



# **DUAL MOMENTUM SYSTEMS**

**Process driven investment decisions  
driving better long term results with more  
shallow drawdowns and better risk  
adjusted performance.**

## **Disclosure**

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# What is Dual Momentum Investing?



- Dual Momentum strategies are evidence based, rules based, objective, tactical investment methodologies with the goal of maximizing participation in upside market momentum and sidestepping long market downturns by going into Treasuries until the markets are again in an upward trending.



- Dual Momentum investing has two primary components. The first is absolute momentum: is there positive return over your look back period? The second momentum is relative momentum: which investment option has the highest return over the look back period. If there is positive momentum then we invest in the highest relative momentum option, otherwise we stay out of harm's way in Treasuries which tend to perform well when the markets are underperforming.



- Smart Leverage is now a part of these strategies in order to take advantage after outsized losses in the markets. These strategies are in leveraged equities about 10% to 15% of the time on average which is about 4 months every 3 years.



- Why use Dual Momentum Strategies? Most professional managers fail to beat the market indices over time and retail investors do even worse. Buy and Hold investors can match the indices performance but have to suffer tremendous drawdowns along the way. For these reasons I use these Dual Momentum strategies for my investing. You will rarely get out of equities at the very top, and back in at the very bottom, but there are incredible improvements, as the pages that follow will illustrate.



- Is Dual Momentum easy to invest in? Investing in Dual Momentum strategies can take some getting used to, you will experience whipsaw in choppy markets, there may be a change of investment at the end of any given month, the strategy may dictate you be fully invested at a time when you may otherwise not be, it can be hard to reconcile when your investments are performing different than the overall market, there will be periods of a year or longer when you underperform the overall market. However, you are paid off with less drawdowns and far better overall returns over the long run.

## Investment Strategies

### Investments for the month of December 31, 2021

**Strategy Components Invested:**

Month	Triad	The Russell OG	Global Navigator	The Russell	Global Navigator XL	The Russell XXL	MAX PAIN
Jan 2021	1/6 SGOL, 1/4 IWB, 1/4 IWS, 1/6 VCSH	Russell Mid-Cap Growth	All Country World ex-US	Russell 2000	All Country World ex-US	Russell 2000	3X Russell 2000
Feb 2021	1/4 IWB, 1/4 IWS, 1/2 VCSH	Russell Mid-Cap Value	All Country World ex-US	Russell 2000	All Country World ex-US	Russell 2000	3X Russell 2000
Mar 2021	1/4 IWB, 1/4 IWS, 1/2 VCSH	Russell Mid-Cap Value	All Country World ex-US	Russell 2000	All Country World ex-US	Russell 2000	3X Russell 2000
Apr 2021	1/4 IWB, 1/4 IWS, 1/2 VGSH	Russell Mid-Cap Value	Total US Market	Russell 2000	Total US Market	Russell 2000	3X Russell 2000
May 2021	1/4 IWB, 1/4 IWS, 1/2 VCSH	Russell Mid-Cap Value	Total US Market	Russell 2000	Total US Market	Russell 2000	3X S&P MidCap 400
Jun 2021	1/6 SGOL, 1/4 IWB, 1/4 IWS, 1/6 VCSH	Russell Mid-Cap Value	All Country World ex-US	Russell 2000	All Country World ex-US	Russell 2000	3X S&P MidCap 400
Jul 2021	1/4 IWB, 1/4 IWS, 1/2 VCSH	Russell Mid-Cap Value	Total US Market	Russell 1000	Total US Market	Russell 1000	3X S&P 500
Aug 2021	1/6 SGOL, 1/4 IWB, 1/4 IWS, 1/6 VGIT	Russell 1000	Total US Market	Russell 1000	Total US Market	Russell 1000	3X S&P 500
Sep 2021	1/6 SGOL, 1/4 IWB, 1/4 IWS, 1/6 VGIT	Russell 1000	Total US Market	Russell 1000	Total US Market	Russell 1000	3X S&P 500
Oct 2021	1/4 IWB, 1/4 VCSH	Russell Mid-Cap Growth	Total US Market	Russell Mid-Cap Growth	Total US Market	Russell Mid-Cap Growth	3X S&P 500
Nov 2021	1/4 IWB, 1/4 IWS, 1/2 VGSH	Russell Mid-Cap Growth	Total US Market	Russell Mid-Cap Growth	Total US Market	Russell Mid-Cap Growth	3X S&P 500
<b>Dec 2021</b>	<b>1/4 IWB, 1/2 VGSH</b>	<b>Russell 1000</b>	Total US Market	<b>Russell 1000</b>	Total US Market	<b>Russell 1000</b>	3X S&P 500

**For December, here are the investments by strategy:**

#### Triad

May invest 1/3 into each of: Russell 1000 & Russell MidCap Value, and 1/6th into Gold. Otherwise it goes into the best of: Short Term Investment Grade Bonds, Short Term Treasuries, or Intermediate Term Treasuries.

Invest in: 1/4 IWB, 1/2 VGSH

IWB = Russell 1000, IWS = Russell MidCap Value, SGOL = Gold

VGSH = Short Term Treasuries, VGIT = Intermediate Term Treasuries, VCSH = Short Term Investment Grade Corporate Bonds

#### Global Navigator

Invests in US or Foreign, with limited Smart Leverage in USA only, Long Term Treasuries when markets are going down

For the month of December 2021 invest in: [VTI] Total US Market

#### The Russell OG

Goes into either Russell: 1000, MidCap Growth, or Russell MidCap Value, Long Term Treasuries when markets are going down

For the month of December 2021 invest In: [IWB] Russell 1000

#### The Russell

Goes into either Russell: 1000, MidCap Growth, or 2000, with Smart Leverage into 2X ETF's, Long Term Treasuries when markets are going down

For the month of December 2021 invest In: [IWB] Russell 1000

#### Global Navigator XL

Goes into either Total US Market or Foreign markets, with Smart Leverage into 3X S&P 500 if US has the most momentum, Extended Duration Treasuries when markets are going down

For the month of December 2021 invest In: [VTI] Total US Market

#### The Russell XXL

Goes into either Russell: 1000, MidCap Growth, or 2000, with Smart Leverage into 3X ETF's, 3X Long Term Treasuries for 1 month, then Extended Duration Treasuries additional months when markets are going down

For the month of December 2021 invest In: [IWB] Russell 1000

#### MAX PAIN

Invests in 3X leveraged versions of Russell 2000, S&P MidCap 400, or S&P 500, 3X Intermediate Treasuries when markets are going down

For the month of December 2021 invest In: [UPRO] 3X S&P 500

## Investment Strategies

### Rolling 12 Month Returns Through November 30, 2021

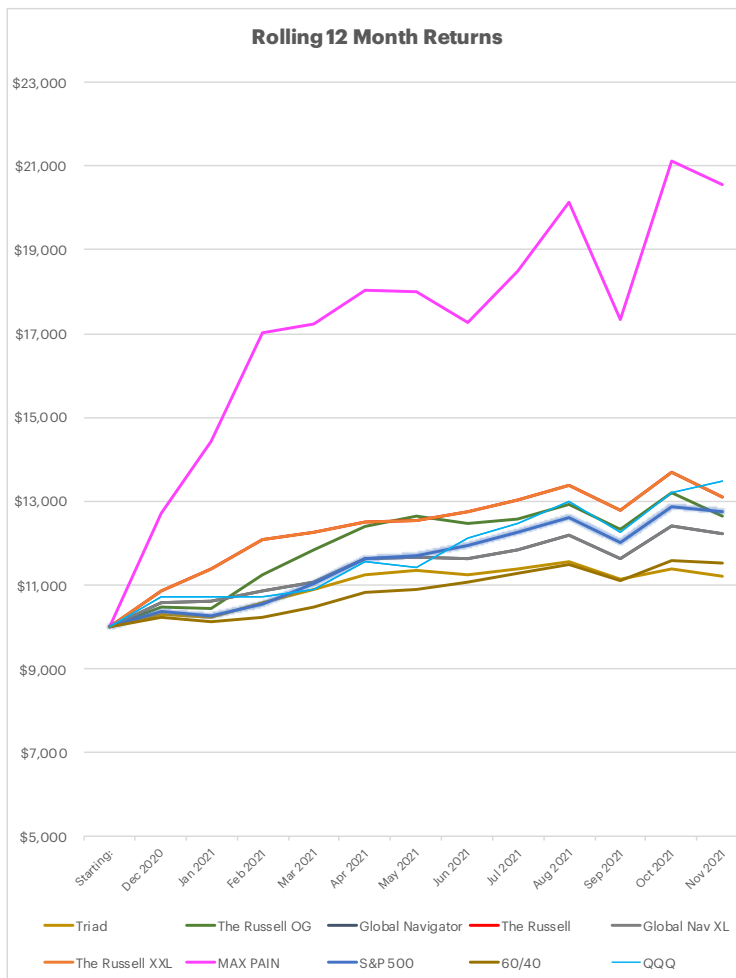
#### Returns and Maximum Drawdown:

Month	Conservative			Aggressive						
	US Market S&P 500	Balanced 60/40	Nasdaq 100 QQQ	Triad	The Russell OG	Global Navigator	The Russell	Global Nav XL	The Russell XXL	MAX PAIN
Dec 2020	3.71%	2.30%	6.99%	3.04%	4.75%	5.86%	8.65%	5.86%	8.65%	27.14%
Jan 2021	-1.02%	-0.96%	0.26%	-0.90%	-0.38%	0.25%	4.85%	0.25%	4.85%	13.49%
Feb 2021	2.78%	1.05%	-0.13%	3.43%	7.66%	2.30%	6.20%	2.30%	6.20%	17.86%
Mar 2021	4.54%	2.22%	1.71%	3.00%	5.33%	1.87%	1.39%	1.87%	1.39%	1.23%
Apr 2021	5.29%	3.52%	5.91%	3.38%	4.72%	5.04%	1.79%	5.04%	1.79%	4.70%
May 2021	0.66%	0.46%	-1.20%	0.91%	1.97%	0.46%	0.27%	0.46%	0.27%	-0.20%
Jun 2021	2.25%	1.71%	6.26%	-0.80%	-1.23%	-0.34%	1.87%	-0.34%	1.87%	-3.96%
Jul 2021	2.44%	1.93%	2.86%	1.00%	0.60%	1.74%	2.09%	1.74%	2.09%	6.93%
Aug 2021	2.98%	1.71%	4.22%	1.63%	2.86%	2.86%	2.86%	2.86%	2.86%	8.97%
Sep 2021	-4.66%	-3.20%	-5.68%	-3.49%	-4.60%	-4.46%	-4.60%	-4.46%	-4.60%	-13.94%
Oct 2021	7.02%	4.24%	7.86%	1.96%	7.14%	6.69%	7.14%	6.69%	7.14%	21.90%
Nov 2021	-0.80%	-0.40%	2.00%	-1.47%	-4.30%	-1.46%	-4.30%	-1.46%	-4.30%	-2.71%
<b>12 Mo Rtrn:</b>	<b>27.63%</b>	<b>15.34%</b>	<b>34.77%</b>	<b>12.01%</b>	<b>26.33%</b>	<b>22.26%</b>	<b>31.00%</b>	<b>22.26%</b>	<b>31.00%</b>	<b>105.46%</b>
Max DD:	-4.66%	-3.20%	-5.68%	-3.49%	-4.60%	-4.46%	-4.60%	-4.46%	-4.60%	-13.94%

b/(w) S&P 500: 0.0% -12.3% 7.1% -15.6% -1.3% -5.4% 3.4% -5.4% 3.4% 77.8%

#### \$10,000 turns into:

Month	Conservative			Aggressive						
	US Market S&P 500	Balanced 60/40	Nasdaq 100 QQQ	Triad	The Russell OG	Global Navigator	The Russell	Global Nav XL	The Russell XXL	MAX PAIN
<b>Starting:</b>	\$ 10,000	\$ 10,000	\$ 10,000	\$10,000	\$ 10,000	\$10,000	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000
Dec 2020	\$ 10,371	\$ 10,230	\$ 10,699	\$10,304	\$ 10,475	\$10,586	\$ 10,865	\$ 10,586	\$ 10,865	\$ 12,714
Jan 2021	\$ 10,265	\$ 10,132	\$ 10,727	\$ 10,211	\$ 10,435	\$ 10,612	\$ 11,392	\$ 10,612	\$ 11,392	\$ 14,429
Feb 2021	\$ 10,551	\$ 10,238	\$ 10,713	\$ 10,561	\$ 11,235	\$ 10,857	\$ 12,098	\$ 10,857	\$ 12,098	\$ 17,006
Mar 2021	\$ 11,030	\$ 10,465	\$ 10,896	\$ 10,877	\$ 11,833	\$ 11,060	\$ 12,266	\$ 11,060	\$ 12,266	\$ 17,215
Apr 2021	\$ 11,613	\$ 10,834	\$ 11,540	\$ 11,245	\$ 12,392	\$ 11,617	\$ 12,486	\$ 11,617	\$ 12,486	\$ 18,024
May 2021	\$ 11,690	\$ 10,883	\$ 11,402	\$ 11,347	\$ 12,636	\$ 11,670	\$ 12,520	\$ 11,670	\$ 12,520	\$ 17,988
Jun 2021	\$ 11,953	\$ 11,069	\$ 12,115	\$ 11,256	\$ 12,481	\$ 11,631	\$ 12,754	\$ 11,631	\$ 12,754	\$ 17,276
Jul 2021	\$ 12,244	\$ 11,283	\$ 12,462	\$ 11,369	\$ 12,555	\$ 11,833	\$ 13,020	\$ 11,833	\$ 13,020	\$ 18,473
Aug 2021	\$ 12,609	\$ 11,476	\$ 12,988	\$ 11,554	\$ 12,915	\$ 12,172	\$ 13,393	\$ 12,172	\$ 13,393	\$ 20,130
Sep 2021	\$ 12,022	\$ 11,109	\$ 12,250	\$ 11,150	\$ 12,320	\$ 11,629	\$ 12,777	\$ 11,629	\$ 12,777	\$ 17,324
Oct 2021	\$ 12,866	\$ 11,580	\$ 13,213	\$ 11,369	\$ 13,200	\$ 12,407	\$ 13,689	\$ 12,407	\$ 13,689	\$ 21,118
Nov 2021	\$ 12,763	\$ 11,534	\$ 13,477	\$ 11,201	\$ 12,633	\$ 12,226	\$ 13,100	\$ 12,226	\$ 13,100	\$ 20,546





# Investment Strategies

1980 through November 30, 2021

Annual returns:

← Conservative

Aggressive →

Year End	Benchmarks			Dual Momentum						
	US Market S&P 500	Balanced 60/40	Nasdaq 100 QQQ	Triad	The Russell OG	Global Navigator	The Russell	Global Nav XL	The Russell XXL	MAX PAIN
1980	32.49%	21.02%	33.38%	17.04%	48.44%	34.52%	42.44%	43.25%	77.55%	112.85%
1981	-4.90%	0.07%	-0.63%	7.83%	3.93%	2.01%	5.18%	4.25%	7.96%	17.16%
1982	21.55%	25.68%	18.20%	31.61%	54.96%	68.23%	92.66%	109.76%	169.57%	147.41%
1983	22.55%	16.21%	19.58%	18.63%	27.91%	38.77%	33.06%	62.01%	46.98%	107.36%
1984	6.25%	9.84%	-13.19%	6.94%	2.83%	4.28%	3.28%	5.15%	4.14%	8.11%
1985	31.23%	27.65%	32.38%	21.10%	24.32%	40.40%	26.73%	42.15%	34.43%	87.51%
1986	18.05%	17.65%	10.83%	11.84%	16.59%	64.86%	15.36%	66.14%	19.73%	37.57%
1987	4.68%	4.81%	-11.38%	-0.64%	-6.94%	8.49%	-6.94%	9.91%	-5.05%	-42.39%
1988	16.22%	12.64%	19.47%	8.30%	9.84%	1.64%	11.72%	3.95%	23.23%	23.23%
1989	31.38%	24.20%	19.49%	21.97%	26.51%	18.62%	43.70%	19.55%	60.42%	50.97%
1990	-3.32%	1.56%	-17.55%	-2.76%	-9.00%	-2.85%	-9.00%	1.43%	-2.82%	-31.86%
1991	30.22%	24.30%	46.97%	17.12%	27.56%	38.79%	42.62%	61.96%	81.52%	89.45%
1992	7.40%	7.35%	21.54%	10.88%	15.78%	9.37%	8.08%	11.61%	19.03%	23.14%
1993	9.58%	9.66%	15.37%	11.47%	12.00%	16.89%	18.88%	16.89%	18.88%	44.23%
1994	0.38%	-0.77%	-3.66%	-3.84%	-5.77%	-0.15%	-4.47%	0.30%	-9.18%	-17.36%
1995	38.05%	29.81%	42.46%	27.98%	36.48%	35.77%	30.41%	35.77%	30.41%	96.18%
1996	22.51%	14.70%	23.41%	13.45%	6.87%	12.97%	7.65%	13.58%	6.07%	24.90%
1997	33.49%	23.58%	21.27%	25.11%	24.03%	30.99%	27.18%	30.99%	27.18%	105.10%
1998	28.69%	21.01%	32.17%	10.54%	3.13%	9.52%	12.47%	16.76%	25.62%	4.10%
1999	20.39%	11.65%	80.58%	5.12%	41.38%	30.49%	41.38%	35.14%	40.37%	15.74%
2000	-9.74%	-1.49%	-28.93%	10.71%	13.76%	-0.43%	25.19%	4.58%	35.26%	23.18%
2001	-11.75%	-3.81%	-25.59%	5.20%	4.30%	4.30%	4.30%	5.80%	5.80%	5.80%
2002	-21.59%	-9.80%	-29.86%	8.59%	7.18%	16.09%	16.25%	21.51%	22.02%	15.04%
2003	28.16%	18.19%	41.08%	20.03%	43.24%	69.72%	65.82%	94.06%	80.60%	222.74%
2004	10.71%	8.00%	9.84%	11.40%	23.22%	20.74%	27.38%	23.93%	55.91%	39.62%
2005	4.83%	3.87%	4.49%	7.57%	5.95%	7.10%	-7.29%	7.18%	-18.19%	-14.67%
2006	15.84%	10.95%	8.27%	14.39%	22.86%	28.10%	21.29%	31.26%	26.47%	55.90%
2007	5.14%	5.94%	9.44%	11.70%	9.31%	21.66%	9.85%	22.19%	12.15%	7.05%
2008	-36.81%	-21.86%	-42.67%	0.69%	33.93%	33.93%	33.93%	48.69%	48.69%	48.69%
2009	26.38%	18.66%	45.53%	25.64%	8.12%	17.19%	19.01%	1.06%	16.23%	23.19%
2010	15.06%	12.04%	18.51%	14.13%	16.24%	7.05%	11.55%	6.09%	16.79%	38.95%
2011	1.88%	4.38%	-1.14%	9.04%	32.68%	30.76%	27.67%	52.36%	63.77%	60.10%
2012	16.00%	11.39%	15.46%	8.49%	19.12%	36.13%	28.82%	51.32%	43.99%	47.10%
2013	32.31%	17.44%	35.69%	20.87%	35.27%	22.16%	35.09%	22.16%	35.09%	149.93%
2014	13.48%	10.56%	16.11%	7.30%	10.30%	9.32%	13.10%	9.32%	13.10%	27.61%
2015	1.26%	1.11%	6.50%	-1.29%	-1.46%	-7.95%	-4.21%	-7.72%	-0.67%	-17.34%
2016	12.00%	8.34%	7.39%	9.96%	12.30%	8.82%	16.19%	9.74%	22.72%	58.20%
2017	21.71%	14.26%	27.28%	10.76%	21.78%	19.39%	10.70%	19.39%	10.70%	23.68%
2018	-4.56%	-2.47%	-1.10%	0.11%	13.33%	10.21%	11.99%	12.97%	18.19%	8.78%
2019	31.23%	21.98%	28.83%	9.90%	12.26%	9.90%	12.26%	11.02%	15.67%	27.64%
2020	18.39%	14.93%	43.75%	15.99%	26.71%	44.35%	83.18%	67.67%	150.19%	120.14%
2021	23.06%	12.75%	25.97%	8.71%	20.60%	15.49%	20.57%	15.49%	20.57%	61.60%
+/- S&P YTD:	0.0%	-10.3%	2.9%	-14.3%	-2.5%	-7.6%	-2.5%	-7.6%	-2.5%	38.5%
CAGR	12.1%	10.4%	11.8%	11.4%	17.0%	19.9%	20.3%	24.4%	28.6%	37.5%

**DUAL  
MOMENTUM  
SYSTEMS**

# **Strategy Fact Sheets**

# Dual Momentum Strategies: Triad

US Markets and Gold Rotational Strategy with multiple out of market options

Results through 11/30/2021

## Investment selection for December 2021:

1/3 IWB, 2/3 VGSH

## Tax friendliness:

Triad is very tax friendly, mostly Long Term Cap Gains.

## Months between change of holdings

Triad has a change to one of it's holdings every 2.24 months on average.

## Portfolio size appropriateness:

Whale, Triad can be used for any sized portfolio.

## Triad Characteristics

Drawdowns: Triad has more conservative drawdowns than a Balanced 60/40 strategy

Volatility: Triad is noticeably less volatile than a Balanced 60/40 approach

Returns: Triad has similar historical returns depending on the time frame, and should do better going forward.

## Strategy Description:

The goal of Triad strategy is to be a better option than a Balanced 60% Stock and 40% Bond investment, both in the past, and in the future. The 50 year bond bull market looks to be ending, Triad tackles this with more nuanced options for the time when the strategy is in Bonds. Instead of just going into aggregate bonds, it evaluates Short Term Treasuries, Intermediate Term Treasuries, and Short Term Corporate Investment Grade Bonds selecting the best option.

## Strategy Components

IWB Russell 1000

IWS Rusell MidCap Value

SGOL Gold

VCSS Short Term Corporate Investment Grade Bonds

VGSH Short Term Treasuries

VGIT Intermediate Term Treasuries

## Annualized Returns actual YTD for current year.

Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
Triad	8.71%	12.01%	12.25%	9.26%	8.81%	10.31%	11.36%
Balanced 60/40	12.75%	15.34%	14.69%	12.27%	10.93%	6.57%	10.38%
S&P 500	23.06%	27.63%	20.37%	17.77%	16.06%	7.26%	12.06%

## Maximum Drawdown, single largest drawdown.

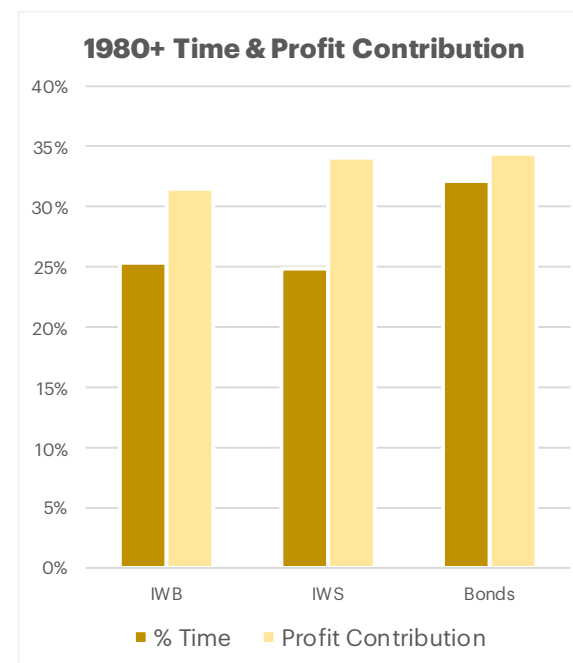
Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
Triad	-3.49%	-3.49%	-5.71%	-5.71%	-5.71%	-9.79%	-15.29%
Balanced 60/40	-3.20%	-3.20%	-11.86%	-11.86%	-11.86%	-32.33%	-32.33%
S&P 500	-4.66%	-4.66%	-19.43%	-19.43%	-19.43%	-50.79%	-50.79%

## Ulcer Index, the higher the number the more painful downside volatility. Considers all downside not just maximum.

Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
Triad	1.46	1.40	1.72	2.03	1.85	2.33	2.92
Balanced 60/40	0.97	0.93	2.55	2.43	1.94	7.63	5.92
S&P 500	1.39	1.34	4.52	4.25	3.43	16.82	12.91

## Sortino Ratio, risk adjusted performance measure - bigger number is better.

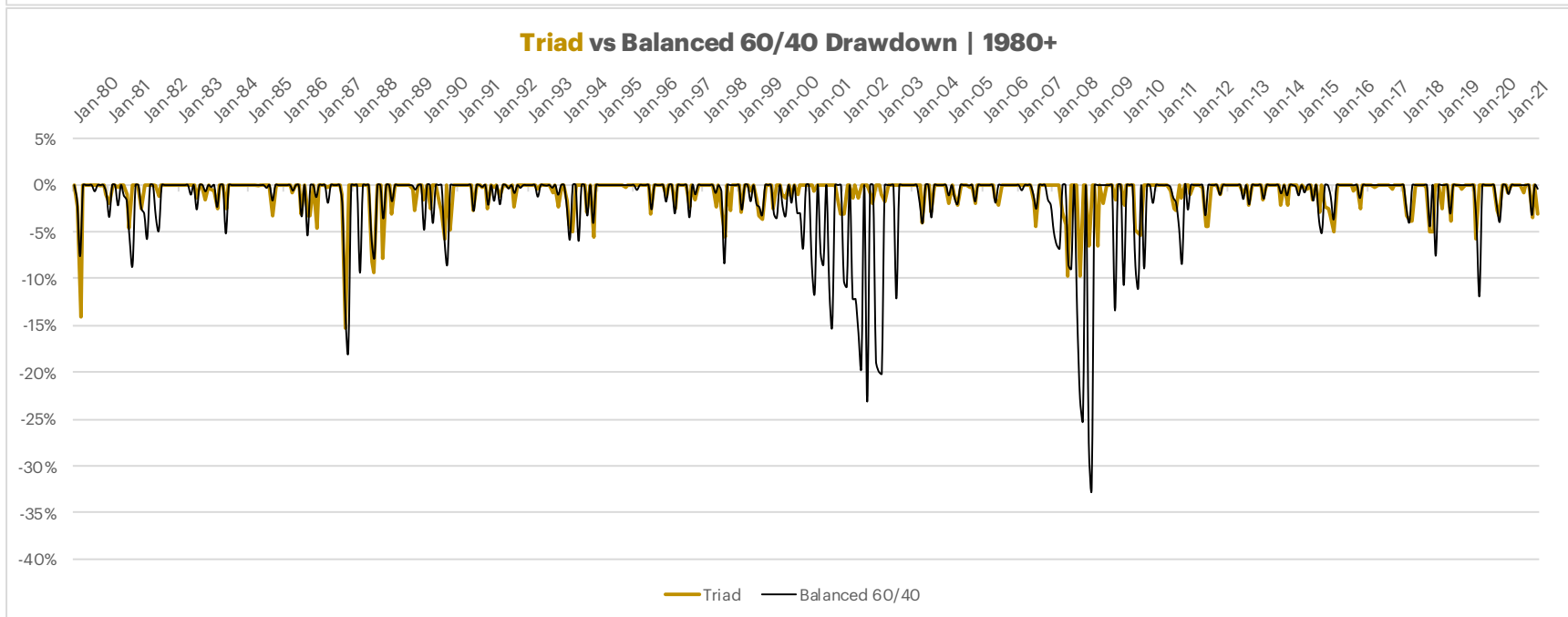
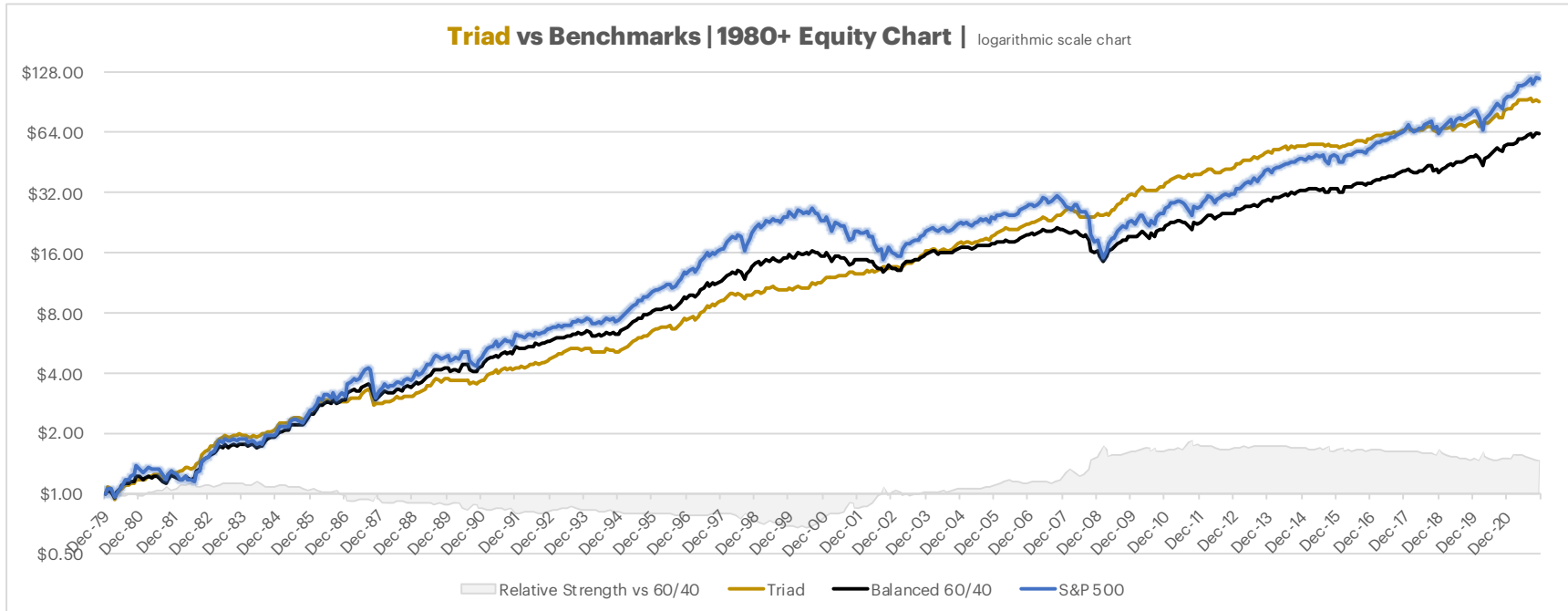
Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
Triad	2.25	2.91	2.45	1.99	2.18	2.69	2.46
Balanced 60/40	3.79	4.31	2.16	2.12	2.31	1.14	1.83
S&P 500	4.62	5.19	1.79	1.85	2.02	0.80	1.31



Triad inception date April 2021, out of sample since then and before 2000.



Dual Momentum Systems: **Triad**



Triad inception date April 2021, out of sample since then and before 2000.

# Dual Momentum Strategies: The Russell OG

USA Momentum Rotational

Results through 11/30/2021

## Investment selection for December 2021:

IWB, Russell 1000

## Tax friendliness:

The Russell OG has mostly Short Term Cap Gains.

## Months between change of holdings

The Russell OG changes it's holdings every 3.3 months on average.

## Portfolio size appropriateness:

Whale, The Russell OG can be used for any sized portfolio.

## The Russell OG Characteristics

Drawdowns: The Russell OG has more conservative drawdowns than the S&P.

Volatility: The Russell OG is usually less volatile than the S&P over time.

Returns: The Russell OG has much better historical returns compared to the S&P 500.

## Strategy Description:

The Russell OG invests in the United States, going into the best performer of the Russell 1000, Russell MidCap Growth, or Russell MidCap Value. When these markets aren't experiencing positive momentum the strategy goes into Long Term Treasuries.

## Strategy Components

IWB Russell 1000

IWP Russell MidCap Growth

IWS Russell MidCap Value

TLT Long Term Treasuries

## Annualized Returns actual YTD for current year.

Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
The Russell OG	20.60%	26.33%	22.00%	19.23%	17.02%	17.33%	17.01%
S&P 500	23.06%	27.63%	20.37%	17.77%	16.06%	7.26%	12.06%
Nasdaq 100	25.97%	34.77%	29.99%	24.75%	19.82%	6.83%	11.76%

## Maximum Drawdown, single largest drawdown.

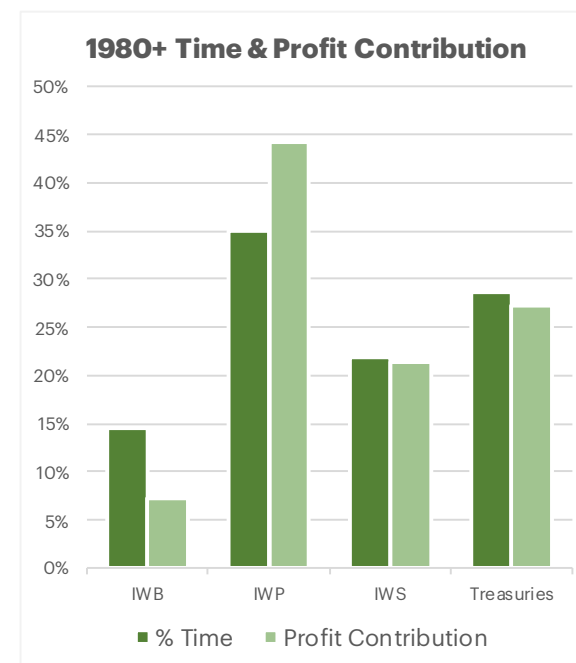
Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
The Russell OG	-4.60%	-4.60%	-8.07%	-8.07%	-10.99%	-19.41%	-23.41%
S&P 500	-4.66%	-4.66%	-19.43%	-19.43%	-19.43%	-50.79%	-50.79%
Nasdaq 100	-5.68%	-5.68%	-17.48%	-17.48%	-17.48%	-74.14%	-74.14%

## Ulcer Index, the higher the number the more painful downside volatility. Considers all downside not just maximum.

Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
The Russell OG	1.86	1.79	2.73	2.58	2.84	4.56	5.84
S&P 500	1.39	1.34	4.52	4.25	3.43	16.82	12.91
Nasdaq 100	1.67	1.61	3.92	4.24	3.73	41.85	31.01

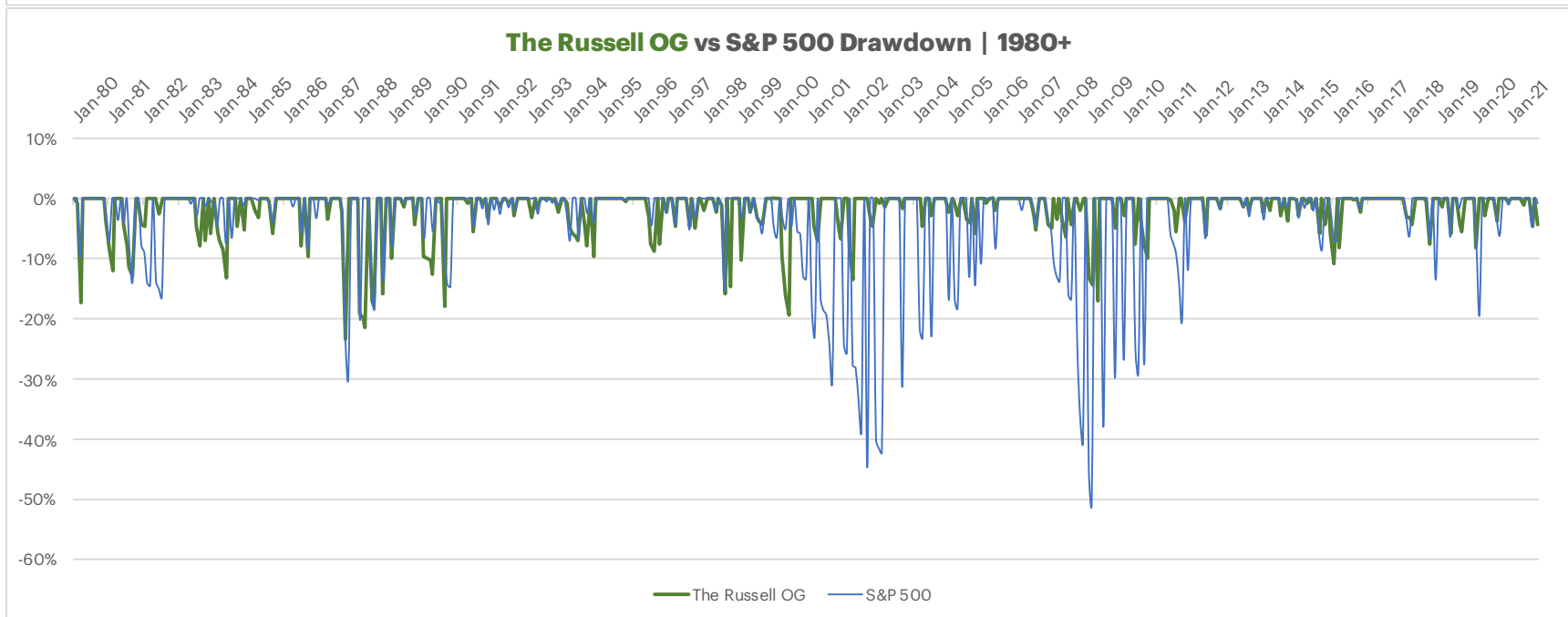
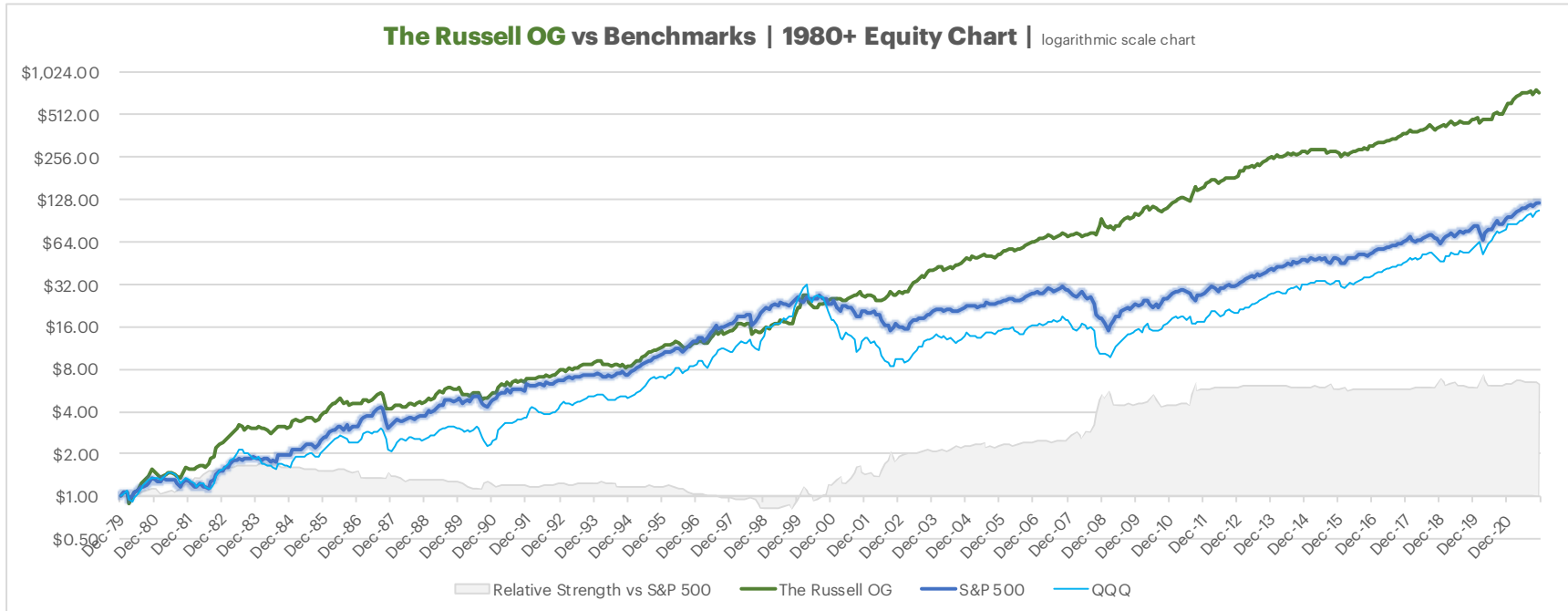
## Sortino Ratio, risk adjusted performance measure - bigger number is better.

Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
The Russell OG	3.20	3.80	2.86	2.76	2.64	2.35	2.00
S&P 500	4.62	5.19	1.79	1.85	2.02	0.80	1.31
Nasdaq 100	4.32	5.33	2.45	2.45	2.38	0.61	1.08



The Russell OG inception date May 2017, out of sample since and before 2000.

Dual Momentum Systems: The Russell OG



The Russell OG inception date May 2017, out of sample since and before 2000.

# Dual Momentum Strategies: Global Navigator

Global Momentum Rotational Strategy using Smart Leverage

Results through 11/30/2021

## Investment selection for December 2021:

VTI, Total US Market

## Tax friendliness:

**Global Navigator** has mostly Short Term Cap Gains.

## Months between change of holdings

Global Navigator changes its holdings every 4 months on average.

## Portfolio size appropriateness:

Whale, **Global Navigator** can be used for any sized portfolio.

## Global Navigator Characteristics

Drawdowns: **Global Navigator** has more conservative drawdowns than the S&P.

Volatility: **Global Navigator** is usually less volatile than the S&P over time.

Returns: **Global Navigator** has superior historical returns compared to the S&P 500.

## Strategy Description:

**Global Navigator** is a global strategy, it invests in the USA when it is outperforming, and in the Foreign markets when they outperform. This strategy uses Smart Leverage, after an outsized drawdown in the markets, could go into 2X Leveraged equities if the USA Markets are the investment, not if going into Foreign Markets. When it goes into 2X leveraged position, it holds it until there is a natural change of investment by the strategy. The strategy holds long term treasuries when out of equities.

## Strategy Components

VTI Total US Market → Smart Leverage: SSO 2X S&P 500

VXUS All World Country ex-USA

TLT Long Term Treasuries

## Annualized Returns actual YTD for current year.

Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
<b>Global Navigator</b>	15.49%	22.26%	24.70%	19.71%	16.34%	18.30%	19.86%
S&P 500	23.06%	27.63%	20.37%	17.77%	16.06%	7.26%	12.06%
Nasdaq 100	25.97%	34.77%	29.99%	24.75%	19.82%	6.83%	11.76%

## Maximum Drawdown, single largest drawdown.

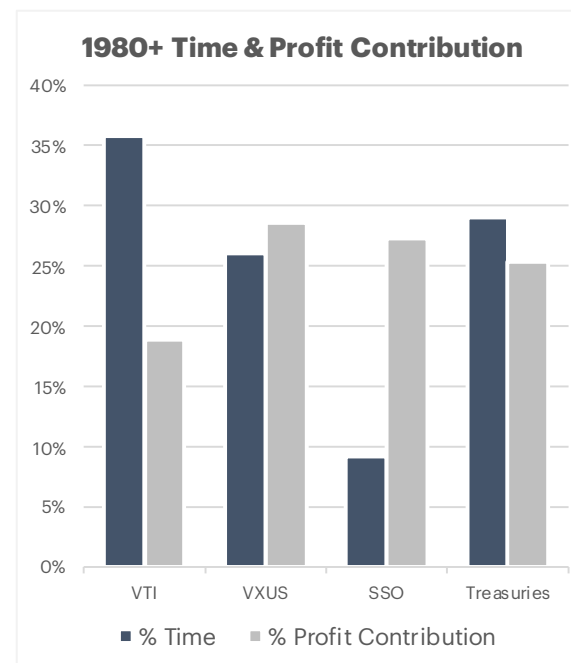
Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
<b>Global Navigator</b>	-4.46%	-4.46%	-12.92%	-12.92%	-15.62%	-17.14%	-17.56%
S&P 500	-4.66%	-4.66%	-19.43%	-19.43%	-19.43%	-50.79%	-50.79%
Nasdaq 100	-5.68%	-5.68%	-17.48%	-17.48%	-17.48%	-74.14%	-74.14%

## Ulcer Index, the higher the number the more painful downside volatility. Considers all downside not just maximum.

Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
<b>Global Navigator</b>	1.36	1.31	3.64	3.30	4.70	4.33	4.94
S&P 500	1.39	1.34	4.52	4.25	3.43	16.82	12.91
Nasdaq 100	1.67	1.61	3.92	4.24	3.73	41.85	31.01

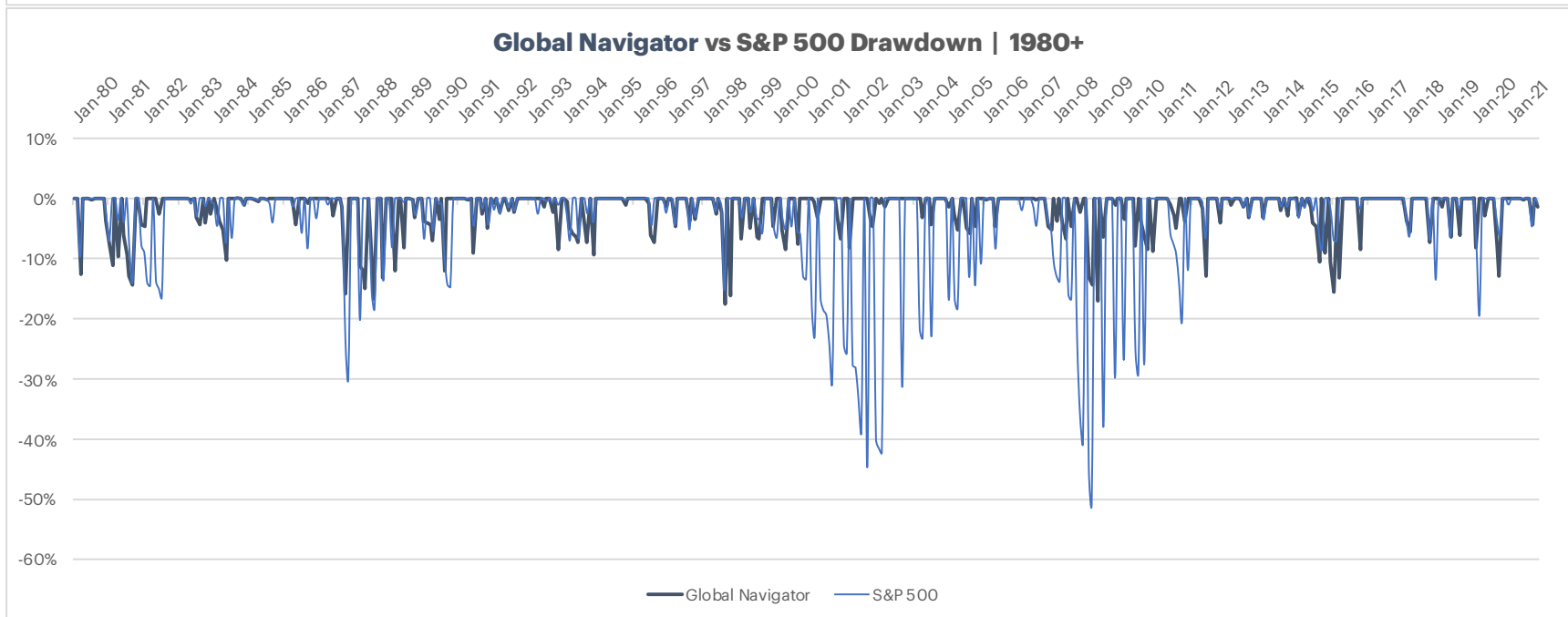
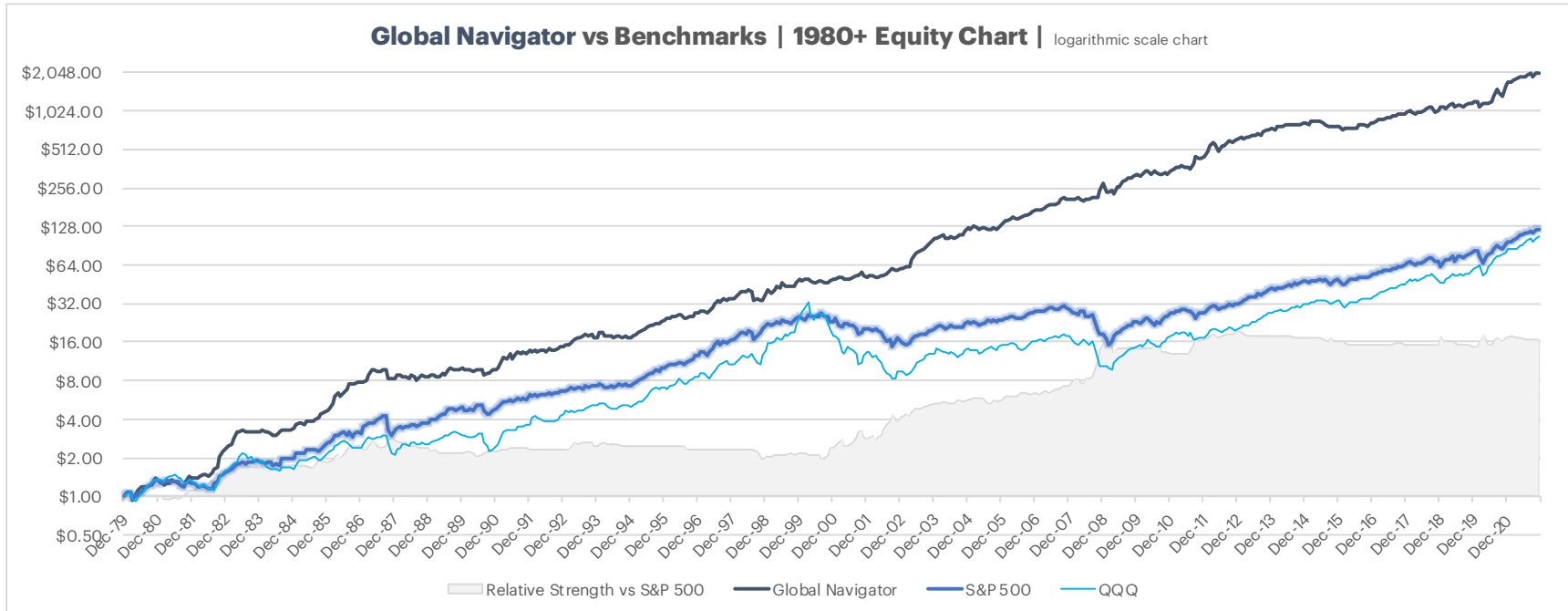
## Sortino Ratio, risk adjusted performance measure - bigger number is better.

Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
<b>Global Navigator</b>	3.30	4.40	2.76	2.49	2.13	2.42	2.44
S&P 500	4.62	5.19	1.79	1.85	2.02	0.80	1.31
Nasdaq 100	4.32	5.33	2.45	2.45	2.38	0.61	1.08



Global Navigator inception date May 2017. Smart Leverage added in October 2020, out of sample then and before 2000.

Dual Momentum Systems: Global Navigator



Global Navigator inception date May 2017. Smart Leverage added in October 2020, out of sample then and before 2000.

# Dual Momentum Strategies: The Russell

USA Momentum Rotational using Smart Leverage

Results through 11/30/2021

## Investment selection for December 2021:

IWB, Russell 1000

## Tax friendliness:

**The Russell** has mostly Short Term Cap Gains.

## Months between change of holdings

The Russell changes it's holdings every 3 months on average.

## Portfolio size appropriateness:

Whale, **The Russell** can be used for any sized portfolio.

## The Russell Characteristics

Drawdowns: **The Russell** has more conservative drawdowns than the S&P.

Volatility: **The Russell** is usually less volatile than the S&P over time.

Returns: **The Russell** has superior historical returns compared to the S&P 500.

## Strategy Description:

**The Russell** invests in the United States, going into the best performer of the Russell 1000, Russell MidCap Growth, or Russell MidCap Value. When these markets aren't experiencing positive momentum the strategy goes into Long Term Treasuries. This strategy uses Smart Leverage and goes into 2X equities after an outsized drawdown in the markets and will hold that position until the strategy has a change of investment.

## Strategy Components

IWB Russell 1000 → Smart Leverage: SSO 2X S&P 500

IWP Russell MidCap Growth → Smart Leverage: QLD 2X Nasdaq 100

IWM Russell 2000 → Smart Leverage: UWM 2X Russell 2000

TLT Long Term Treasuries

## Annualized Returns actual YTD for current year.

Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
<b>The Russell</b>	20.57%	31.00%	37.94%	25.89%	21.42%	20.59%	20.33%
S&P 500	23.06%	27.63%	20.37%	17.77%	16.06%	7.26%	12.06%
Nasdaq 100	25.97%	34.77%	29.99%	24.75%	19.82%	6.83%	11.76%

## Maximum Drawdown, single largest drawdown.

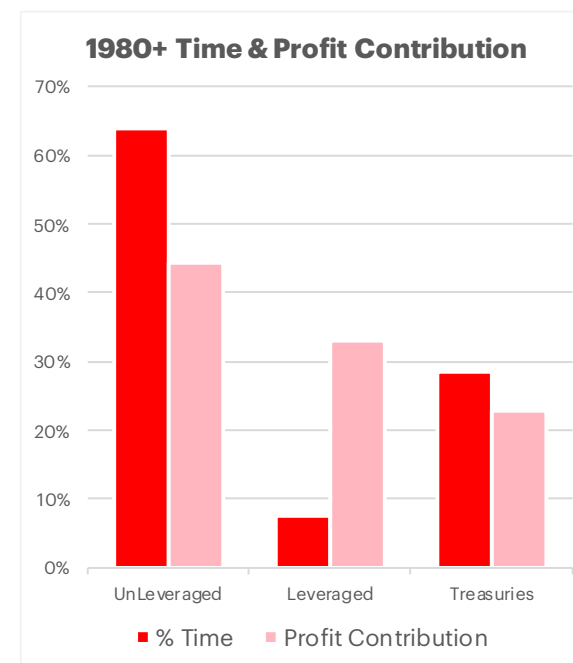
Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
<b>The Russell</b>	-4.60%	-4.60%	-8.07%	-8.07%	-12.51%	-19.84%	-24.12%
S&P 500	-4.66%	-4.66%	-19.43%	-19.43%	-19.43%	-50.79%	-50.79%
Nasdaq 100	-5.68%	-5.68%	-17.48%	-17.48%	-17.48%	-74.14%	-74.14%

## Ulcer Index, the higher the number the more painful downside volatility. Considers all downside not just maximum.

Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
<b>The Russell</b>	1.82	1.75	2.72	2.82	3.48	4.70	6.08
S&P 500	1.39	1.34	4.52	4.25	3.43	16.82	12.91
Nasdaq 100	1.67	1.61	3.92	4.24	3.73	41.85	31.01

## Sortino Ratio, risk adjusted performance measure - bigger number is better.

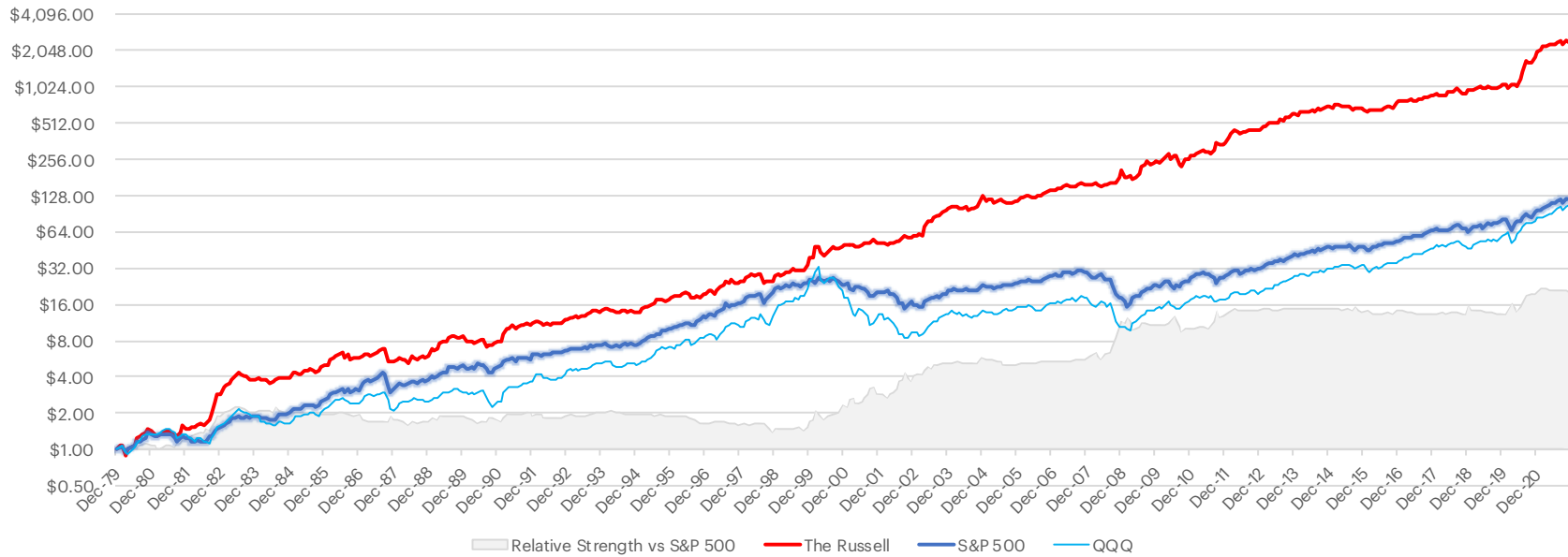
Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
<b>The Russell</b>	3.23	4.47	4.72	3.62	3.22	2.43	2.19
S&P 500	4.62	5.19	1.79	1.85	2.02	0.80	1.31
Nasdaq 100	4.32	5.33	2.45	2.45	2.38	0.61	1.08



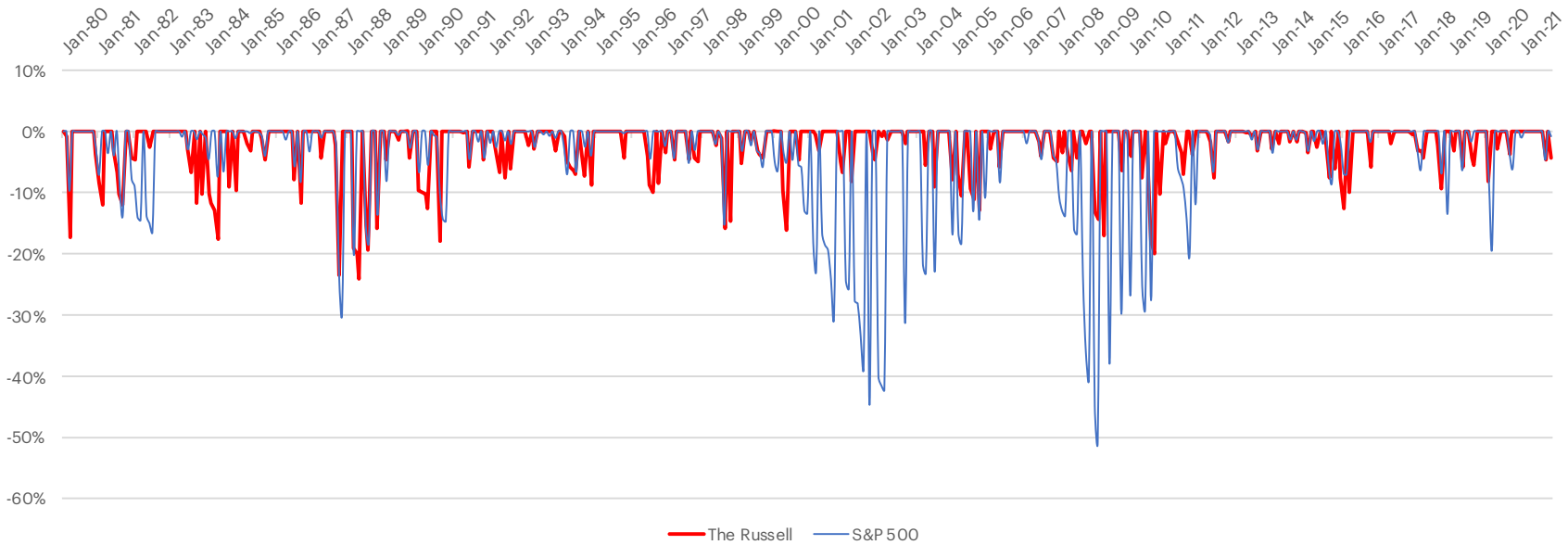
The Russell inception date May 2017, Smart Leverage added in October 2020, out of sample then and before 2000.



### The Russell vs Benchmarks | 1980+ Equity Chart | logarithmic scale chart



### The Russell vs S&P 500 Drawdown | 1980+



The Russell inception date May 1977, Smart Leverage added in October 2020, out of sample then and before 2000.

# Dual Momentum Strategies: Global Navigator XL

Global Momentum Rotational Strategy using Smart Leverage

Results through 11/30/2021

## Investment selection for December 2021:

VTI, Total US Market

## Tax friendliness:

Global Navigator XL has mostly Short Term Cap Gains.

## Months between change of holdings

Global Navigator XL changes its holdings every 4 months on average.

## Portfolio size appropriateness:

Whale, Global Navigator XL can be used for any sized portfolio.

## Strategy Description:

Global Navigator XL is a global strategy, it invests in the USA when it is outperforming, and in the Foreign markets when they outperform. This strategy uses 3X leverage by way of Smart Leverage, after an outsized drawdown in the markets, could go into 3X Leveraged equities if the USA Markets are the investment, not if going into Foreign Markets. When it goes into 2X leveraged position, it holds it until there is a natural change of investment by the strategy. When out of equities it holds extended duration treasuries.

## Strategy Components

VTI Total US Market → Smart Leverage: UPRO 3X S&P 500

VXUS All World Country ex-USA

TLT Long Term Treasuries

## Global Navigator Characteristics

Drawdowns: Global Navigator XL has more conservative drawdowns than the S&P.

Volatility: Global Navigator XL is usually less volatile than the S&P over time.

Returns: Global Navigator XL has superior historical returns compared to the S&P 500.

Global Navigator goes into 2X with Smart Leverage, and TLT when out of equities, Global Navigator XL goes into 3X and EDV when out of equities.

## Annualized Returns actual YTD for current year.

Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
Global Nav XL	15.49%	22.26%	32.45%	24.21%	20.13%	22.14%	24.41%
S&P 500	23.06%	27.63%	20.37%	17.77%	16.06%	7.26%	12.06%
Nasdaq 100	25.97%	34.77%	29.99%	24.75%	19.82%	6.83%	11.76%

## Maximum Drawdown, single largest drawdown.

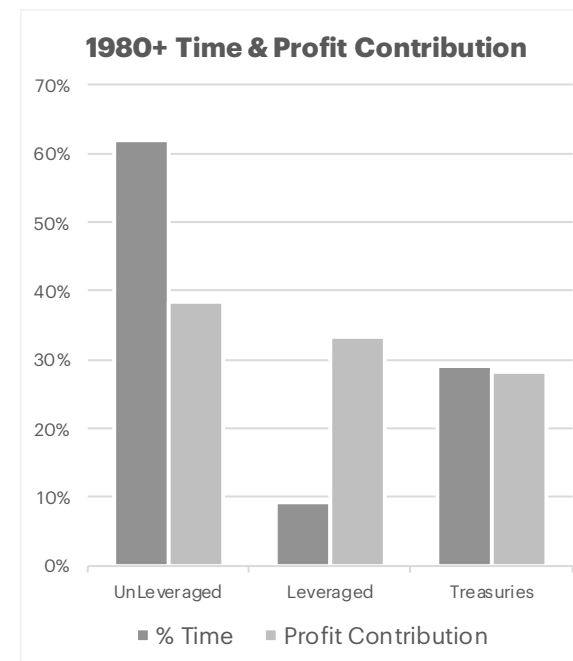
Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
Global Nav XL	-4.46%	-4.46%	-19.70%	-19.70%	-19.70%	-28.54%	-28.54%
S&P 500	-4.66%	-4.66%	-19.43%	-19.43%	-19.43%	-50.79%	-50.79%
Nasdaq 100	-5.68%	-5.68%	-17.48%	-17.48%	-17.48%	-74.14%	-74.14%

## Ulcer Index, the higher the number the more painful downside volatility. Considers all downside not just maximum.

Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
Global Nav XL	1.36	1.31	4.67	4.00	5.07	5.48	5.45
S&P 500	1.39	1.34	4.52	4.25	3.43	16.82	12.91
Nasdaq 100	1.67	1.61	3.92	4.24	3.73	41.85	31.01

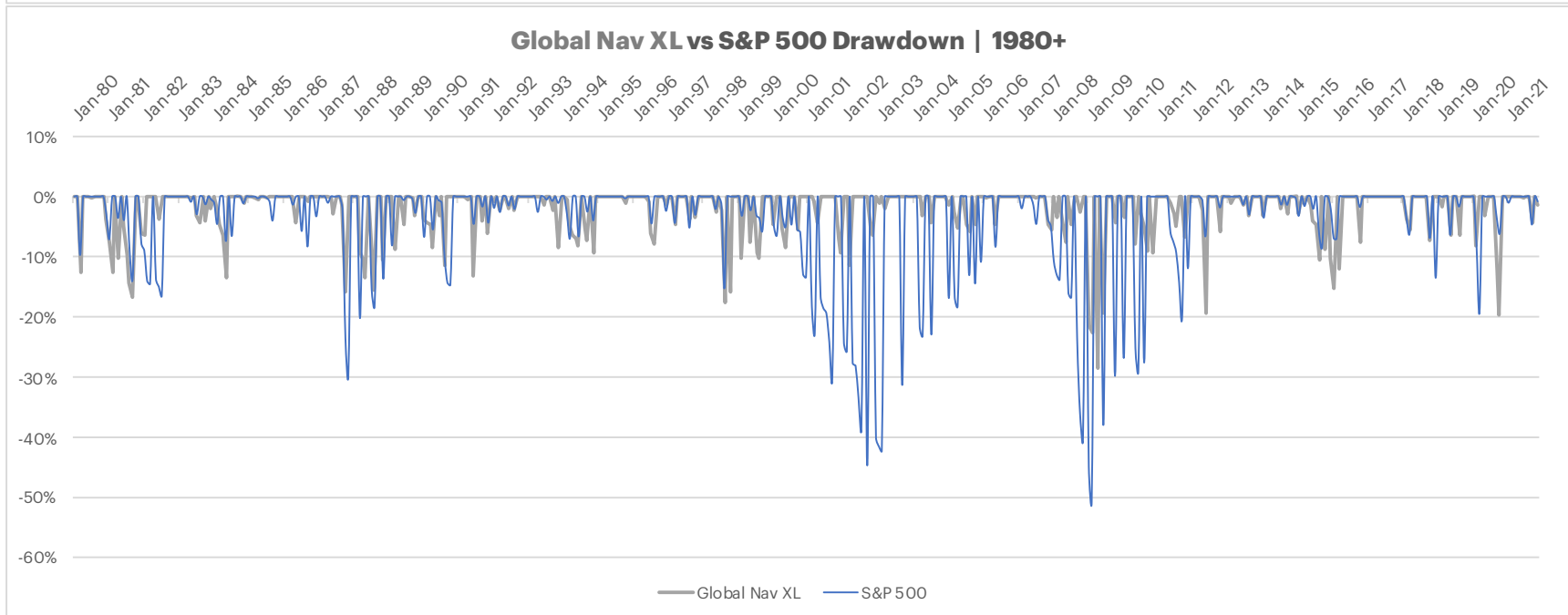
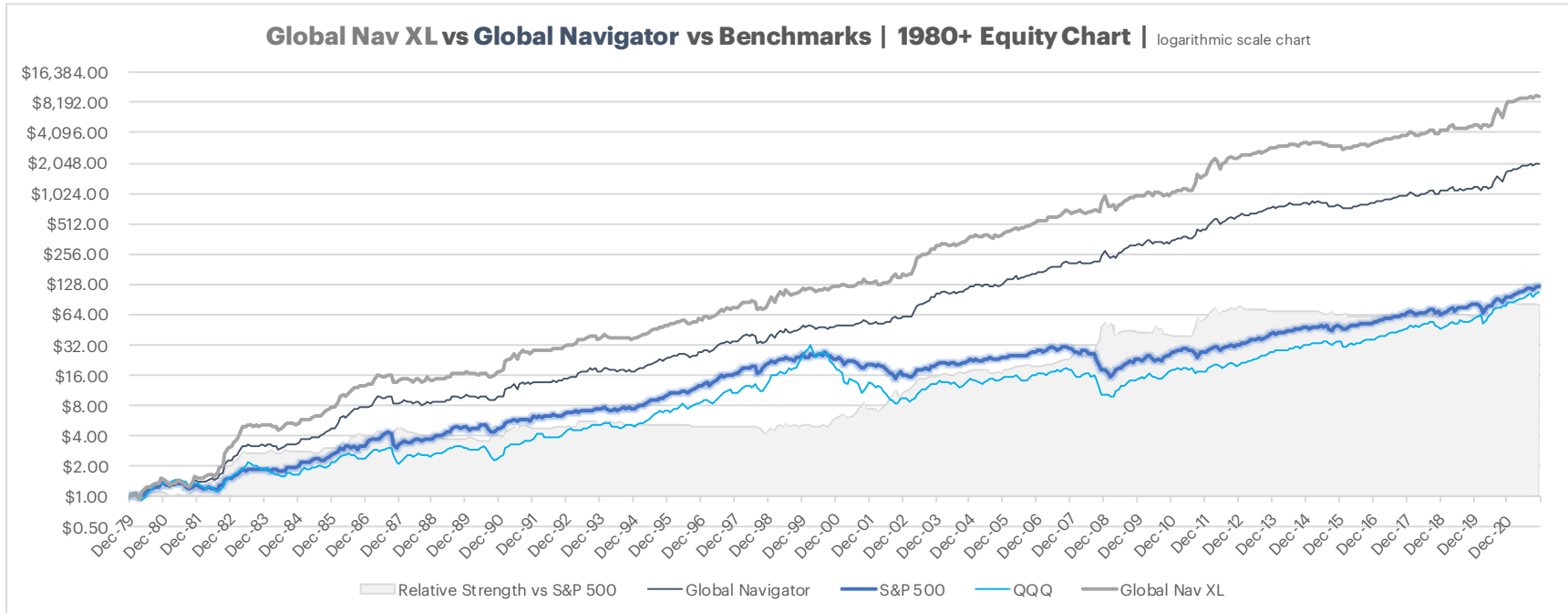
## Sortino Ratio, risk adjusted performance measure - bigger number is better.

Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
Global Nav XL	3.30	4.40	2.90	2.58	2.13	2.27	2.49
S&P 500	4.62	5.19	1.79	1.85	2.02	0.80	1.31
Nasdaq 100	4.32	5.33	2.45	2.45	2.38	0.61	1.08



Global Navigator XL inception date May 2021, out of same since then and before 2000.

Dual Momentum Systems: Global Navigator



Global Navigator XL inception date May 2021, out of same since then and before 2000.

# Dual Momentum Strategies: The Russell XXL

USA Momentum Rotational using Smart Leverage

Results through 11/30/2021

## Investment selection for December 2021:

IWB, Russell 1000

## Tax friendliness:

The Russell XXL has mostly Short Term Cap Gains.

## Months between change of holdings

The Russell XXL changes it's holdings every 2.7 months on average.

## Portfolio size appropriateness:

Big Fish, The Russell XXL can be used for up to \$2,500,000 allocations.

## Global Navigator Characteristics

Drawdowns: The Russell XXL has more conservative drawdowns than the S&P.

Volatility: The Russell XXL is usually less volatile than the S&P over time.

Returns: The Russell XXL has far higher historical returns compared to the S&P 500.

The Russell goes into 2X with Smart Leverage, and TLT when out of equities, The Russell XXL goes into 3X and TMF/EDV when out of equities.

## Strategy Description:

The Russell XXL invests in US equities going into the best performer of the Russell 1000, Russell MidCap Growth, or Russell MidCap Value. When these markets aren't experiencing positive momentum the strategy goes into 3X Long Term or Extended Duration Term Treasuries. This strategy uses Smart Leverage and goes into 3X equities for a limited time after an outsized drawdown in the markets, could go into 3X Leveraged equities until the strategy has a natural change of investment, then back into unleveraged.

## Strategy Components

IWB Russell 1000 → Smart Leverage: UPRO 3X S&P 500

IWP Russell MidCap Growth → Smart Leverage: TQQQ 3X Nasdaq 100

IWM Russell 2000 → Smart Leverage: URTY 3X Russell 2000

TMF 3X Long Term Treasuries, 1st month in treasuries

EDV Extended Duration Treasuries, subsequent months in treasuries

## Annualized Returns actual YTD for current year.

Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
The Russell XXL	20.57%	31.00%	55.66%	36.26%	29.15%	28.18%	28.61%
S&P 500	23.06%	27.63%	20.37%	17.77%	16.06%	7.26%	12.06%
Nasdaq 100	25.97%	34.77%	29.99%	24.75%	19.82%	6.83%	11.76%

## Maximum Drawdown, single largest drawdown.

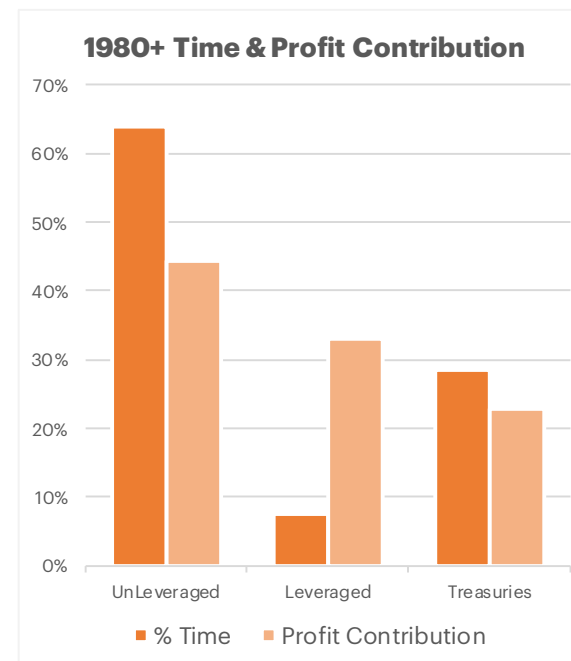
Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
The Russell XXL	-4.60%	-4.60%	-8.07%	-8.07%	-9.28%	-29.49%	-29.49%
S&P 500	-4.66%	-4.66%	-19.43%	-19.43%	-19.43%	-50.79%	-50.79%
Nasdaq 100	-5.68%	-5.68%	-17.48%	-17.48%	-17.48%	-74.14%	-74.14%

## Ulcer Index, the higher the number the more painful downside volatility. Considers all downside not just maximum.

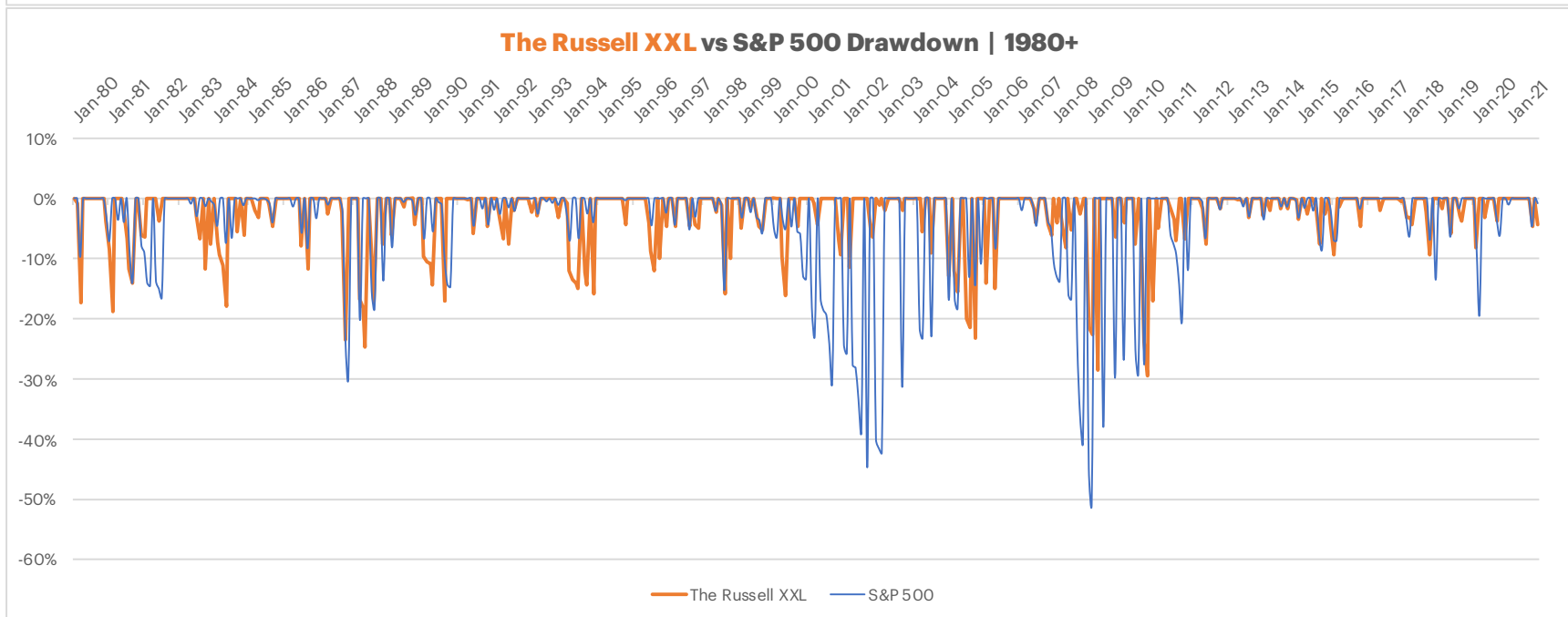
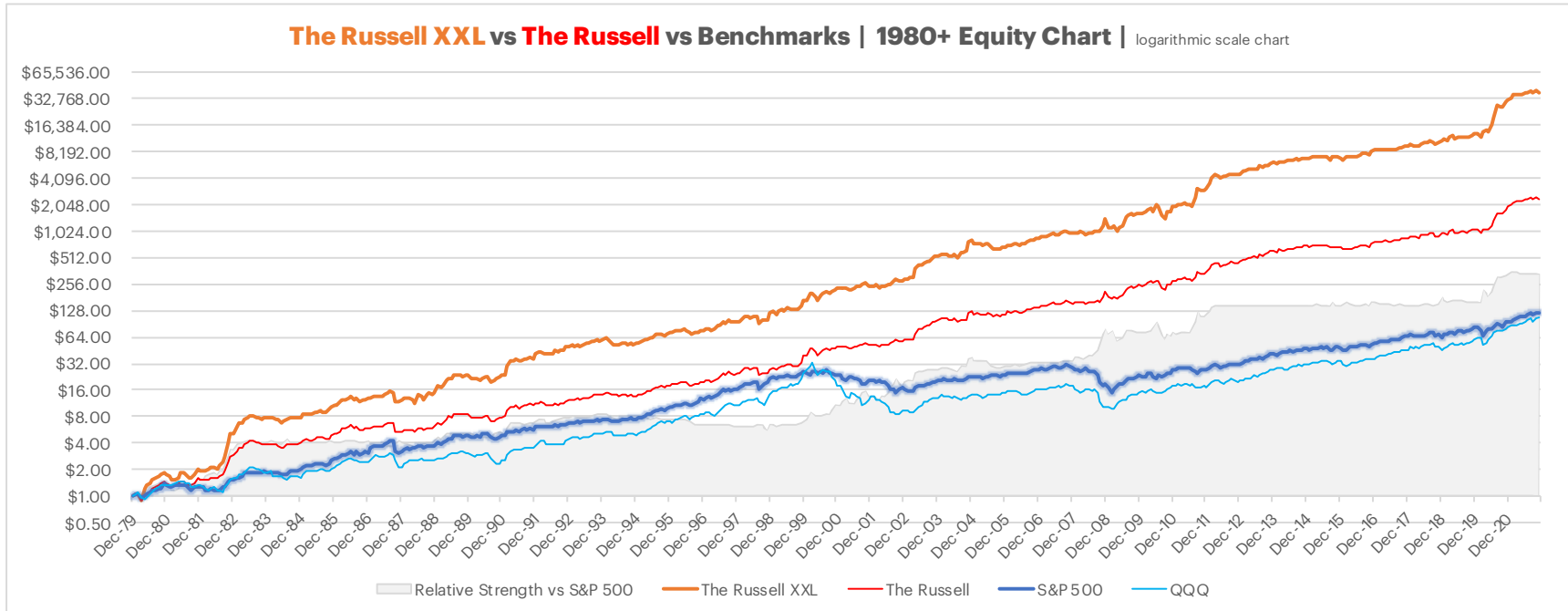
Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
The Russell XXL	1.82	1.75	2.40	2.47	2.43	6.76	6.91
S&P 500	1.39	1.34	4.52	4.25	3.43	16.82	12.91
Nasdaq 100	1.67	1.61	3.92	4.24	3.73	41.85	31.01

## Sortino Ratio, risk adjusted performance measure - bigger number is better.

Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
The Russell XXL	3.23	4.47	6.48	4.88	4.27	2.58	2.58
S&P 500	4.62	5.19	1.79	1.85	2.02	0.80	1.31
Nasdaq 100	4.32	5.33	2.45	2.45	2.38	0.61	1.08



The Russell XXL inception date March 2021, out of sample since then and before 2000.



The Russell XXL inception date March 2021, out of sample since then and before 2000.

# Dual Momentum Strategies: MAX PAIN

USA Momentum Rotational always using triple leverage

Results through 11/30/2021

## Investment selection for December 2021:

UPRO, 3X S&P 500

## Tax friendliness:

MAX PAIN has mostly Short Term Cap Gains.

## Months between change of holdings

MAX PAIN changes it's holdings every 2.5 months on average.

## Portfolio size appropriateness:

Small Fry, MAX PAIN is only suitable for < \$500,000 allocations.

## Global Navigator Characteristics

Drawdowns: MAX PAIN has frequent and larger drawdowns than the S&P.

Volatility: MAX PAIN is far more volatile than the S&P over time.

Returns: MAX PAIN has incredibly huge historical returns compared to the S&P 500.

## Strategy Description:

MAX PAIN invests in the United States, going into the 3X leveraged version of the best performer of the Russell 1000, Russell MidCap Growth, or Russell Small Cap. When these markets aren't experiencing positive momentum the strategy goes into 3X Long Term Treasuries. This is an extremely high return strategy with equally high volatility and frequent drawdowns, know what you're getting into.

## Strategy Components

URTY 3X Russell 2000

MIDU 3X S&P MidCap 400

UPRO 3X S&P 500

TMF 3X Long Term Treasuries, 1st month in treasuries

EDV Extended Duration Treasuries, subsequent months in treasuries

## Annualized Returns actual YTD for current year.

Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
MAX PAIN	61.60%	105.46%	69.94%	45.99%	44.44%	39.48%	37.50%
S&P 500	23.06%	27.63%	20.37%	17.77%	16.06%	7.26%	12.06%
Nasdaq 100	25.97%	34.77%	29.99%	24.75%	19.82%	6.83%	11.76%

## Maximum Drawdown, single largest drawdown.

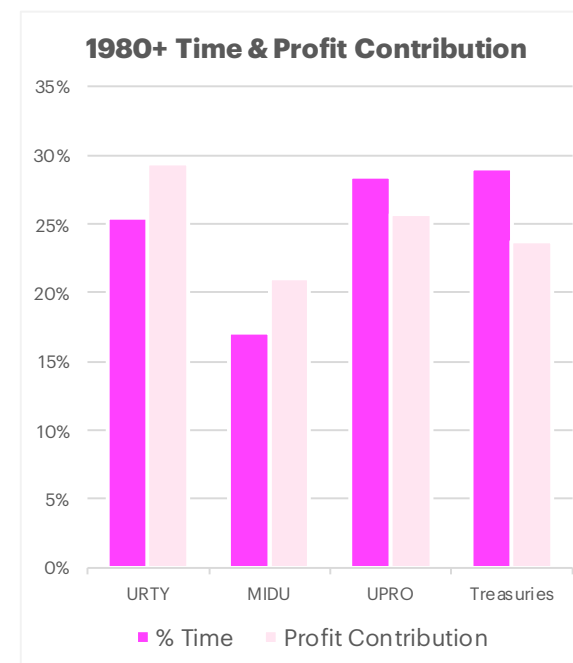
Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
MAX PAIN	-13.94%	-13.94%	-23.74%	-23.74%	-35.19%	-35.19%	-67.06%
S&P 500	-4.66%	-4.66%	-19.43%	-19.43%	-19.43%	-50.79%	-50.79%
Nasdaq 100	-5.68%	-5.68%	-17.48%	-17.48%	-17.48%	-74.14%	-74.14%

## Ulcer Index, the higher the number the more painful downside volatility. Considers all downside not just maximum.

Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
MAX PAIN	4.27	4.10	9.22	10.63	11.39	12.58	21.11
S&P 500	1.39	1.34	4.52	4.25	3.43	16.82	12.91
Nasdaq 100	1.67	1.61	3.92	4.24	3.73	41.85	31.01

## Sortino Ratio, risk adjusted performance measure - bigger number is better.

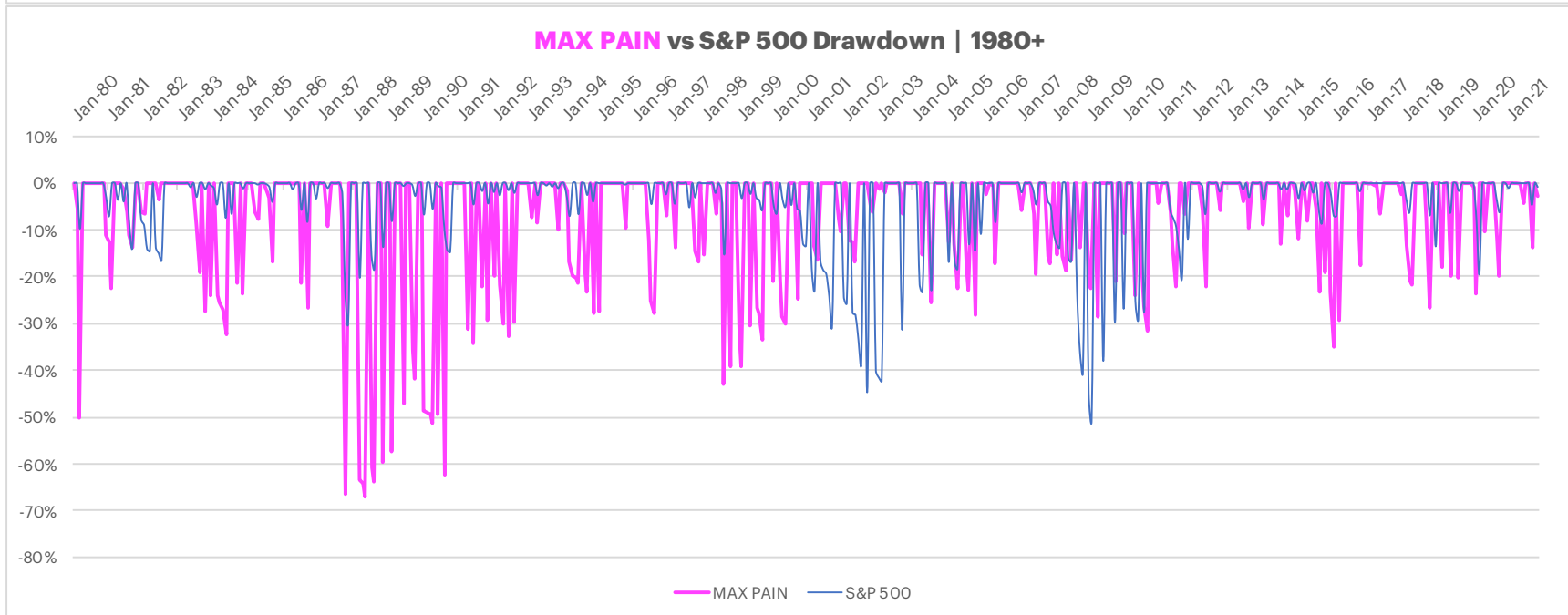
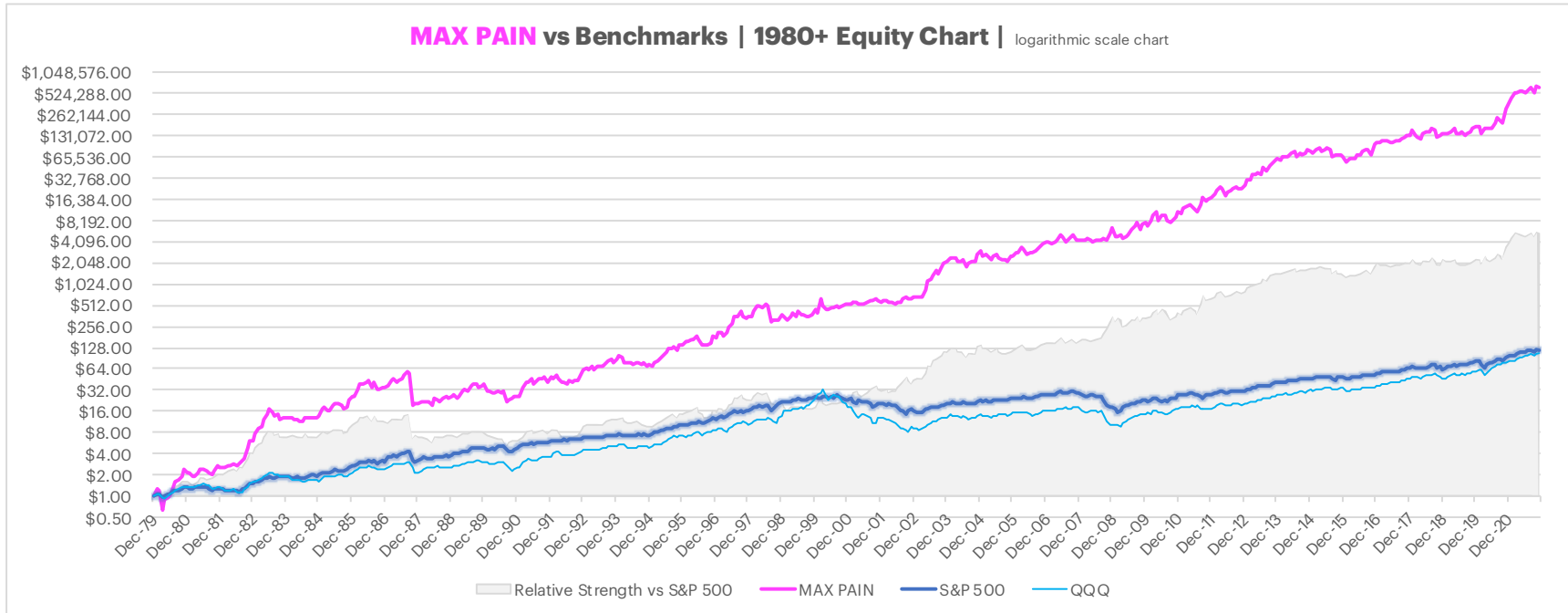
Investment	YTD	1 Year	3 Year	5 Year	10 Year	2000+	1980+
MAX PAIN	3.84	5.51	3.05	2.26	2.25	2.04	1.74
S&P 500	4.62	5.19	1.79	1.85	2.02	0.80	1.31
Nasdaq 100	4.32	5.33	2.45	2.45	2.38	0.61	1.08



The MAX PAIN inception date January 2021, out of sample since then and before 2000.



Dual Momentum Systems: MAX PAIN



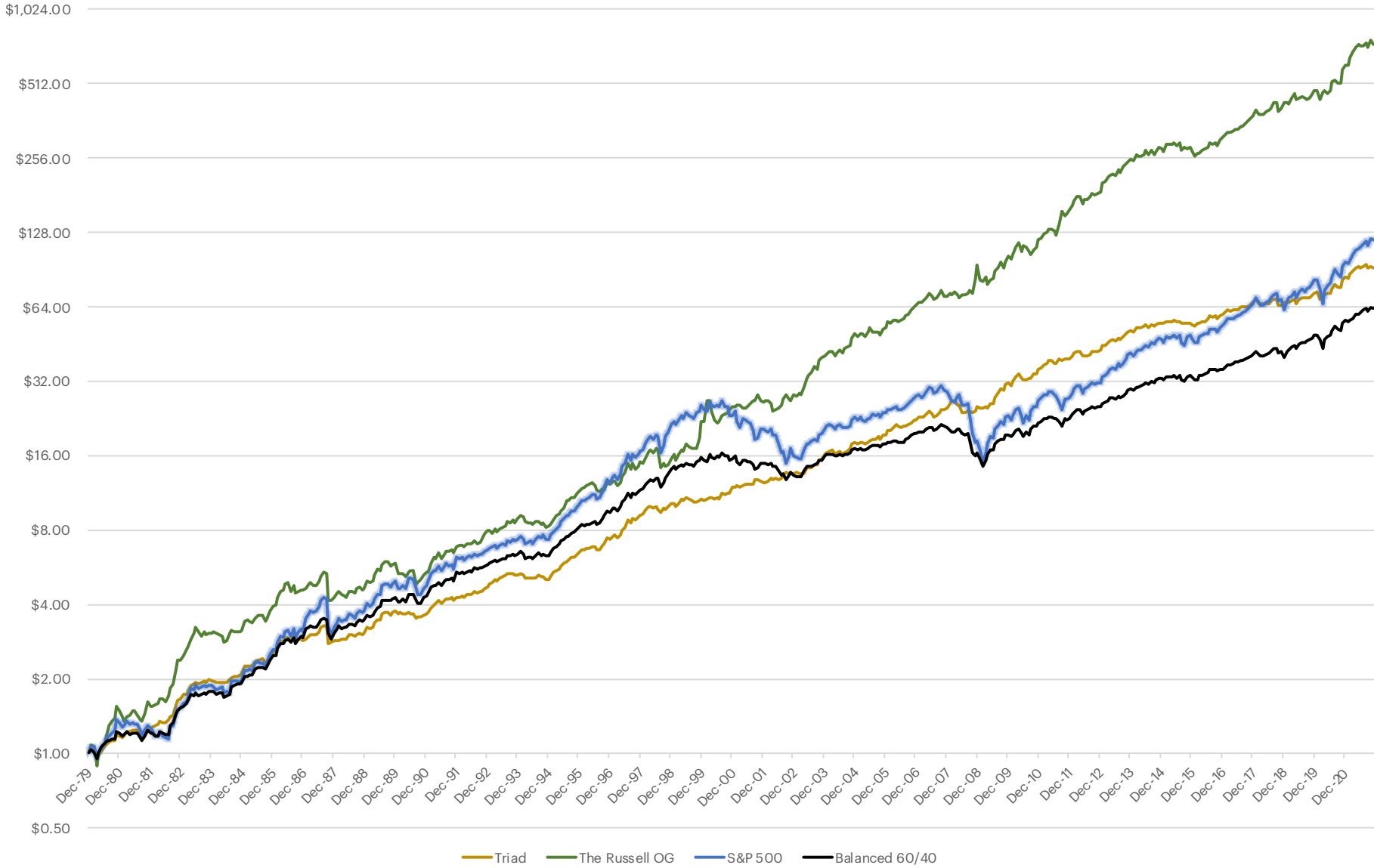
The MAX PAIN inception date January 2021, out of sample since then and before 2000.

# **DUAL MOMENTUM SYSTEMS**

## **Equity Charts**

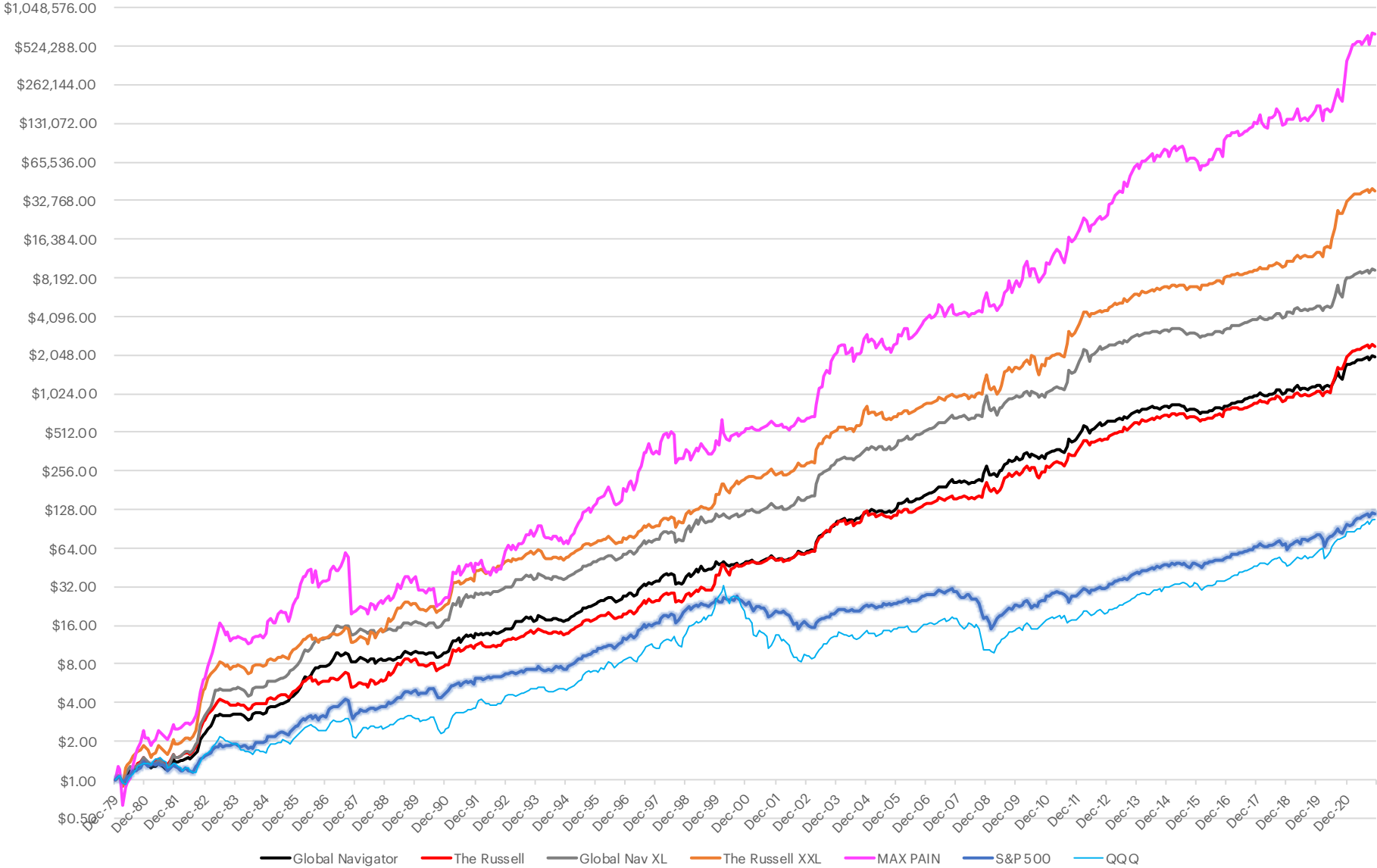
### Triad vs The Russell OG vs Benchmarks 1980+ Equity Chart for Strategies which never use leverage

logarithmic scale chart



### Global Navigator vs The Russell vs Global Nav XL vs The Russell XXL vs MAX PAIN vs Benchmarks 1980+ Equity Chart for Strategies which use leverage

logarithmic scale chart



## Metrics, Annual Returns and Correlations

**CAGR:** Compound Annual Growth Rate, on average how much the strategy has returned per year

**Ulcer Performance Index:** A risk adjusted performance ratio which uses the Ulcer Index in it's calculations

**Sortino Ratio:** A risk adjusted performance ratio commonly used

**Gain to Pain:** Used by the famous Jack Schwager, simply the total net gain divided by net loses along the way

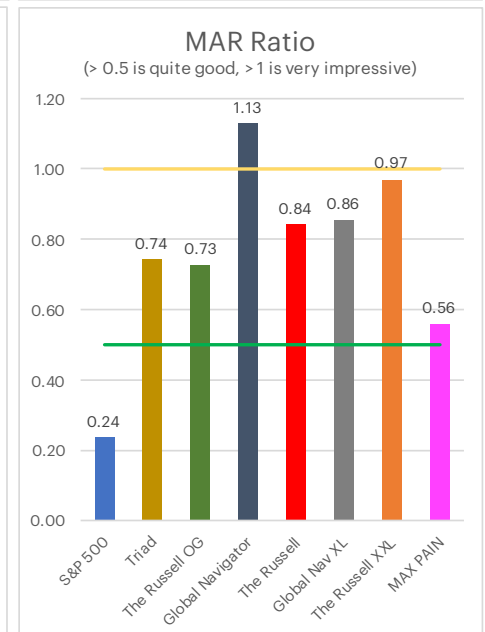
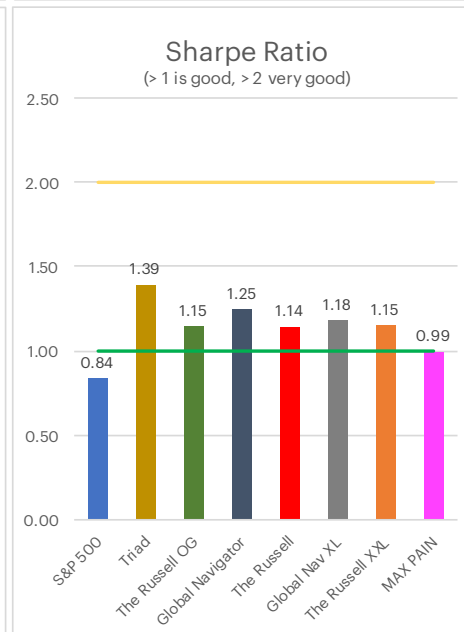
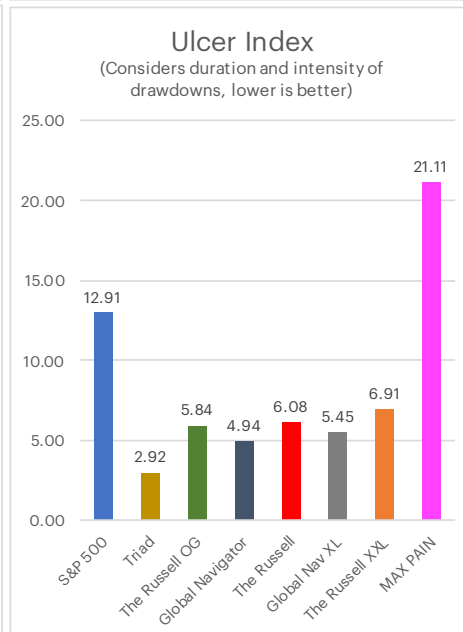
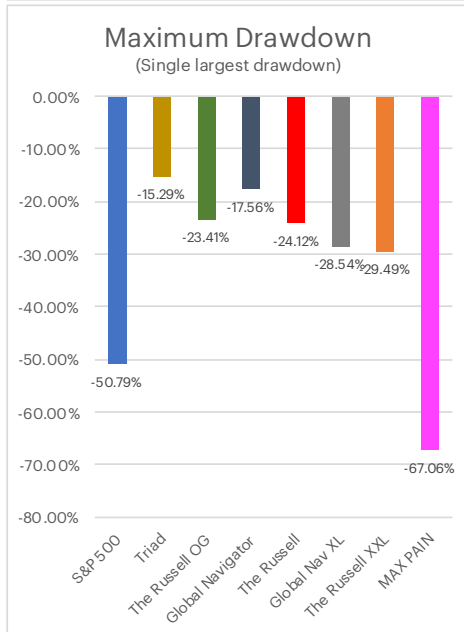
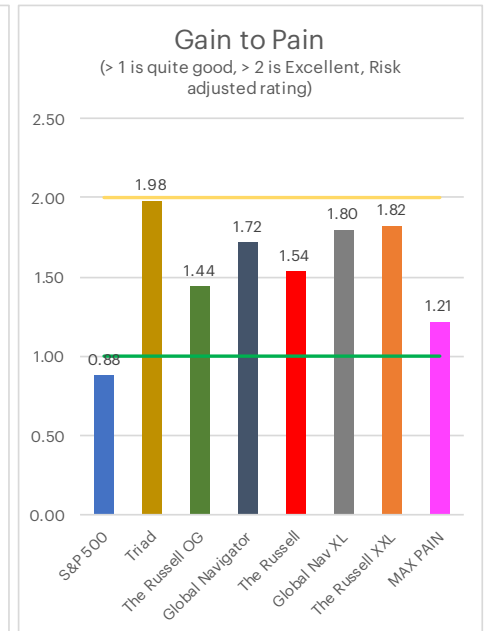
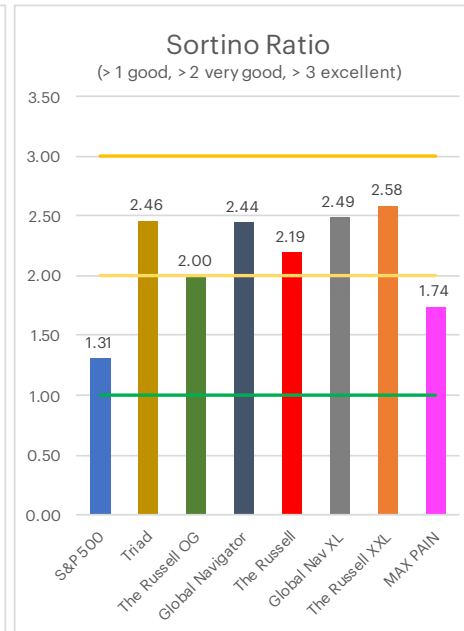
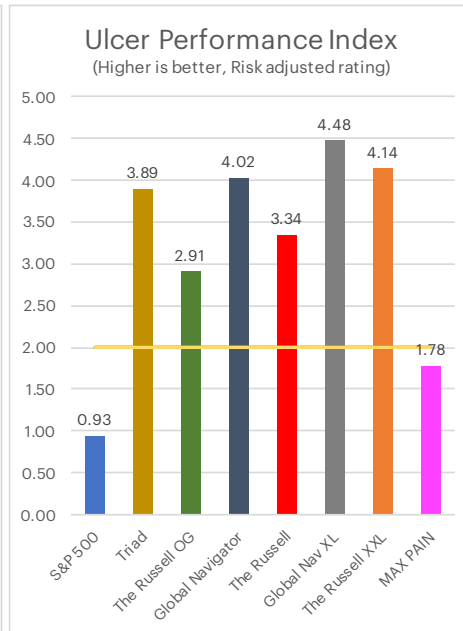
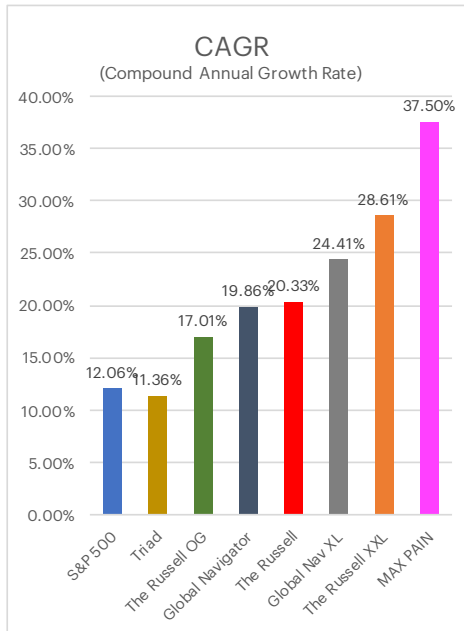
**Maximum Drawdown:** The largest negative drawdown for the strategy, on a month end basis

**Ulcer Index:** Measures how bad drawdowns are for an investment, not related to gains, just drawdowns

**Sharpe Ratio:** A commonly used risk adjusted performance measure, however, it penalizes for upside volatility

**MAR Ratio:** A risk adjusted performance ratio, uses maximum drawdown in it's calculations

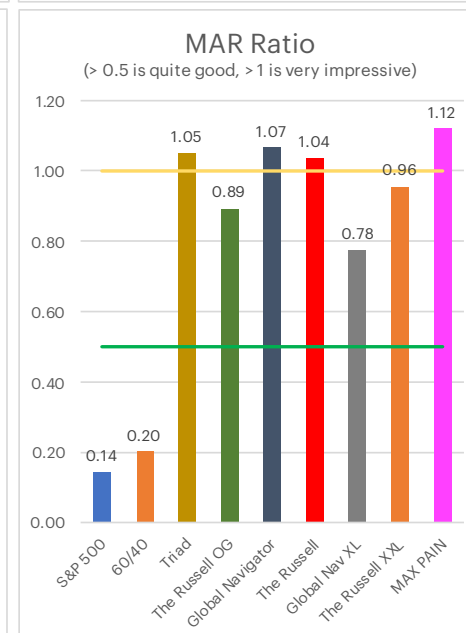
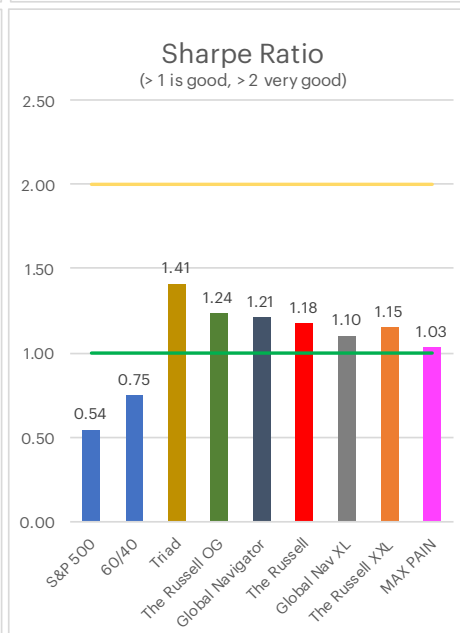
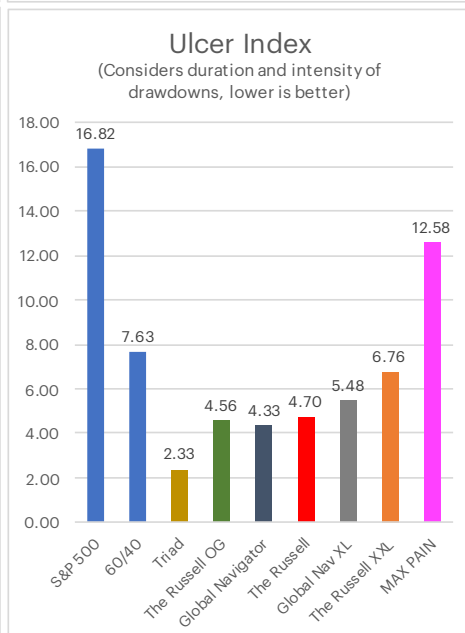
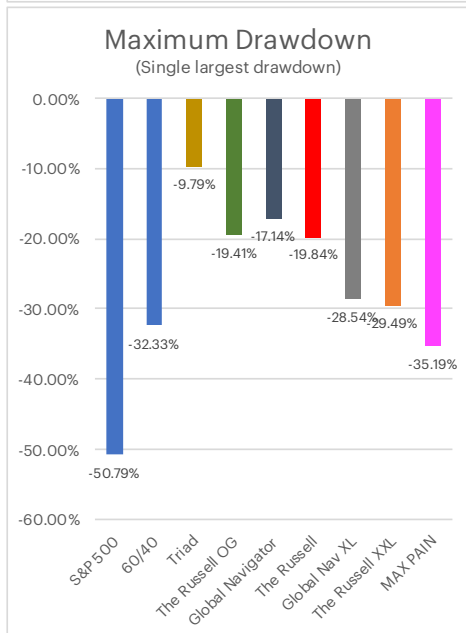
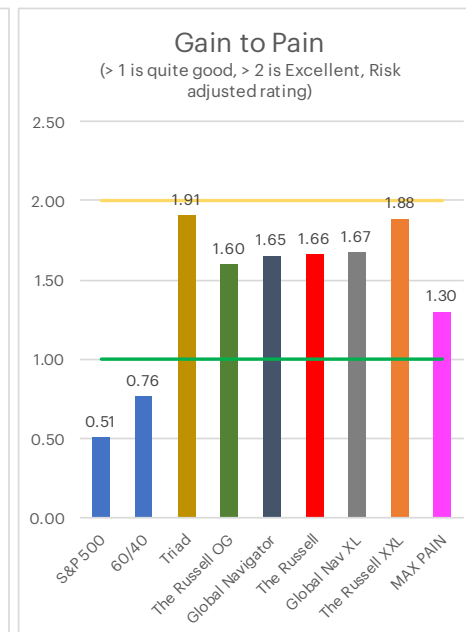
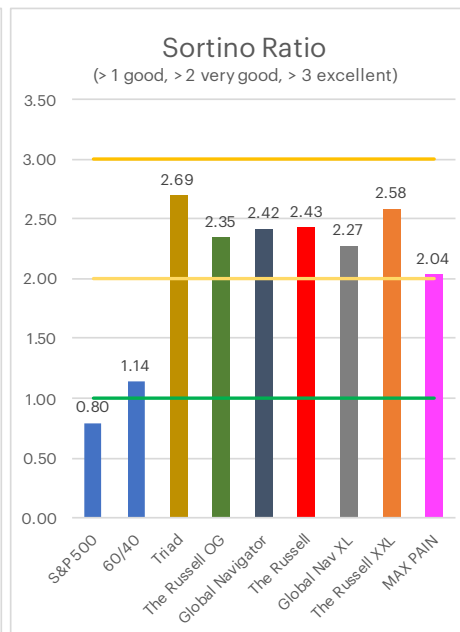
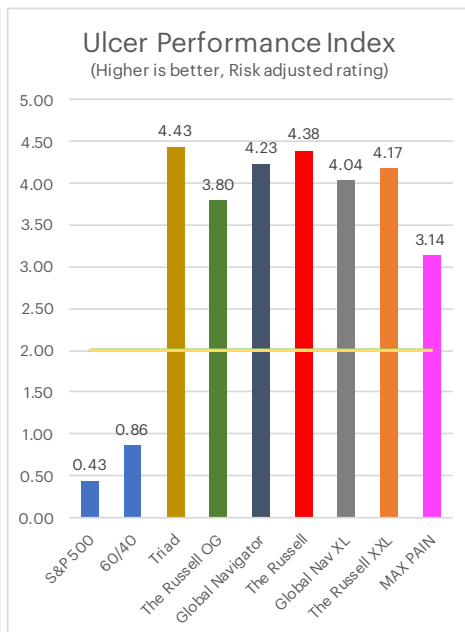
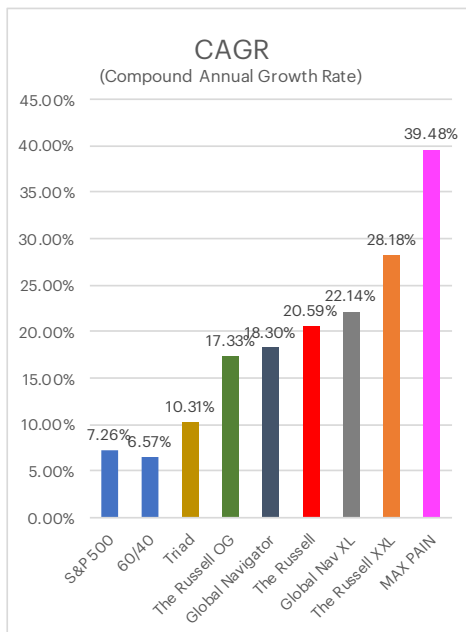
## "Long Term" Metrics Comparisons: Strategies vs S&P 500 1980 to current



All Metrics are calculated from Monthly returns



## "Modern Era" Metrics Comparisons: Strategies vs S&P 500 2000 to current



All Metrics are calculated from Monthly returns

### 36 Month Strategy Return Correlations

←Conservative

Aggressive →

	S&P 500	Balanced 60/40	QQQ	Triad	The Russell OG	Global Navigator	The Russell	Global Nav XL	The Russell XXL	MAX PAIN
S&P 500	1.00									
Balanced 60/40	0.99	1.00								
QQQ	0.72	0.73	1.00							
Triad	0.60	0.57	0.18	1.00						
The Russell OG	0.41	0.38	0.07	0.90	1.00					
Global Navigator	0.48	0.46	0.15	0.86	0.85	1.00				
The Russell	0.39	0.37	0.23	0.74	0.74	0.86	1.00			
Global Nav XL	0.44	0.44	0.12	0.80	0.78	0.99	0.83	1.00		
The Russell XXL	0.23	0.20	0.06	0.64	0.64	0.78	0.96	0.77	1.00	
MAX PAIN	0.47	0.43	0.12	0.85	0.86	0.92	0.77	0.88	0.66	1.00

# DUAL MOMENTUM SYSTEMS

Thank you for your time, my hope is that these strategies may help you grow your investments more than a market index fund, with less drawdowns along the way.

Countless hours of thought, development, and modeling have gone into these strategies which were inspired from the work of Gary Antonacci at [www.OptimalMomentum.com](http://www.OptimalMomentum.com). I have entrusted my invested net worth into these strategies, I am not looking to gain from anybody else who chooses to use them, I simply want to share what I think are fantastic ways to invest money for the long run. Receive the strategy information free by emailing me and getting on the distribution list, your information is kept private.

A handwritten signature in black ink, appearing to read "Randy".

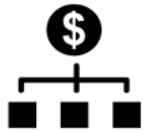
# **DUAL MOMENTUM SYSTEMS**

## **Appendix: How to invest in Dual Momentum and How it works**

# How would a person invest in these Strategies?



- At the end of the month notice of which investments the strategies should be invested in for the next month are distributed. You can make any necessary trades the first day or two of the month. This is a free service, these models are run for my own investment portfolio, I like to share with interested people who want more than a buy and hold strategy.



- Determine your allocation, you'll need to decide if you want to go with Global Navigator, The Russell, or some combination of both. In the reporting you'll see a "30/70 Model Portfolio", that is because this is what I do personally: 30% Global Navigator and 70% The Russell.



- Place your trade at your brokerage company so that you are in the investment that the ETF which the strategy indicates for the next month. There is no need to scale in when you start the strategies, every month is a new investment decision to be fully in equities or in Treasuries. You only need to make sure that you are holding the investment for the month that the models tell you to hold.

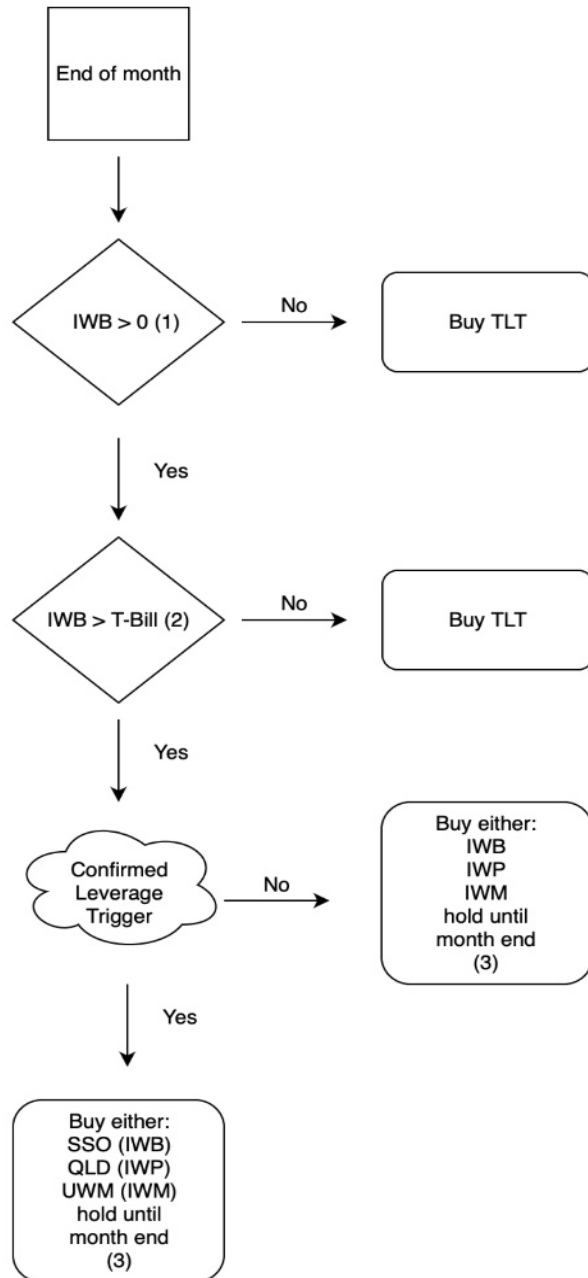


- When the models are in Risk OFF mode they are out of equities and in Treasuries. When in Risk OFF mode the models set to go into UST which is a 2X Intermediate Treasuries ETF. For most of us, this is a great choice. If you are a whale investor then you should probably be considering going into either ZROZ or EDV instead for maximum gain prospects, a whale could instead buy VGLT if they want less volatility when are out of equities.



- These strategies move differently than a market index fund, and on any given day, week, month, or year could underperform the market index, however, this does not mean that the strategies are no longer working - they are best evaluated over a longer time period. Please look closely at the annual performance compared to the S&P on the Bar Chart, it shows very clearly on an annual basis how great these strategies perform to the market, but not every year. Also look closely at the Maximum Drawdown chart, yes, there are some big dips on the dual momentum strategies, but the drawdowns are both more shallow and fewer in number than the market.

# How do the strategies select where to invest?



This example to the left shows the decision process for **The Russell**.

**Decision 1)** When the month is over the full month results are used to calculate the weighted returns: 25% of the 1 month return plus 25% of the 3 month return plus 50% of the 6 month return. If the weighted return for the Russell 1000 is less than zero, then the strategy goes into Treasuries for the next month.

**Decision 2)** If the Russell 1000 weighted return was positive, check to see if the weighted return is greater than the 90 day T-Bill weighted return, if not the strategy goes into Treasuries for the next month.

**Decision 3 No)** If the Russell 1000 weighted return was higher than the 90 day T-Bill weighted return, do we have a confirmed Leverage Trigger (which can happen after an outsized drawdown in the Russell 1000), if not we invest in either the Russell 1000, Russell Mid-Cap Growth, or Russell 2000, the one of those three selected is the one with the highest relative strength determined by comparing their weighed returns.

**Decision 3 Yes)** If there was a confirmed Leverage Trigger, then we invest in SSO instead of Russell 1000, and QLD instead of Russell Mid-Cap Growth, and UWM instead of Russell 2000.

The investment is held until the end of the month, and the process is done again. On average, investments are held about 4 months before changing.



## Extended Data & Out of Sample

### Extended Data

The strategies use ETF monthly total return data. Leveraged ETF data is used as far back as it is available, it is simulated using the available daily return total data to extend the leverage returns back in time. At this time, only the leveraged S&P 500 from 1970 through 1979 had to be simulated on monthly data instead of daily, if that information becomes available to me it will be updated. This deck is reporting back to 1980 for all strategies, I do have Global Navigator and Global Navigator XL back to 1970 but as mentioned the extended data for the 1970's should be based on daily returns.

The Nasdaq 100 benchmark data is based on Nasdaq 100 back to 1986, however, it didn't exist or data can't be found before that time, so the Nasdaq Composite is used pre-1986 as a proxy. I couldn't reliably emulate Nasdaq 100 from Nasdaq comp.

### In Sample, and Out of Sample

The strategies were created with available data from 2000 through the time each strategy was created. Because this data was available and used in the modeling of each strategy, it is considered "In Sample". "Out of Sample" is the periods that the strategy is looking at for which returns were not available when the strategies were created. 1980 through 2000, and from when the strategy was finalized forward is all out of sample.

Nothing was changed to any of the strategies after seeing the additional 20 years from 1980 through 2000, nor were any of the strategies changed or modified due to any returns which have resulted after the strategies were created. I use these strategies myself to invest my hard earned dollars in them, I don't want to fool anybody, most especially not myself by tweaking the strategies to handle some big incident better than it was originally designed to do, no data mining!