7%	1.8%	-2.0%	3.6%	-1.8%	-3.5%	3.9%	-0.3%	5.0%
2015	0.2%	4.1%	0.5%	-3.0%	4.8%	0.0%	2.9%	-10.4%	0.0%	0.0%	0.0%	0.0%	-1.9%
2016	0.0%	0.0%	0.0%	3.2%	-0.2%	5.7%	1.9%	-3.6%	0.6%	-4.7%	6.9%	1.6%	11.5%
2017	1.3%	3.5%	-0.4%	1.0%	1.8%	-1.1%	3.3%	1.6%	1.9%	4.4%	2.9%	0.1%	22.2%
2018	6.3%	-3.0%	-1.9%	0.0%	3.9%	-0.4%	2.0%	6.0%	-1.4%	-7.7%	0.0%	0.0%	2.9%
2019	0.0%	-0.4%	0.1%	2.2%	-2.7%	6.0%	2.4%	3.0%	0.3%	1.3%	1.7%	1.5%	16.4%
2020	2.5%	-4.5%	0.0%	0.0%	0.0%	2.5%	6.0%	9.1%	-2.8%	-0.9%	14.4%	6.0%	35.7%
2021	0.8%	4.1%	3.4%	5.2%	0.8%	-0.5%	0.9%	2.6%	-4.3%	5.9%	-2.2%	4.7%	22.8%
2022	-6.4%	-0.1%	-0.6%	2.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-8.4%	-13.1%
2023	1.2%	-3.8%	-3.4%	-0.1%	0.2%								-5.9%
Avg	0.5%	0.9%	0.7%	1.2%	0.3%	0.6%	1.6%	0.3%	0.3%	-0.3%	2.3%	1.1%	11.0%

**Green Shading: Up 3% or more (53 months or 27%) Red Shading: Down 3% or more (19 months or 9.7%)**

**ETF Strategies Performance Comparison May 2023 (3/4)**  
StochClose, 50 All Weather **vs.** NormROC w/ eSlope, 74 US equity





## Daily vs. Weekly Trading **May 2023 (4/4)**

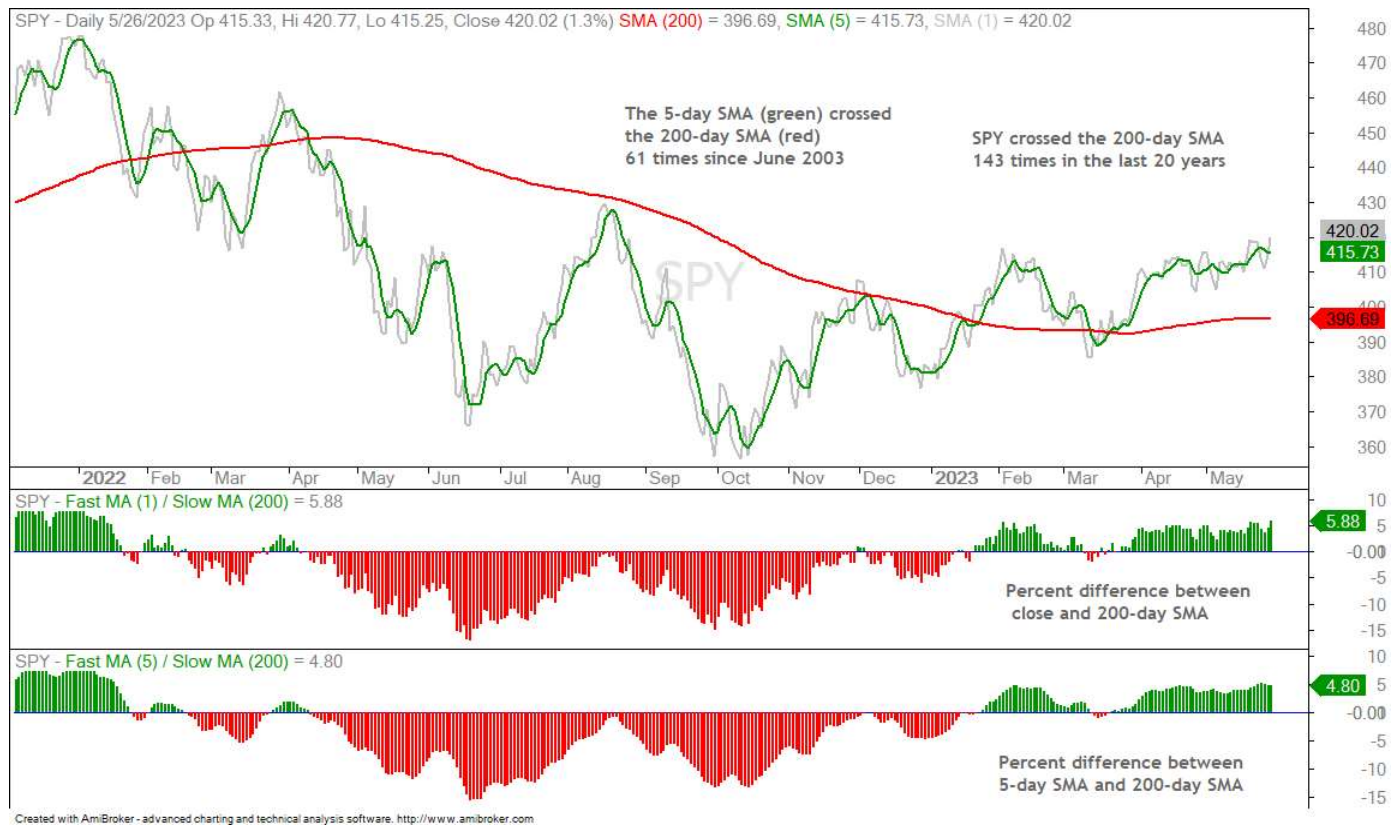
NormROC w/ eSlope + Trend Momentum, 74 US equity



TrendComp, eSlope & Normalized-ROC Portfolio Tests - 74 Stock-Based ETFs 10 Equal Weight Positions - <b>Daily vs Weekly</b> 1-Jan-2007 to 1-May-2023 - No Dividends Signals on Close - Buy/Sell Next Open Scaling Commissions - 25bps Slippage										
	Compound Annual Return (CAR)	Maximum Drawdown (MDD)	Average of Top 5 Drawdowns	CAR/ AverageDD Ratio	Total Trades	Win Rate	Average Gain	Average Loss	Profit Factor	
Daily Trading	9.42%	-21.04%	14.37%	0.66	459	61.4%	9.06%	-5.34%	2.29	
Weekly Trading (first day of week)	9.82%	-17.33%	14.20%	0.69	444	65.1%	9.00%	-5.96%	2.39	

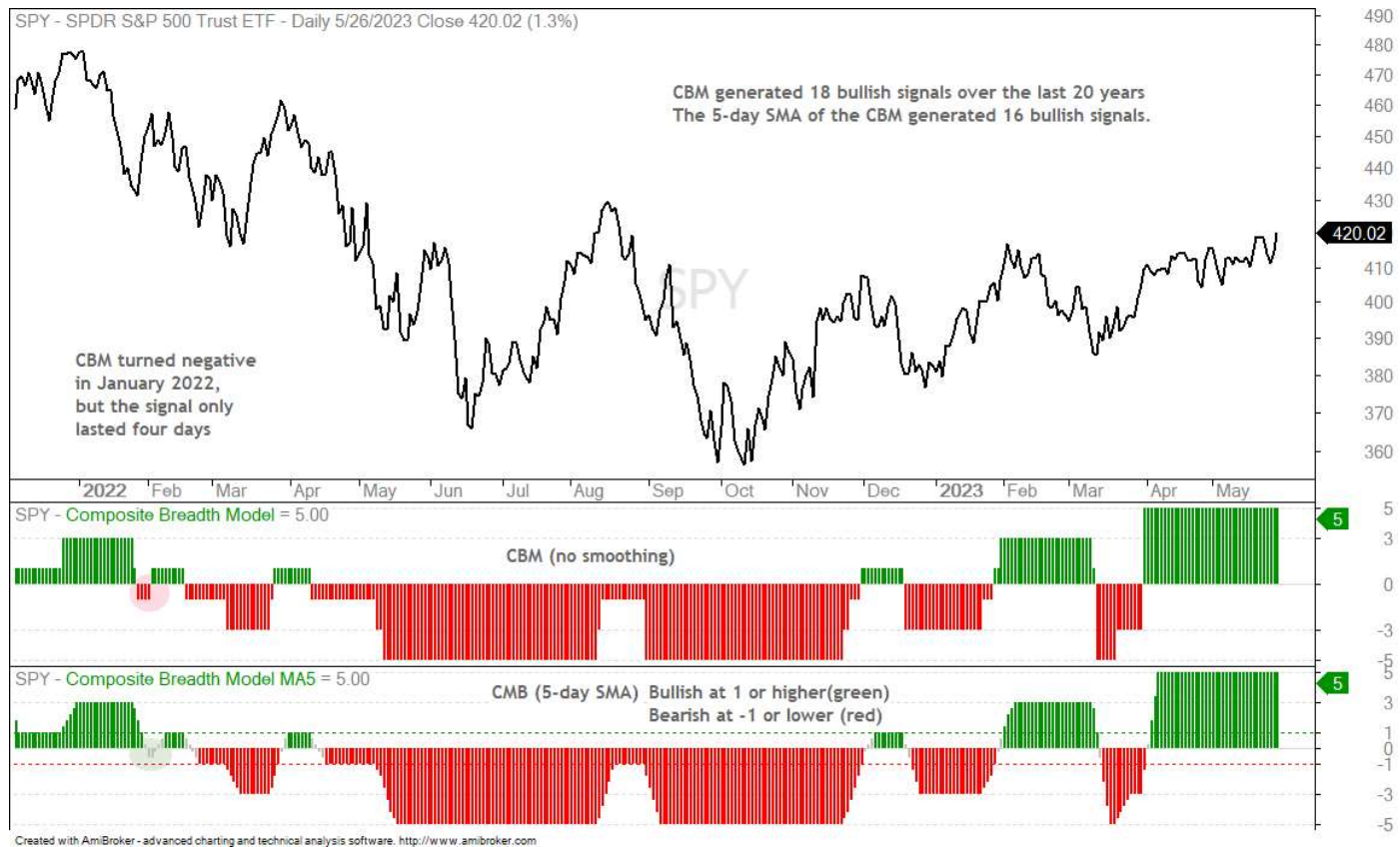
## Smoothing the CBM w/ 5-day SMA (1/3)

### Reducing whipsaws, Improving Performance



## Smoothing the CBM w/ 5-day SMA (2/3)

### Reducing whipsaws, Improving Performance



## Smoothing the CBM w/ 5-day SMA (3/3) May 2023

Reducing whipsaws, Improving Performance

Weekly Trading

TrendComp, eSlope & Normalized-ROC Portfolio Tests - 74 Stock-Based ETFs 10 Equal Positions - <b>CBM vs CBM MA5</b> 1-Jan-2007 to 1-May-2023 - No Dividends Signals on Close - Buy/Sell Next Open Scaling Commissions - 25bps Slippage	Compound Annual Return (CAR)	Maximum Drawdown (MDD)	Average of Top 5 Drawdowns	CAR/ AverageDD Ratio	Total Trades	Win Rate	Average Gain	Average Loss	Profit Factor
CBM: BullMkt > 0 BearMkt < 0	9.82%	-17.33%	14.20%	0.69	444	65.1%	9.00%	-5.96%	2.39
CBM 5-day SMA: BullMkt >= 1 BearMkt <= -1	10.37%	-16.46%	13.56%	0.76	451	65.4%	9.06%	-5.83%	2.49

5d SMA CBM  
Smoothing

TrendComp, eSlope & Normalized-ROC Portfolio Tests - 74 Stock-Based ETFs 10 Equal Weight Positions - <b>Daily vs Weekly</b> 1-Jan-2007 to 1-May-2023 - No Dividends Signals on Close - Buy/Sell Next Open Scaling Commissions - 25bps Slippage	Compound Annual Return (CAR)	Maximum Drawdown (MDD)	Average of Top 5 Drawdowns	CAR/ AverageDD Ratio	Total Trades	Win Rate	Average Gain	Average Loss	Profit Factor
Daily Trading (CBM MA5)	10.16%	-15.06%	13.14%	0.77	471	64.8%	8.87%	-5.89%	2.47
Weekly Trading (CBM SMA5)	10.37%	-16.46%	13.56%	0.76	451	65.4%	9.06%	-5.83%	2.49

Just like weekly vs. daily trading, introduction of CBM smoothing did **not** reduce performance. It improved the daily trading.

**Smoothed CBM August 2023 (1/4)**  
**NormROC, eSlope & Trend Momentum , Daily or Weekly Trading**

Trend Momentum Strategy with 10% Profit Target (74 stock ETFs) - 1-Jan-2007 to 2-Aug-2023 10 Equal Weight Positions - No Dividends Signals on Close - Buy/Sell Next Open Scaling Commission - .125% Slippage per Trade	Compound	Exposure	Maximum	Average of	Total	Win	Avg	Avg	Gain/	Profit
	Annual Return (CAR)	(time fully invested)	Drawdown (MDD)	Top 5 Drawdowns	Trades	Rate	Gain	Loss	Loss Ratio	Factor
Daily Trading	10.41%	70%	-14.83%	-13.11%	490	65%	8.82%	5.89%	1.50	2.49
Weekly Trading	10.85%	69%	-16.33%	-13.50%	465	66%	9.10%	-5.88%	1.55	2.53

Profit Factor = Total Dollar Profits/Total Dollar Losses. This is the ex-post reward-to-risk ratio (above 2 is good).



Smoothed CBM August 2023 (2/4)  
NormROC, eSlope & Trend Momentum , Daily or Weekly Trading



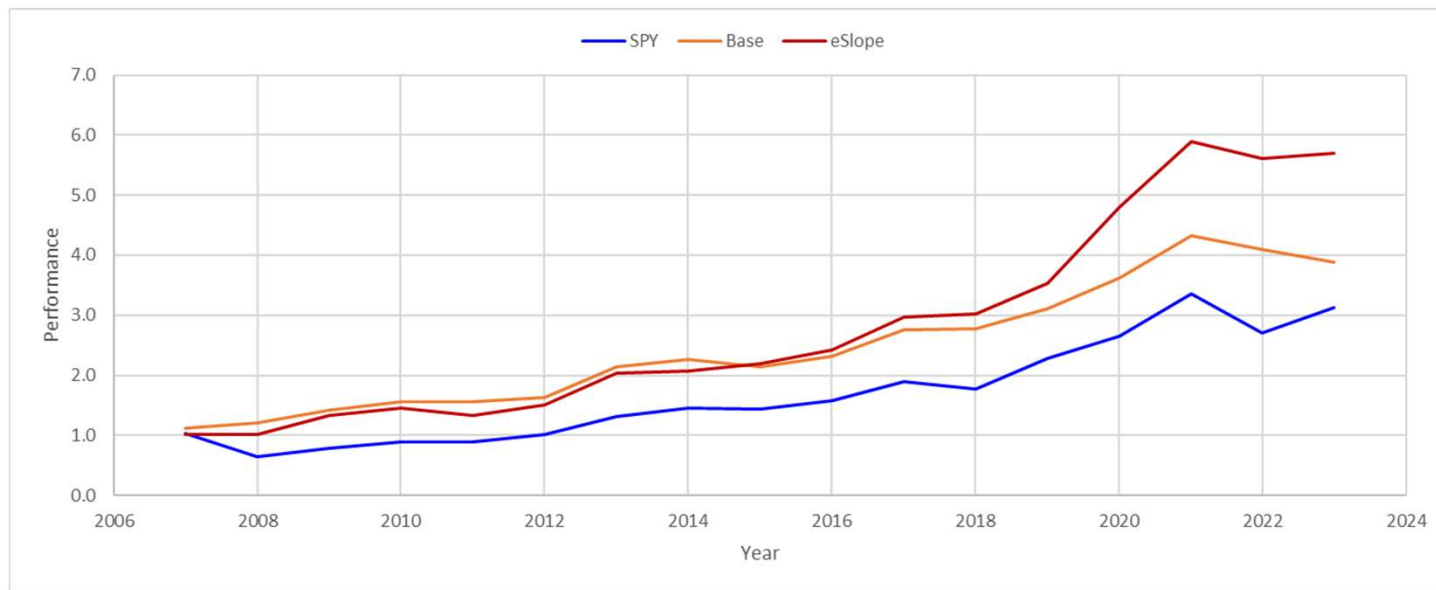
## Smoothed CBM August 2023 (3/4)

### NormROC, eSlope & Trend Momentum , Daily or Weekly Trading

Trend-Momentum Strategy Trading 74 Stock-Based ETFs													Yearly
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr%
2007	1.2%	-0.3%	0.8%	3.8%	3.0%	-2.6%	-3.7%	-0.3%	0.0%	0.0%	0.0%	0.0%	1.7%
2008	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2009	0.0%	0.0%	0.0%	0.0%	4.2%	-1.6%	8.2%	2.1%	6.8%	-1.4%	5.2%	4.8%	31.4%
2010	-4.1%	4.3%	6.0%	3.5%	-6.5%	-1.1%	0.0%	0.0%	-0.7%	3.7%	0.4%	4.4%	9.5%
2011	0.7%	2.7%	2.0%	2.4%	-0.6%	-1.7%	-2.8%	-11.6%	0.0%	0.0%	0.0%	0.0%	-9.3%
2012	0.1%	2.8%	3.7%	0.3%	-3.6%	3.9%	0.7%	2.7%	2.5%	-1.2%	1.0%	0.2%	13.7%
2013	6.5%	0.8%	5.1%	1.1%	2.7%	-0.8%	5.7%	-2.9%	3.4%	3.8%	3.8%	1.6%	35.2%
2014	-1.8%	5.0%	-1.5%	-1.0%	2.5%	1.8%	-2.8%	4.0%	-1.7%	-5.8%	3.5%	-0.3%	1.4%
2015	0.6%	4.9%	0.3%	-2.6%	5.1%	0.2%	4.4%	-6.3%	0.0%	0.0%	0.0%	0.0%	6.3%
2016	0.0%	0.0%	0.6%	2.0%	-0.2%	5.7%	2.0%	-3.6%	0.4%	-4.9%	7.4%	0.9%	10.3%
2017	1.1%	3.8%	-0.3%	1.5%	1.9%	-1.4%	3.9%	2.1%	1.9%	3.2%	2.5%	0.1%	22.2%
2018	5.2%	-3.3%	-2.3%	0.3%	4.0%	-0.4%	2.2%	5.4%	-0.8%	-7.3%	0.0%	0.0%	2.2%
2019	0.0%	-0.4%	0.2%	2.4%	-3.1%	5.8%	2.0%	3.0%	1.7%	0.7%	1.6%	1.6%	16.4%
2020	2.2%	-7.8%	-1.5%	0.0%	0.0%	3.3%	5.6%	9.2%	3.3%	-1.7%	14.2%	5.8%	35.9%
2021	1.8%	3.6%	3.8%	4.5%	0.9%	-0.1%	1.0%	2.0%	-4.5%	5.2%	-2.5%	5.4%	22.7%
2022	-4.0%	1.1%	0.0%	-4.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.0%	-4.8%
2023	0.0%	-3.5%	-5.7%	3.9%	-4.4%	8.2%	3.9%	-2.3%					1.6%
Avg	0.6%	0.8%	0.7%	1.0%	0.4%	1.1%	1.8%	0.4%	0.8%	-0.4%	2.3%	1.7%	

Green Shading: Up 3% or more (51 months or 25.63%) Red Shading: Down 3% or more (19 months or 9.55%)

**Smoothed CBM August 2023 (4/4)**  
**NormROC, eSlope & Trend Momentum , Daily or Weekly Trading**



## Recap for the Trend Momentum & Profit Target Strategy

- **Buy** Signal requires **all** conditions –
  - 5-day SMA of the Composite Breadth Model  $> 0$  (Bull Market)
  - The ETF's Trend Composite  $> 0$
  - The ETF's eSlope(120)  $> 10$
  - Select the **10** ETFs w/ the highest ATR-Normalized ROC(200,20)
- **Hold** as long as
  - The price is below the price target  $< 110\%$
  - Is in the top **10** ETFs
- **Sell** when **any** of the conditions occurs
  - 5-day SMA of the Breadth Composite  $< 0$  (Bear Market)
  - The Price Target is Hit (**10**%)
  - Trend Composite  $< 0$
  - eSlope(120)  $< 0$
  - Drops below the 10<sup>th</sup> position

This table is updated the day after every trading day.

## Trend Momo Profit Strategy for Stock ETFs (close: Wednesday 4-Oct-2023)

Column visibility ▾

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Search:

Nos	Sort Prefix & Name	↕ Sym ↕	Composite Breadth Model MA5	Trend Composite	eSlope 120	Eligibility to Buy	Normalized ROC(200,20)	Exit Signal within last 5-Days	Chart Link
1	1015 Nasdaq 100 Trust	QQQ	-0.20	+5	38.93	Eligible	15.19	-	<a href="#">QQQ</a>
2	3010 TE Software	IGV	-0.20	+5	47.90	Eligible	13.68	-	<a href="#">IGV</a>
3	2010 Technology	XLK	-0.20	+5	32.06	Eligible	13.06	-	<a href="#">XLK</a>
4	1040 Russell 1000 Growth	IWF	-0.20	+5	31.03	Eligible	12.27	-	<a href="#">IWF</a>
5	3010 TE Internet	FDN	-0.20	+5	41.17	Eligible	11.08	-	<a href="#">FDN</a>
6	1044 S&P 500 Growth	IVW	-0.20	+5	24.87	Eligible	10.41	-	<a href="#">IVW</a>
7	1031 S&P 500 High Quality	SPHQ	-0.20	+5	22.63	Eligible	9.84	-	<a href="#">SPHQ</a>



Nos	Sort Prefix & Name	↕ Sym ↕	Composite Breadth Model MA5	Trend Composite	eSlope 120	Eligibility to Buy	Normalized ROC(200,20)	Exit Signal within last 5-Days	Chart Link
20	2200 EW Energy	RSPG	-0.20	+5	51.68	Eligible	0.13	-	<a href="#">RSPG</a>
21	3090 BM Metals & Mining	XME	-0.20	+3	20.15	Eligible	0.12	-	<a href="#">XME</a>
22	3080 EN Oil&Gas Explor&Prod	XOP	-0.20	+5	69.11	Eligible	-0.21	-	<a href="#">XOP</a>
23	3090 BM Natural Resources	IGE	-0.20	+5	26.92	Eligible	-0.59	-	<a href="#">IGE</a>
24	3080 EN Natural Gas Index	FCG	-0.20	+5	54.76	Eligible	-1.26	-	<a href="#">FCG</a>
25	3010 TE Semiconductor	XSD	-0.20	-3	19.79	-	3.78	-	<a href="#">XSD</a>
26	1045 S&P 500 Value	IVE	-0.20	-3	13.04	-	3.71	Exit	<a href="#">IVE</a>
27	1046 S&P 400 MidCap Growth	IJK	-0.20	-1	14.42	-	1.86	Exit	<a href="#">IJK</a>
28	3040 IN Aerospace Defense	PPA	-0.20	-5	7.62	-	1.51	-	<a href="#">PPA</a>
29	2200 EW Consumer Discretionary	RSPD	-0.20	-5	7.72	-	1.29	-	<a href="#">RSPD</a>
30	2040 Industrials	XLI	-0.20	-1	16.57	-	1.20	Exit	<a href="#">XLI</a>
31	3095 UT Water Resources	PHO	-0.20	-3	11.45	-	1.02	-	<a href="#">PHO</a>
32	1042 Russell 2000 Growth	IWO	-0.20	-5	7.47	-	0.42	-	<a href="#">IWO</a>
33	3900 DV Dividend Appreciation	VIG	-0.20	-3	8.47	-	0.37	Exit	<a href="#">VIG</a>
34	1012 S&P 400 MidCap	MDY	-0.20	-5	12.22	-	-0.10	Exit	<a href="#">MDY</a>
35	1016 Dow Jones Industrials	DIA	-0.20	-3	7.49	-	-0.55	Exit	<a href="#">DIA</a>
36	1048 S&P 600 SmallCap Growth	IJT	-0.20	-3	15.17	-	-1.02	Exit	<a href="#">IJT</a>

## ETF Mean Reversion Strategy

[Page Link](#) 12 Jan 2023

- Applicable at any Market Regime (CBM is not applicable)
- Short Term, Hit & Run Trading System, **limited to 5 days**
- Arthur Hill uses a proprietary indicator – Relative ROC
- **Buy** with **all** the requirements
  - A strong pull back - Relative ROC < -150,-200,-250 [analogous to RSI(10) < 30, 25,20]
  - In an uptrend - eSlope(100) > 10
  - Volatile –  $100 * \text{ATR}(5) / \text{SMA}(5) > 1$
  - Liquid –  $\text{SMA}(65, \text{volume} * \text{price}) > 10$  million
  - **Buy** - Set a Buy Limit = **Low** –  $0.4 * \text{ATR}(22)$  for the next day only
  - Max 5 equal positions, rank by  $\text{ATR}(5) / \text{SMA}(5)$
- **Sell** with **any** of the requirements, fill the next day
  - Strong Bounce -  $\text{RSI}(2) > 70$  at the close
  - Decaying Momentum -  $\text{eSlope}(100) < 10$
  - Stale Trade – reaches 5 days long

Setup





## ETF Mean Reversion Back Testing 1/6

**138 ETF Universe** - AGG, BWX, CGW, CUT, DBA, DBB, DBC, DBE, DIA, DVY, ECH, EEM, EFA, EMB, EWA, EWC, EWD, EWG, EWH, EWI, EWJ, EWK, EWL, EWM, EWN, EWP, EWQ, EWS, EWT, EWU, EWW, EWY, EWZ, EZA, EZU, FCG, FDN, FEZ, FXA, FXB, FXC, FXE, FXF, FXI, FXY, GDX, GLD, HYG, IBB, IEF, IEI, IGE, IGN, IGV, IHF, IHI, IJJ, IJK, IJR, IJS, IJT, ILF, ITA, ITB, IVE, IVW, IWC, IWD, IWF, IWM, IWN, IWO, IYR, IYT, IYZ, JNK, KBE, KIE, KRE, LQD, MBB, MDY, MOO, MUB, PBD, PBJ, PBW, PCY, PFF, PHO, PPA, PSP, QCLN, QQQ, RCD, REM, REZ, RSPC, RSPR, RSPD, RSPN, RSPS, RSPM, RSPG, RSPF, RSPH, RSPT, RSPU, SCZ, SDY, SHY, SLV, SLX, SOXX, SPHQ, SPIP, SPY, SUSL, TIP, TLT, USO, UUP, VIG, VPL, XBI, XES, XHB, XLB, XLE, XLF, XLI, XLK, XLP, XLU, XLV, XLY, XME, XOP, XRT, XSD

### Testing Criteria

- Starting account size is \$100,000
- 5 Equal Weight Positions (20% each)
- Commissions are \$2 per trade
- Dividends are NOT included
- Signals generated on the close
- Trades executed on the next open

Note – The system tends to **cluster**: Extended periods w/o setup & trades, vs. short periods w/ multiple trades. Trades mostly during volatile bounce backs.



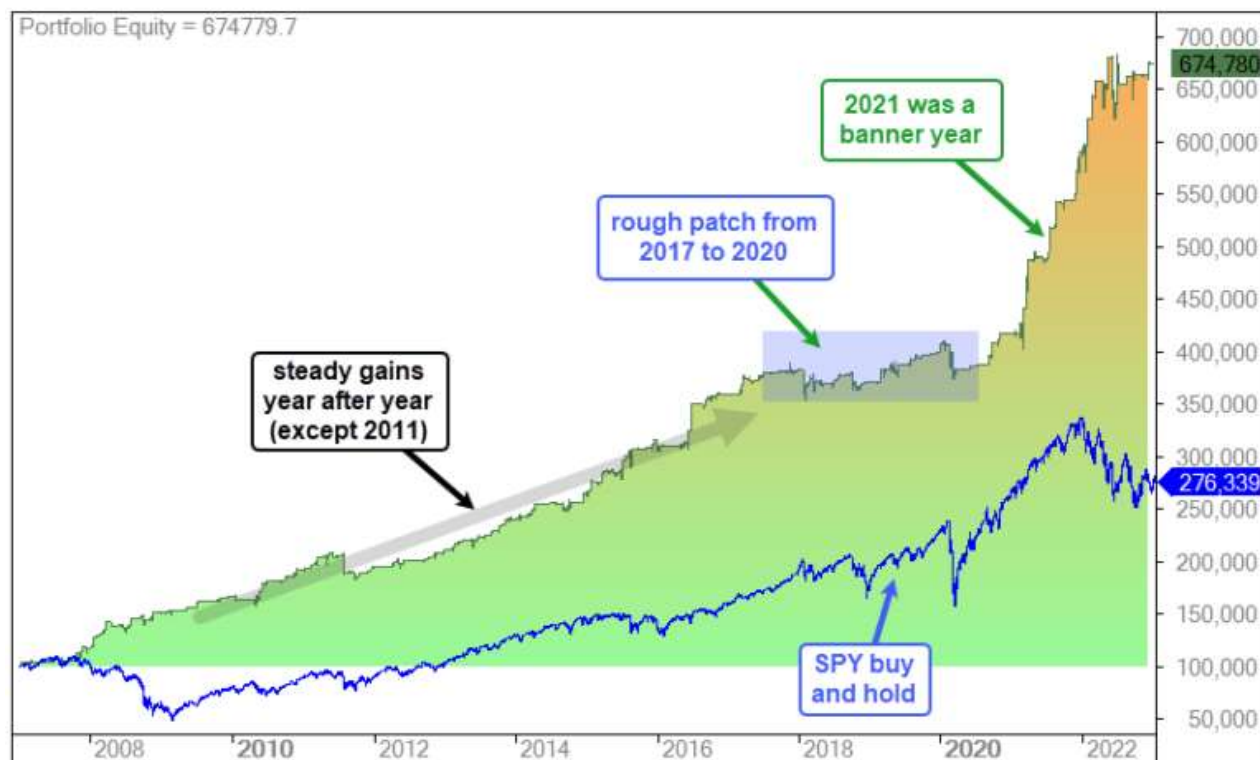
## ETF Mean Reversion Strategy Backtesting (2/6)



Mean-Reversion Strategy for ETFs 1/1/2007 to 12/31/2022 5 Equal Weight Positions (20%) Signals on Close. Entry-Exit Next Day \$2 per Trade Commission - No Dividends										
	Expo sure	Compound Annual Return (CAR)	Maximum Drawdown (MDD)	Average of Top 5 Draw- downs	CAR/ Avg DD5	Total Trades	Win Rate	Average Gain	Average Loss	Profit Factor
Relative ROC Strategy (137 ETFs)	15%	12.67%	-12.29%	9.06%	1.40	776	69%	3.14%	-2.80%	2.35

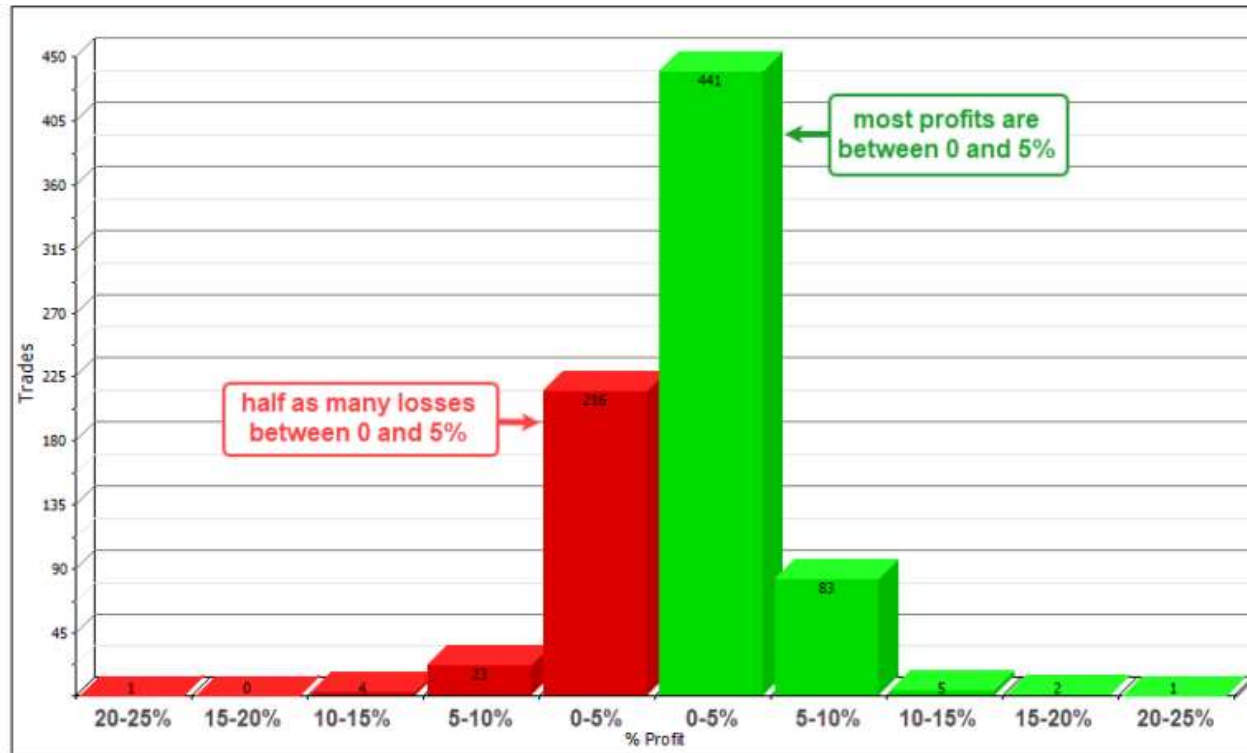
## ETF Mean Reversion Strategy Backtesting (3/6)

### 1. Portfolio Equity Copy



## ETF Mean Reversion Strategy Backtesting (4/6)

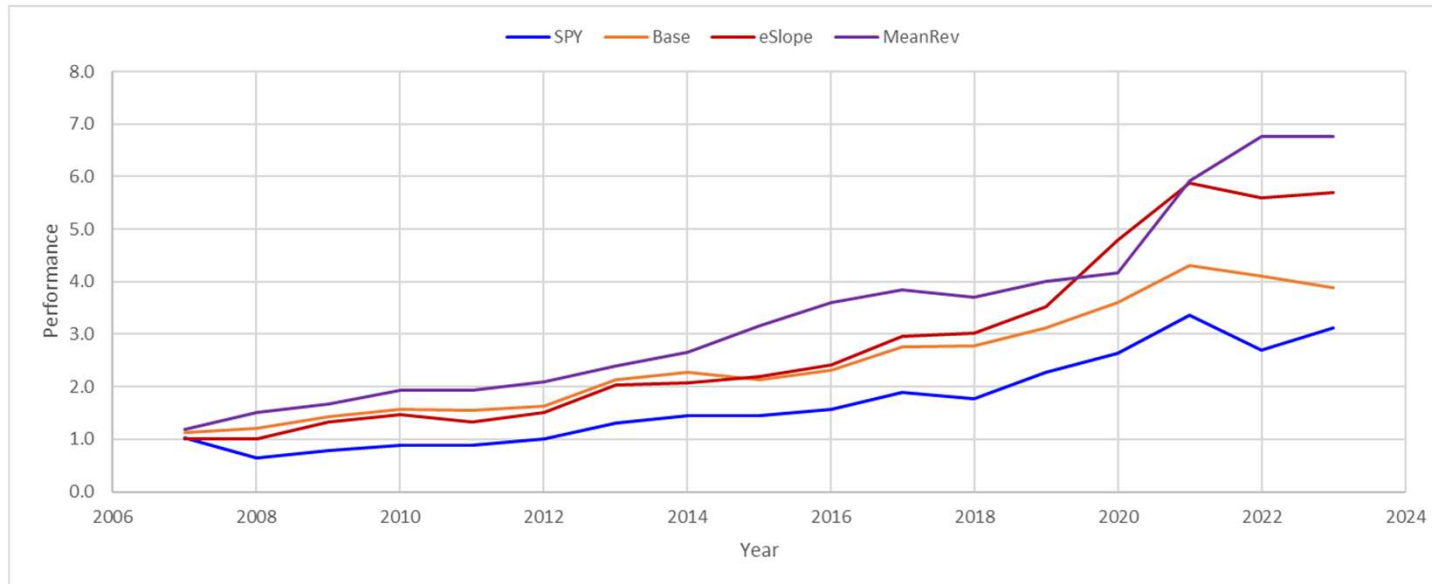
Profit distribution



### ETF Mean Reversion Strategy Backtesting (5/6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr%
2007	3.70%	-0.30%	1.20%	0.00%	0.50%	2.70%	-2.80%	0.20%	0.00%	7.20%	4.90%	-0.30%	18.00%
2008	8.80%	1.50%	9.10%	-1.00%	-0.40%	-3.30%	7.10%	0.00%	1.50%	-1.70%	4.60%	0.00%	28.40%
2009	0.20%	-0.50%	1.80%	0.00%	2.10%	0.00%	3.60%	0.00%	0.00%	-0.40%	2.40%	1.00%	10.50%
2010	-2.60%	0.40%	0.00%	0.00%	4.20%	3.60%	2.60%	0.00%	0.40%	2.00%	1.30%	2.30%	15.00%
2011	0.40%	2.40%	3.30%	0.70%	1.00%	-1.40%	2.00%	-8.90%	-3.20%	2.60%	0.40%	2.40%	0.90%
2012	0.00%	0.60%	0.00%	2.40%	-1.30%	1.80%	0.00%	0.00%	0.60%	1.00%	2.00%	0.80%	8.00%
2013	0.80%	3.00%	0.40%	0.50%	-2.70%	4.70%	-0.60%	1.30%	1.60%	3.00%	2.20%	-0.20%	14.60%
2014	0.20%	0.90%	1.40%	3.10%	0.00%	0.20%	0.50%	-0.20%	-3.00%	3.30%	0.20%	3.40%	10.40%
2015	0.90%	2.90%	3.00%	0.30%	0.10%	0.20%	4.90%	2.20%	0.30%	0.00%	0.10%	2.50%	18.90%
2016	-1.70%	0.00%	0.00%	0.00%	0.80%	11.60%	0.20%	-1.00%	2.70%	0.50%	0.60%	0.00%	14.00%
2017	0.00%	0.00%	4.30%	0.10%	-0.90%	1.00%	0.90%	0.20%	0.40%	-0.50%	0.10%	0.90%	6.70%
2018	-0.70%	-3.40%	0.30%	0.30%	-0.10%	-0.30%	2.00%	0.30%	0.70%	-3.60%	1.00%	0.30%	-3.40%
2019	0.00%	0.30%	2.80%	1.10%	-2.60%	2.80%	0.00%	2.50%	-0.60%	0.60%	0.30%	0.50%	7.80%
2020	0.30%	-4.20%	-0.10%	0.00%	0.00%	0.60%	0.40%	0.00%	5.40%	-0.60%	2.70%	0.00%	4.30%
2021	-0.60%	0.50%	15.40%	1.10%	0.90%	-0.60%	6.30%	4.80%	-0.30%	0.70%	-0.10%	8.60%	41.80%
2022	4.50%	4.00%	2.40%	-2.60%	6.10%	-6.60%	3.10%	1.20%	-0.60%	0.70%	0.00%	1.70%	14.20%
Avg	0.90%	0.50%	2.80%	0.40%	0.50%	1.10%	1.90%	0.20%	0.40%	0.90%	1.40%	1.50%	

## ETF Mean Reversion Strategy Backtesting (6/6)



System	CAGR
SPY B&H	6.9%
Base	8.3%
eSlope	10.8%
Mean Rev	11.9%



## ETF Mean Reversion Strategy (1/2)

Extending the Universe, Reducing the history  
275 ETFs; Backtesting to Jan 2020



## ETF Mean Reversion Strategy (2/2)

Extending the Universe, Reducing the history

ETF Mean Reversion Strategy 1-Jan-2017 to 8-Mar-2022 Signals on Close - Entry/Exit Next Day Entry Price=Buy Limit Exit Price= Open \$2 Commission Per Trade No Dividends	Compound Annual Return (CAR)	Exposure (time invested)	Maximum Drawdown (MDD)	Average of Top 5 Drawdowns	Total Trades	Fill Rate	Win Rate	Avg Gain	Avg Loss	Gain/ Loss Ratio	Profit Factor
Buy and Hold SPY (no dividends)	9.70%	100%	-34.09%	-19.91%	1						
138 ETFs (U138) - 5 Equal Positions (20%)	18.52%	15.42%	-9.24%	-6.91%	161	39%	66%	4.18%	-3.06%	1.37	2.58
275 ETFs (U275) - 10 Equal Positions (10%)	17.35%	20.42%	-16.53%	-8.45%	415	37%	66%	4.04%	-3.97%	1.02	1.98

**Profit Factor** = Total Profits/Total Losses. An ex-post reward-to-risk ratio greater than 2 is good. **Fill Rate**: percentage of setups that resulted in trades (hit Buy Limit the next day)

### Mean-Reversion Strategy: 275 ETFs w/ Data to 2016 - 10 Equal Weight Positions

Last Close: 08-Mar-23

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr%
2020	-4.2%	-3.7%	-5.8%	0.0%	0.9%	0.7%	0.4%	1.2%	4.3%	-0.6%	3.1%	0.5%	-3.7%
2021	0.0%	1.3%	17.0%	1.8%	-0.6%	-1.0%	7.1%	5.3%	-0.3%	0.4%	-2.2%	9.2%	43.1%
2022	0.1%	3.5%	1.9%	-2.5%	6.2%	-4.0%	6.1%	0.6%	0.5%	2.2%	0.0%	1.3%	16.5%
2023	1.0%	2.2%	0.3%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.5%
Avg	-0.8%	0.9%	3.3%	-0.2%	2.1%	-1.4%	4.5%	2.3%	1.5%	0.7%	0.3%	3.7%	

Open Buy Limit Orders only to the extent of available positions ( $\leq 10$  or  $\leq 5$ )

## ETF Mean Reversion Setups (last close: Thursday, 9-Feb-23)

Column visibility

Default sort puts ETFs that meet Trend (eSlope), \$Volume and ATR5/SMA5 requirements at the top

Search:

Nos	List	Sym	eSlope	Relative ROC	Oversold Setup	Buy Limit	ATR5/SMA5	Low\$V LowATR	Open Trade Bars	Exit Signal
1	3300 ARK Fintech Innovation ETF	ARKF	22.64	-165.55	Yes	17.84	4.82	-	-	-
2	2050 Communications Services SPDR	XLC	30.58	-199.45	Yes	54.76	3.03	-	-	-
3	U138 3020 CD Retail SPDR	XRT	47.16	-174.31	Yes	68.67	2.95	-	-	-
4	U138 3030 FI Mortgage REIT ETF	REM	39.54	-222.05	Yes	24.69	2.86	-	-	-
5	U138 3100 TC Telecom ETF	IYZ	34.31	-267.26	Yes	23.08	2.29	-	-	-
6	U138 1049 S&P 600 SmallCap Value ETF	IDS	51.36	-170.74	Yes	100.75	2.20	-	-	-
7	U138 2100 Utilities SPDR	XLU	14.65	-173.64	Yes	65.76	2.06	-	-	-
8	U138 1043 Russell 2000 Value ETF	IWN	31.71	-154.26	Yes	148.94	2.05	-	-	-
9	U138 3030 FI REIT ETF	IYR	33.80	-153.70	Yes	90.15	2.00	-	-	-
10	U138 1047 S&P 400 MidCap Value ETF	DIJ	59.23	-166.56	Yes	110.03	1.97	-	-	-
11	U138 3060 HC Medical Devices ETF	IHI	45.16	-150.88	Yes	53.05	1.96	-	-	-
12	U138 3900 DV Dividend Index SPDR	SDY	38.69	-192.27	Yes	126.10	1.57	-	-	-
13	U138 4014 Treasuries 20+YR T-Bond ETF	TLT	20.14	-158.94	Yes	103.73	1.48	-	-	-
14	U138 6100 EM USD Bond ETF	EMB	36.77	-198.89	Yes	86.01	1.14	-	-	-
15	U138 3900 DV Preferred Stock ETF	PFF	15.28	-158.08	Yes	32.75	1.04	-	-	-

ARKF and XLC are part of the U275 list

sorted by ATR5/SMA5 to rank by volatility

## ETF Mean-Reversion Trading Strategy (Universe: 275 ETFs Master List)

Last Close: 8-Mar-23

Short-term strategy buying dip after initial oversold condition and selling first bounce

Last Price = Last Close or Exit Price (if sold). Entry/Exit Price = Open with 2.5bps slippage

	Symbol	Entry Date	Entry Price	Exit Date	Exit Price	Profit/Loss	Bars	Exit Signal	Symbol
1	EWM	24-Feb-23	21.98	3-Mar-23	21.85	-0.61%	6	Sixth Bar (6)	EWM
2	IDRV	24-Feb-23	38.13	3-Mar-23	39.51	3.61%	6	RSI or eSlope	IDRV
3	XLV	28-Feb-23	127.14	1-Mar-23	126.56	-0.46%	2	RSI or eSlope	XLV
4	FPXI	22-Feb-23	39.21	1-Mar-23	39.56	0.90%	6	Sixth Bar (6)	FPXI
5	IGE	22-Feb-23	39.14	28-Feb-23	40.27	2.89%	5	RSI or eSlope	IGE
6	MUB	17-Feb-23	105.94	27-Feb-23	105.41	-0.50%	6	Sixth Bar (6)	MUB
7	ARKF	10-Feb-23	17.84	16-Feb-23	19.09	6.98%	5	RSI or eSlope	ARKF
8	GDXJ	09-Feb-23	36.28	16-Feb-23	34.59	-4.65%	6	Sixth Bar (6)	GDXJ
9	SIL	09-Feb-23	28.26	16-Feb-23	27.04	-4.31%	6	Sixth Bar (6)	SIL
10	TUR	08-Feb-23	29.32	15-Feb-23	33.81	15.31%	6	RSI or eSlope	TUR
11	FXA	06-Feb-23	68.20	13-Feb-23	68.73	0.77%	6	Sixth Bar (6)	FXA
12	FXB	06-Feb-23	115.42	10-Feb-23	116.38	0.83%	5	RSI or eSlope	FXB
13	ASHR	06-Feb-23	30.01	10-Feb-23	30.33	1.07%	5	RSI or eSlope	ASHR
14	CHIX	06-Feb-23	12.33	10-Feb-23	12.46	1.05%	5	RSI or eSlope	CHIX
15	MCHI	06-Feb-23	51.37	10-Feb-23	51.67	0.58%	5	RSI or eSlope	MCHI
16	KURE	06-Feb-23	22.83	10-Feb-23	22.82	-0.04%	5	RSI or eSlope	KURE
17	CRAK	03-Feb-23	31.56	9-Feb-23	32.05	1.55%	5	RSI or eSlope	CRAK
18	TUR	01-Feb-23	32.29	6-Feb-23	32.52	0.71%	4	RSI or eSlope	TUR
19	SPLV	20-Jan-23	62.23	26-Jan-23	63.31	1.73%	5	RSI or eSlope	SPLV
20	XLP	19-Jan-23	72.22	25-Jan-23	72.71	0.68%	5	RSI or eSlope	XLP
21	RHS	19-Jan-23	166.12	25-Jan-23	168.30	1.31%	5	RSI or eSlope	RHS
22	TUR	10-Jan-23	33.80	18-Jan-23	35.83	6.01%	6	RSI or eSlope	TUR
23	EPU	16-Dec-22	27.73	22-Dec-22	28.29	2.03%	5	RSI or eSlope	EPU
24	ILF	14-Dec-22	22.03	16-Dec-22	21.88	-0.68%	3	RSI or eSlope	ILF
25	XOP	08-Dec-22	132.23	14-Dec-22	138.77	4.94%	5	RSI or eSlope	XOP
26	CRAK	08-Dec-22	31.10	14-Dec-22	31.93	2.67%	5	RSI or eSlope	CRAK
27	FCG	08-Dec-22	24.10	14-Dec-22	25.13	4.29%	5	RSI or eSlope	FCG
28	UUP	11-Nov-22	28.81	18-Nov-22	28.75	-0.21%	6	Sixth Bar (6)	UUP
29	IGN	13-Oct-22	63.44	18-Oct-22	67.73	6.76%	4	RSI or eSlope	IGN
30	URA	12-Oct-22	18.83	17-Oct-22	19.09	1.36%	4	RSI or eSlope	URA

18  
entries



28	UUP	11-Nov-22	28.81	18-Nov-22	28.75	-0.21%	6	Sixth Bar (6)	UUP
29	IGN	13-Oct-22	63.44	18-Oct-22	67.73	6.76%	4	RSI or eSlope	IGN
30	URA	12-Oct-22	18.83	17-Oct-22	19.09	1.36%	4	RSI or eSlope	URA
31	UUP	04-Oct-22	29.82	7-Oct-22	30.24	1.41%	4	RSI or eSlope	UUP
32	XLU	30-Sep-22	66.07	5-Oct-22	67.98	2.90%	4	RSI or eSlope	XLU
33	LIT	30-Sep-22	66.11	5-Oct-22	69.17	4.63%	4	RSI or eSlope	LIT
34	RYU	30-Sep-22	107.69	4-Oct-22	110.41	2.52%	3	RSI or eSlope	RYU
35	PBW	23-Sep-22	50.88	29-Sep-22	50.59	-0.57%	5	RSI or eSlope	PBW
36	ARKG	23-Sep-22	31.93	29-Sep-22	33.66	5.43%	5	RSI or eSlope	ARKG
37	QCLN	23-Sep-22	59.09	29-Sep-22	59.58	0.83%	5	RSI or eSlope	QCLN
38	XHE	22-Sep-22	87.38	29-Sep-22	85.94	-1.65%	6	RSI or eSlope	XHE
39	SBIO	22-Sep-22	29.76	29-Sep-22	30.27	1.71%	6	RSI or eSlope	SBIO
40	IDNA	22-Sep-22	27.02	29-Sep-22	26.97	-0.20%	6	RSI or eSlope	IDNA
41	TAN	22-Sep-22	79.47	29-Sep-22	75.80	-4.62%	6	RSI or eSlope	TAN
42	IPO	22-Sep-22	29.46	29-Sep-22	28.96	-1.71%	6	RSI or eSlope	IPO
43	XBI	22-Sep-22	77.73	29-Sep-22	80.32	3.33%	6	RSI or eSlope	XBI
44	EDOC	19-Sep-22	11.94	26-Sep-22	11.30	-5.34%	6	Sixth Bar (6)	EDOC
45	PSCC	02-Sep-22	100.53	12-Sep-22	102.61	2.07%	6	RSI or eSlope	PSCC
46	IDNA	01-Sep-22	29.10	9-Sep-22	30.76	5.70%	6	RSI or eSlope	IDNA
47	PHO	01-Sep-22	49.25	8-Sep-22	50.43	2.39%	5	RSI or eSlope	PHO
48	XBI	22-Aug-22	85.35	25-Aug-22	90.50	6.03%	4	RSI or eSlope	XBI
49	UUP	22-Jul-22	28.44	27-Jul-22	28.60	0.58%	4	RSI or eSlope	UUP
50	CHIQ	15-Jul-22	21.53	20-Jul-22	22.27	3.43%	4	RSI or eSlope	CHIQ

ETF138 Mean-Reversion Strategy  
Closed Trades - Last 50

Wins: 36	Avg Profit: +3.08%
Losses: 14	Avg Loss: -1.83%
Win Rate: 72%	P/L Ratio: 1.69 Profit Factor: 5.03

68% of trades in < 50% of the time



# Mean-Reversion Strategy: 275 ETFs w/ Data to 2016 - 10 Equal Weight Positions

Last Close: 08-Mar-23

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr%
2020	-4.2%	-3.7%	-5.8%	0.0%	0.9%	0.7%	0.4%	1.2%	4.3%	-0.6%	3.1%	0.5%	-3.7%
2021	0.0%	1.3%	17.0%	1.8%	-0.6%	-1.0%	7.1%	5.3%	-0.3%	0.4%	-2.2%	9.2%	43.1%
2022	0.1%	3.5%	1.9%	-2.5%	6.2%	-4.0%	6.1%	0.6%	0.5%	2.2%	0.0%	1.3%	16.5%
2023	1.0%	2.2%	0.3%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.5%
Avg	-0.8%	0.9%	3.3%	-0.2%	2.1%	-1.4%	4.5%	2.3%	1.5%	0.7%	0.3%	3.7%	

Nos	List	Sort Prefix & Name	Sym	eSlope	Relative ROC	Oversold Setup	Buy Limit	ATR5/ SMA5	Low\$V LowATR	Open Trade Bars	Exit Signal	Chart Link
1	U138	1010 S&P 500 SPDR	SPY	12.23	23.09	-	-	1.45	-	-	-	SPY
2	U138	1011 S&P 500 EW ETF						1.47	-	-	-	RSP
3	U138	1013 S&P 600 SmallCap ETF						1.60	-	-	-	DR
4	U138	1014 Russell 2000 SmallCap ETF	IWM	11.12	1.94	-	-	1.71	-	-	-	IWM
5	U138	1015 Nasdaq 100 Trust ETF	QQQ	-9.75	70.19	-	-	1.93	-	-	-	QQQ
6	U138	1016 Dow Jones Industrials SPDR	DIA	42.63	-23.85	-	-	1.34	-	-	-	DIA
7	U138	1016 Russell Micro-Cap ETF	IWC	6.08	0.77	-	-	1.57	\$V<10m	-	-	IWC
8	U138	1031 S&P 500 High Quality ETF	SPHQ	27.03	16.85	-	-	1.38	-	-	-	SPHQ
9	U138	1035 MSCI USA Minimum Volatility ETF	USMV	21.66	-41.42	-	-	1.36	-	-	-	USMV

Search:

U138

use search term to isolate a term (i.e. U138, RSI70, Bar5)



## ETF Mean Reversion Setups (last close: Tuesday, 24-Jan-23)

Nos	List ↕	Sort Prefix & Name	↕ Sym ↕	eSlope ↕	Relative ROC ↕	Oversold Setup ↕	Buy Limit ↕	ATR5/ SMA5 ↕	Low\$V LowATR ↕	Open Trade Bars ↕	Exit Signal ↕
1	U138	2070 Consumer Staples SPDR	XLP	27.40	-118.57	-	-	1.36	-	3	RSI70
2	U138	2200 EW Consumer Staples ETF	RHS	25.88	-128.23	-	-	1.18	\$V<10m	4	RSI70
3		1030 S&P 500 Low Volatility ETF	SPLV	21.00	-83.88	-	-	1.28	-	3	RSI70
4	U138	3080 EN Oil&Gas Equip&Serv SPDR	XES	152.46	-54.20	-	-	2.94	\$V<10m	-	-

Liquidity

ATRMA < 1

Volatility