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MANAGE RISK. EXPLOIT OPPORTUNITY.

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Real Asset Allocation: The World Has Changed

"***Time takes it all***, *whether you want it to or not.*" – **Stephen King**

"***Much unhappiness has come into the world because of bewilderment*** *and things left unsaid.*"
– **Fyodor Dostoevsky**

"***How dangerous is the acquirement of knowledge*** *and how much happier that man is who believes his native town to be the world, than he who aspires to be greater than his nature will allow.*" – **Mary Shelley, Frankenstein**

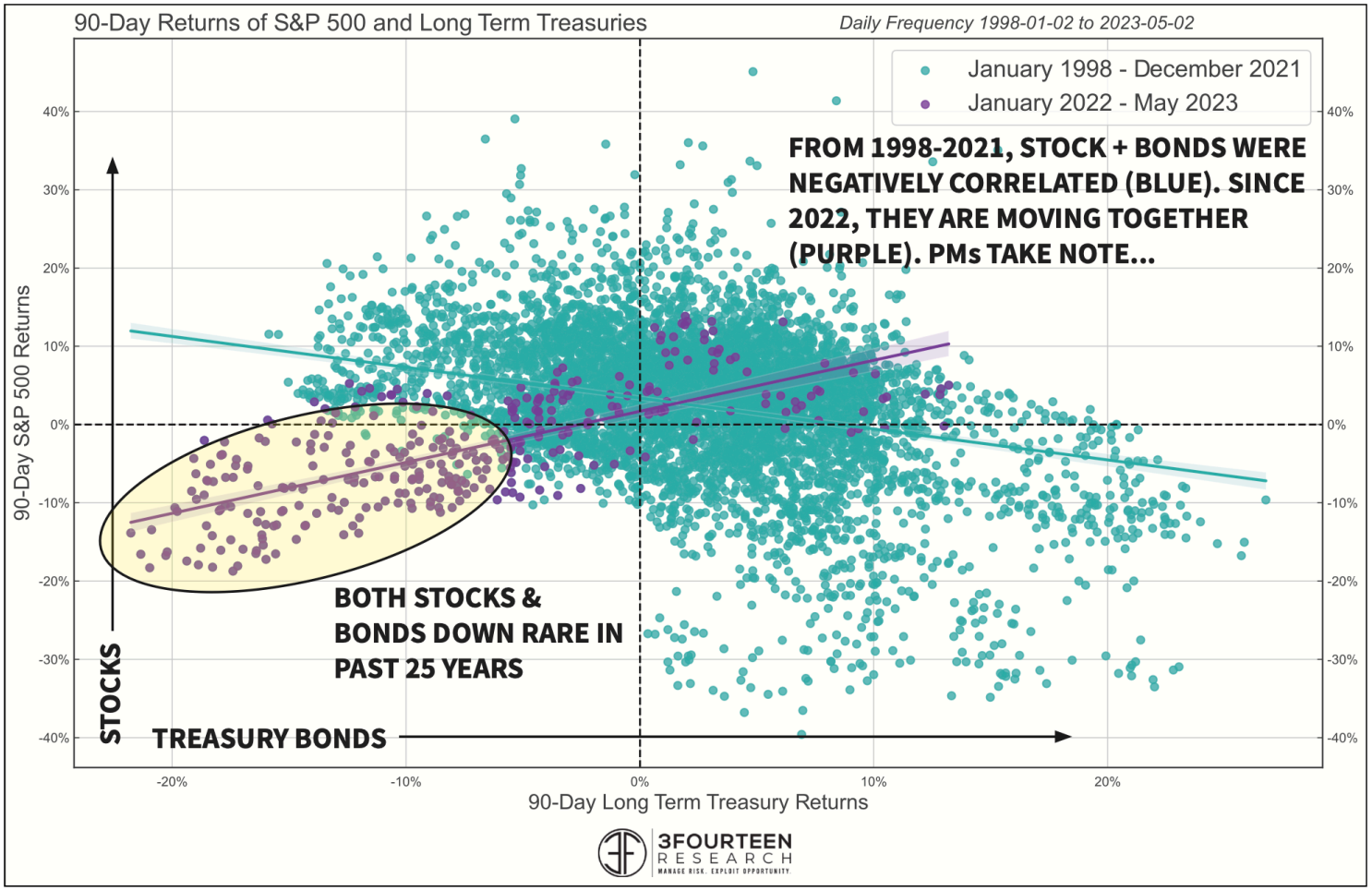
"*The only way* ***to make sense out of change is to plunge into it****, move with it, and join the dance.*" – **Alan Watts**

"***Desperation is the raw material of drastic change****. Only those who can leave behind everything they have ever believed in can hope to escape.*"
– **William S. Burroughs**

"*The 60/40 is not 'back' because it never left.*" – **Barry Ritholtz, April 19, 2023**

EXECUTIVE SUMMARY

- Since 2022, stocks and bonds have begun moving together in a way they have not in the previous 25 years.
- The addition of $8 trillion of Federal debt, a war involving a major energy producer, and a looming energy transition ensures that inflation will be a bigger problem over the next 25 years.
- Expanded asset menus, novel trend following and vol-dampening strategies are necessary tools for success.

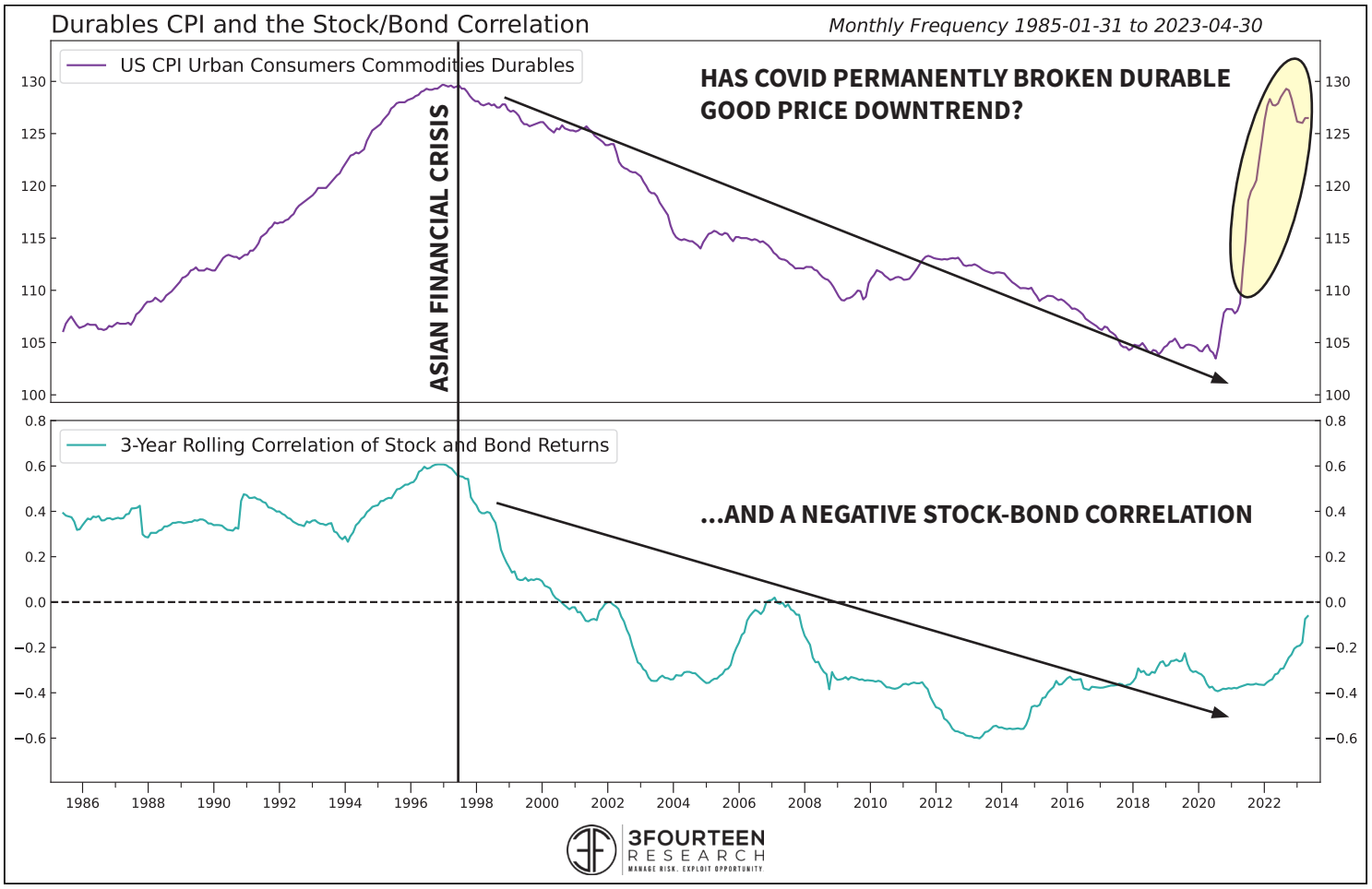


These days, defined price trends are a rare thing. Stocks, bonds, and commodities are all stuck in frustratingly wide ranges. Throughout 2023, we have fielded client questions from both bulls and bears. The questions change, but the theme remains the same: confusion. From one perspective, the economy still appears healthy and inflation persistent. But, from another angle, a credit crisis is threatening the foundation of an overleveraged system. Loans and business models made when interest rates were at 0% are now struggling under the burden of positive real rates. There is evidence supporting both narratives. At 3Fourteen, a big part of our job is to help make sense of the world and specifically markets. Zooming out helps us better understand the strange crosscurrents of the moment.

From 40,000 feet, we believe that the pandemic (and our collective response) marks the end of a market epoch. This belief fueled the creation of 3Fourteen. Our vision is simple in theory: Exiting COVID, the world has changed. The investing approaches that dominated the past 25 years will no longer work. We must create new systems for this next chapter of market history. Put simply, one era has ended and another is here. The transition period is bound to be confusing.

This is not a new theory. We have written about secular changes often. (See our reports from June and October 2021 here and here. We first pondered a tectonic shift in market structure two years ago. Back then, we saw the first changes in the stock-bond relationship and wondered "*whether the market structure that began with the Asian Financial Crisis will end with the COVID crisis.*"

Most weeks, we focus on the "cyclical" factors impacting markets (new econ data, recession timing, market valuations, etc.). Cyclical issues work on an intermediate-term timeframe (6-24 months). Secular factors are—by definition—less dynamic. They move, in the background, at glacial speeds. However, they are the primary trends of the market. When they change, things get weird. **This week, we widen our view to take in the secular changes we are witnessing. More importantly, we provide an overview of our solution to the changing landscape: The 3Fourteen Real[1] Asset Allocation Model (RAAM).** In preview, the RAAM's premise is simple. To survive in this next market phase, investors must broaden their asset menu and allow for dynamic weighting of these many assets.

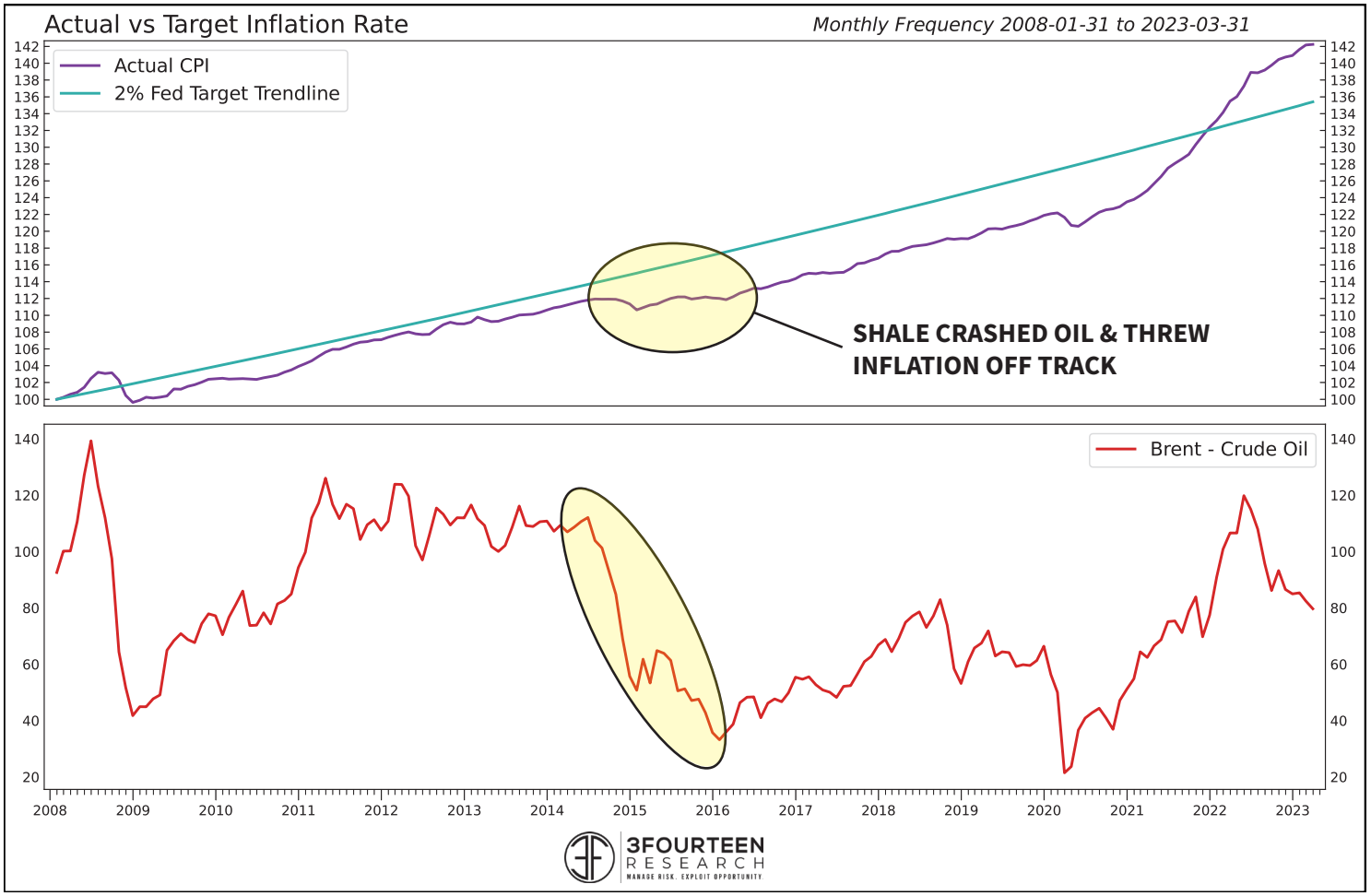


Let's review our thesis: Around 1998-2000, there was sea change in intermarket relationships. **After moving together for most of financial history, stocks and bonds began trading opposite of each other. Why? This period introduced powerful disinflationary forces.** First, the Asian Contagion weakened the region's currencies, which set the table for the Far East to become the manufacturer to the world. Then, on the back of a boom in its working age population, China entered the WTO (2000). Finally, the Euro emerged fully in 2002. Globalization was here and it delivered on the promise of cheap consumer goods (chart page 2).

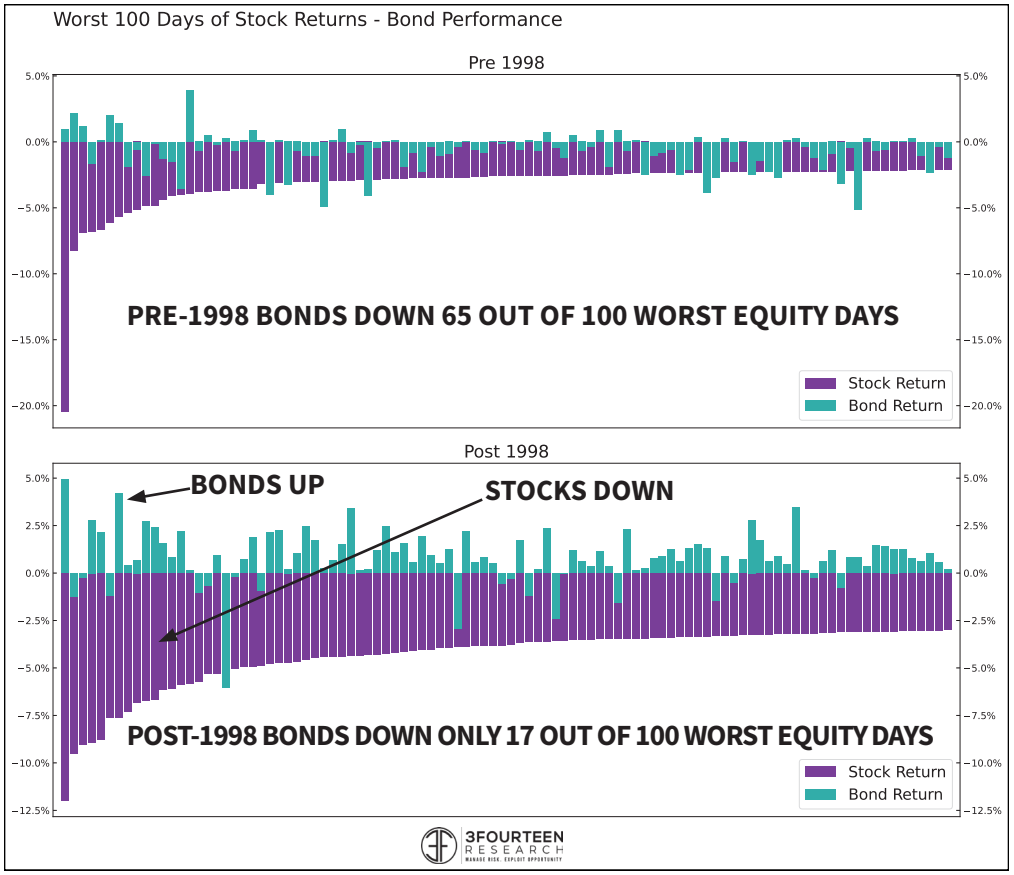
The impacts went far beyond cheaper washers, dryers, and TVs. This disinflationary era changed the relationship between stocks and bonds (chart previous page). Globalization was not the only force working to hold down prices in the early 21st Century. In the years following the GFC, the Shale Revolution exploded. Over a roughly 10-year period, investors funded money-losing shale operators. Wall Street's excitement over this new source of hydrocarbons subsidized consumers and provided another disinflationary tailwind. Altogether, inflation was not a concern for 20+ years. In the 2010s, the Fed worked hard to RAISE inflation to its 2% target.

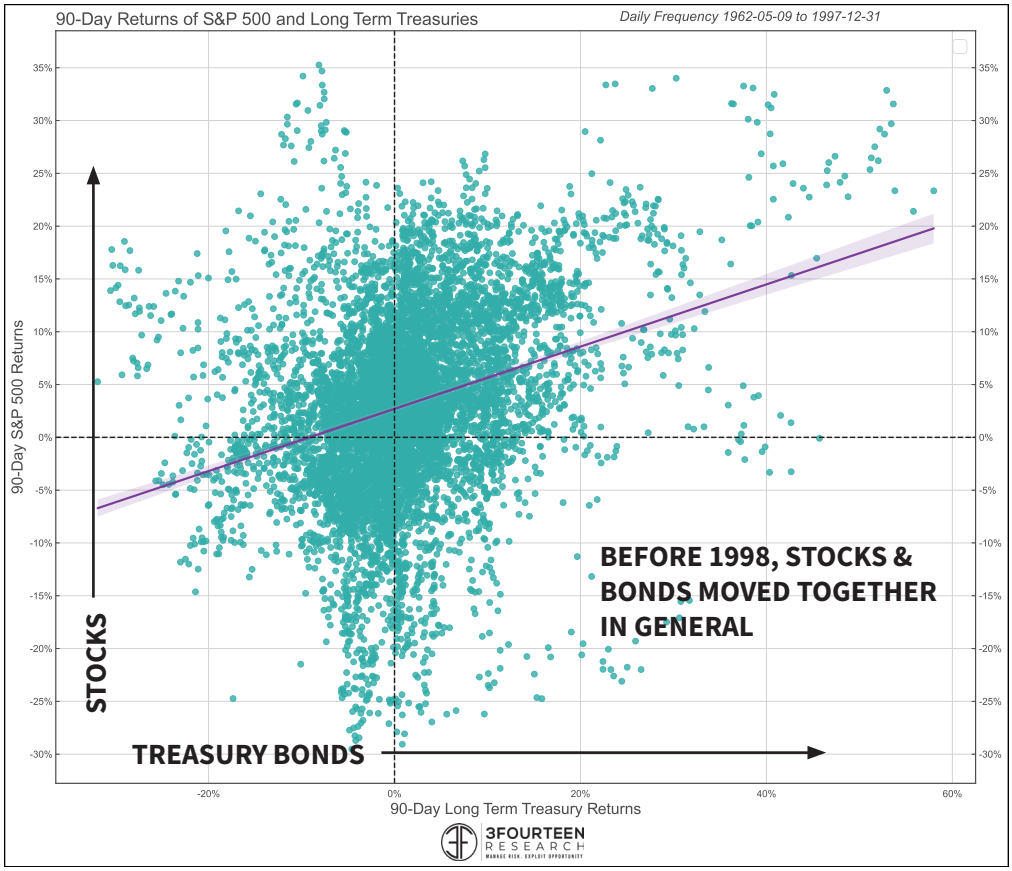
Without the threat of inflation, growth became the main factor in determining the relative price movements of stocks and bonds. All of this conspired to create the market structure we were familiar with from 1998 to 2021: Bonds go up (yields down) when stocks fall. These disinflationary forces are now reversing. Intermarket relationships are changing as well.

Back in 2021, our theory was just that—a theory. With the pandemic ongoing, all we could do was speculate on how the world would change coming out the other side. Now, two years later, we have data. And, the data confirms our theory: The markets have changed. In the scatter plot on page one, we display the relationship between stock and bond returns from 1998 to 2021 (90-day rolling returns - blue dots). Against these dates, we juxtapose the stock-bond relationship from 2022 to present in purple. The difference is striking. As we already know, stocks and bonds moved opposite of each other during 1998-2021 period. **Notice how few blue dots were in the bottom left quadrant (negative stock + bond returns). Since 2022, the relationship has completely flipped. Stocks and bonds are moving together.** The bottom left quadrant is littered with purple dots.



Moving into 2023, both stocks and bonds have rallied together (for the most part). This has boosted 60/40 returns and led some commentators to proclaim that the rumors of the classic benchmark's death have been greatly exaggerated (see Ritholtz quote on page 1). This is not the correct conclusion. The magic of 60/40 has been the negative correlation between stocks and bonds. Especially during periods of intense market stress, the bond hedge softened the downside volatility for retirement portfolios. From 1998 through 2021, bonds were up 83 out of the 100 worst stock market days (chart next page).

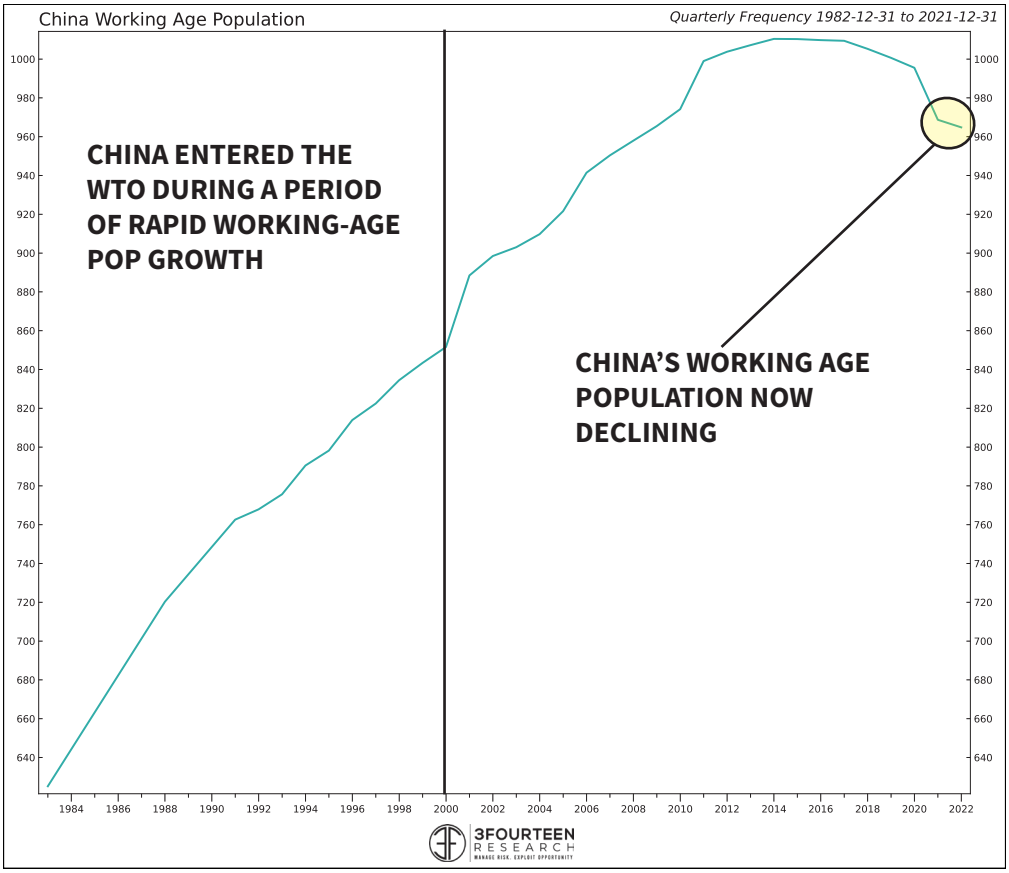


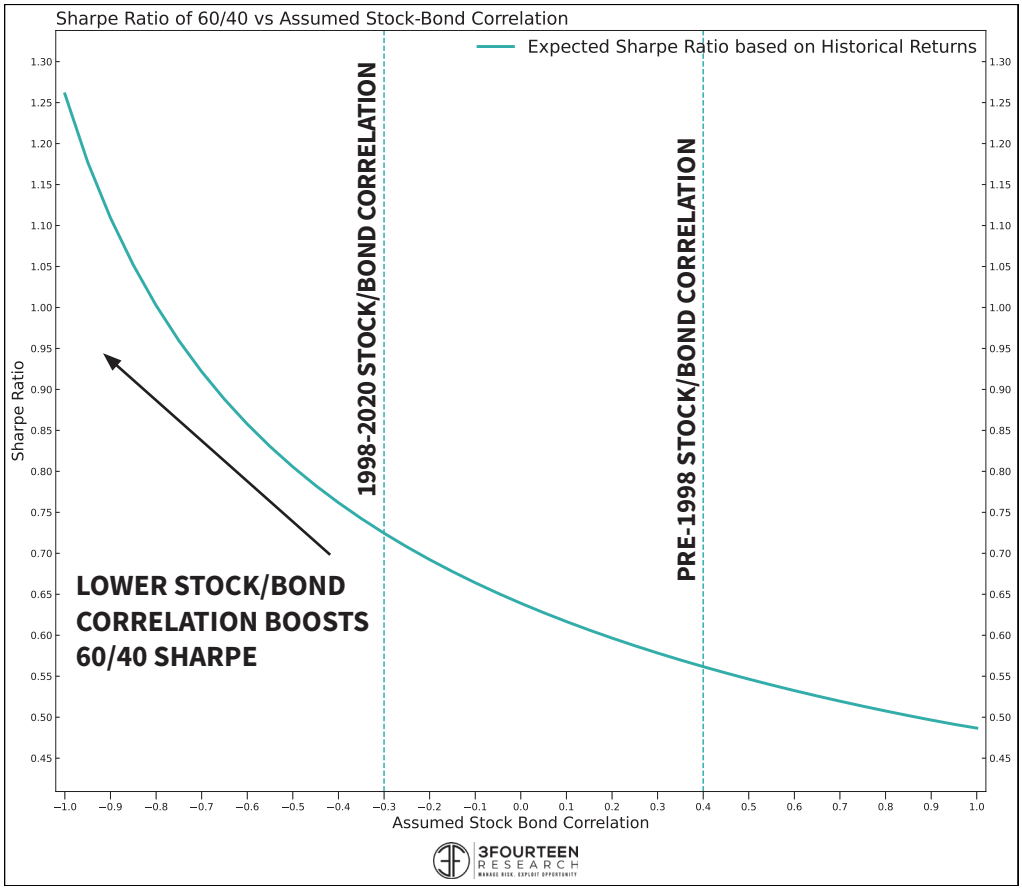


It wasn't always this way. Before 1998, bonds were up on only 35 of the 100 worst stock market days (chart above). On the 10 worst stock market days last year, bonds were up on only 4 (closer to the pre-1998 ratio). In the scatter plot to the left, we replicate the study on page 1 (stock vs bond returns), but move the date range to 1962 through 1997. In these years, the stock-bond relationship more closely resembled the pattern observed since 2022 (positive relationship). **The key point is not that 60/40 will never produce positive returns again. Rather, as the stock-bond relationship flips, there will be more 60/40 volatility—both on the upside and downside. The strong returns of 2023 (so far) are a symptom of the underlying problems…not an invalidation.**

We shouldn't be too surprised that recent market action has been bewildering. The secular winds are shifting. Many of the trends of the past 25 years are reversing. Consider the following post-COVID changes:

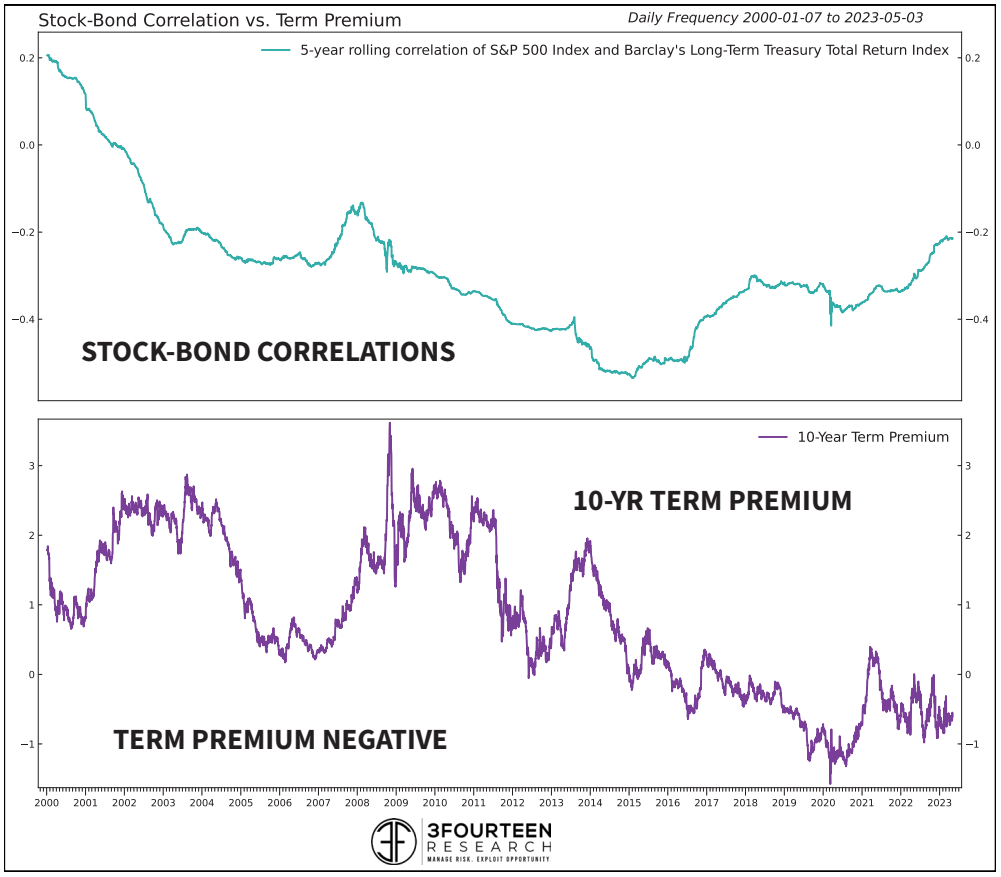
- The U.S. added $8 trillion to the Federal debt (unprecedented 33% increase). With a structural $1 trillion deficit.
- China's working age population has contracted by at least 40 million (chart right).
- Russia's invasion of Ukraine has placed +10% of global oil production at long-term risk and threatens to create new geopolitical divisions.
- Most shale basins have passed peak production.
- Western governments are committed to a new "Green Revolution."

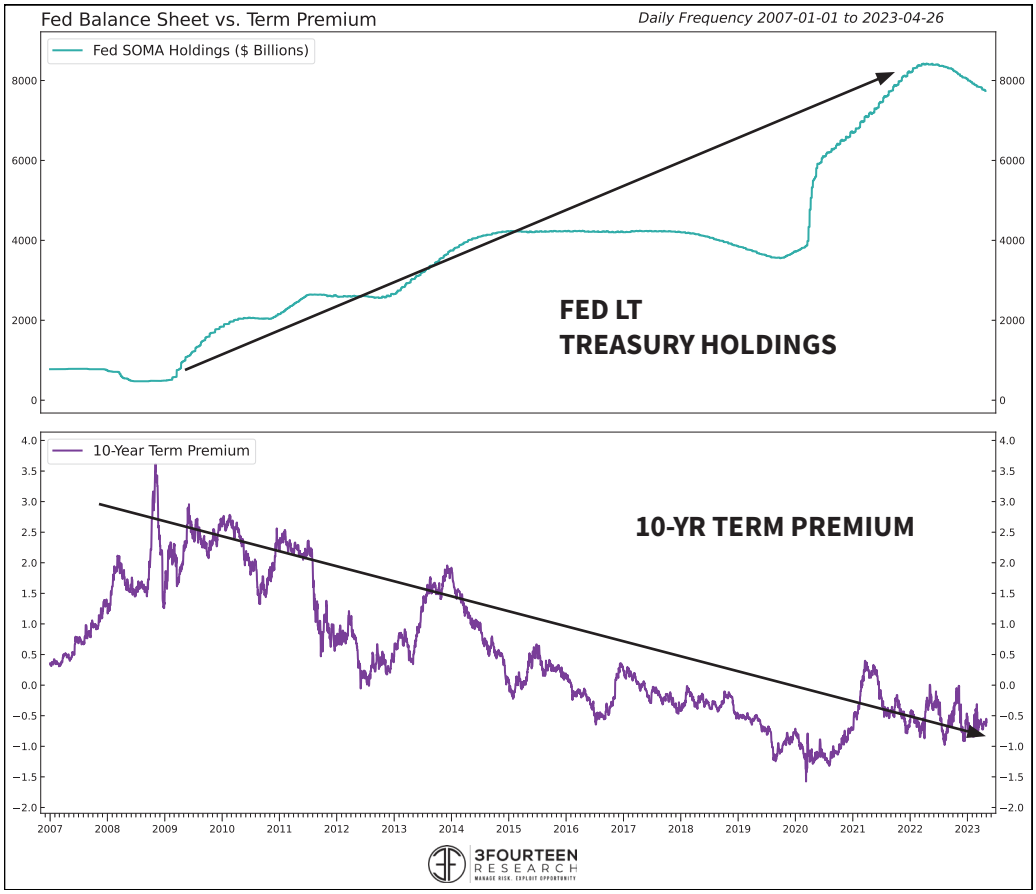




The upshot: Expect stocks and bonds to continue to move together. **A strong positive correlation between these two primary assets is an unequivocal negative for portfolio managers.** In the chart to the left, we plot the Sharpe Ratio of a 60/40 stock-bond portfolio under varying correlation assumptions (holding returns constant). A negative correlation—as we have observed post 1998—translates into a much higher Sharpe Ratio. As correlations rise, the implied Sharpe Ratio falls. These results should be intuitive for anyone who has experienced the portfolio cushioning effect of bonds over the past quarter-century. If we are right about the return of secular inflation, the job of asset managers will be much more difficult in the years ahead.

A related, but separate, issue is the possibility that the secular decline in interest rates, which began in the early-1980s is now coming to an end. Of course, a return of inflation and the Fed moving off of the "zero-bound" should push interest rates up in the years ahead. In our view, long bonds are at risk of a rising (normalizing) term premium. As a reminder, the term premium is the additional yield that investors demand as compensation for the risks associated with long-term bonds. In the years since the GFC, the 10-year term premium has collapsed to negative territory.





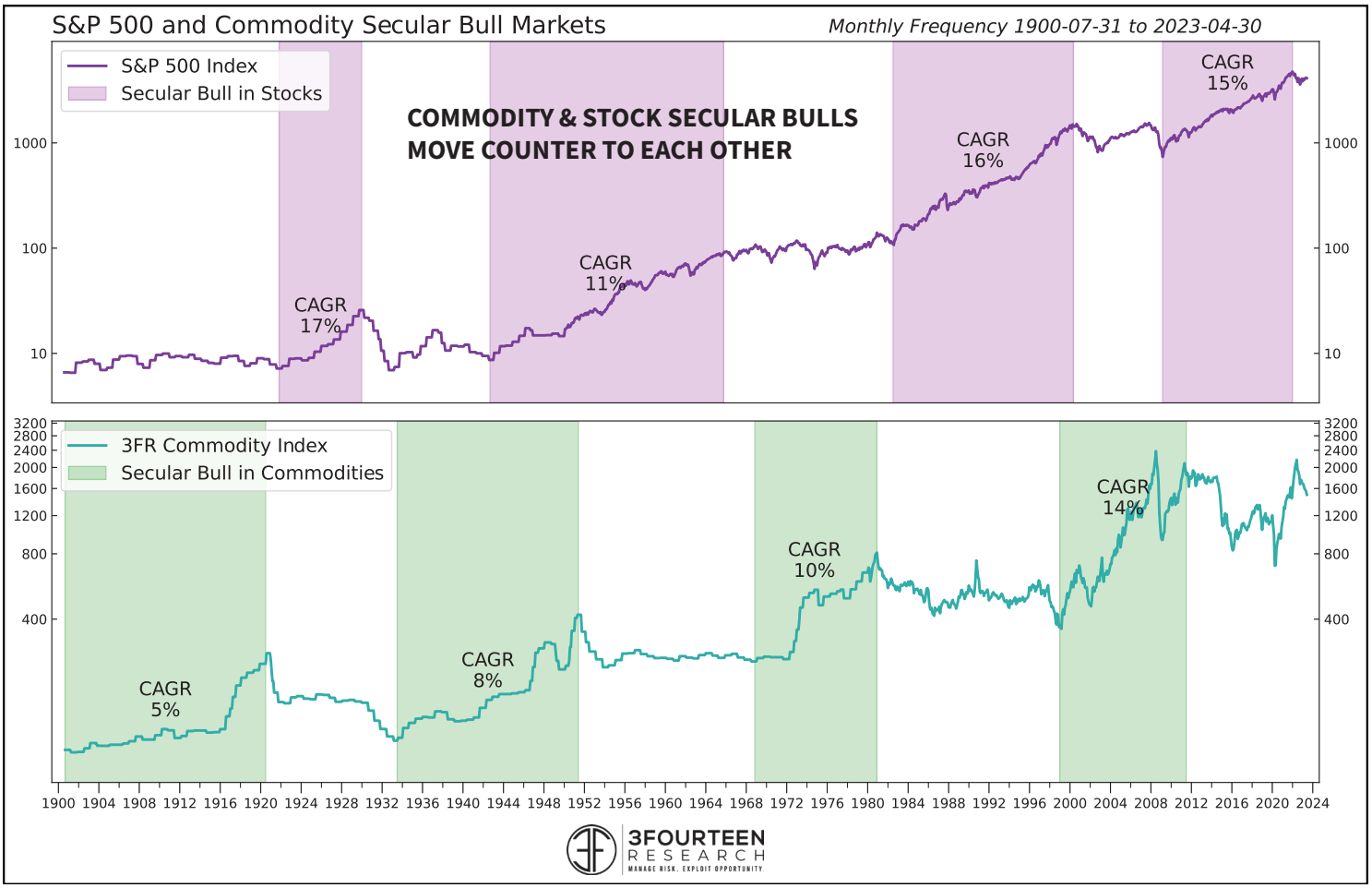
In the past, we have speculated that there are three broad reasons for the shrinking term premium: 1) Structurally lower inflation, 2) Fed QE program has crowded out the relatively thin bond market (i.e. removed duration—chart above), and 3) The negative stock-bond correlation created an "equity hedge" bid to long bonds. Put simply, we see all of these forces reversing. On a secular basis, the term premium should rise. Falling yields have benefited portfolios since the early '80s. A reversal would become a major headwind. **Bottom Line: We expect lower returns and higher volatility (i.e. lower Sharpe Ratios) for basic stock/bond portfolios in the years ahead. Now to our solution—the Real Asset Allocation Model.**

STEP 1: EXPANDED ASSET MENU

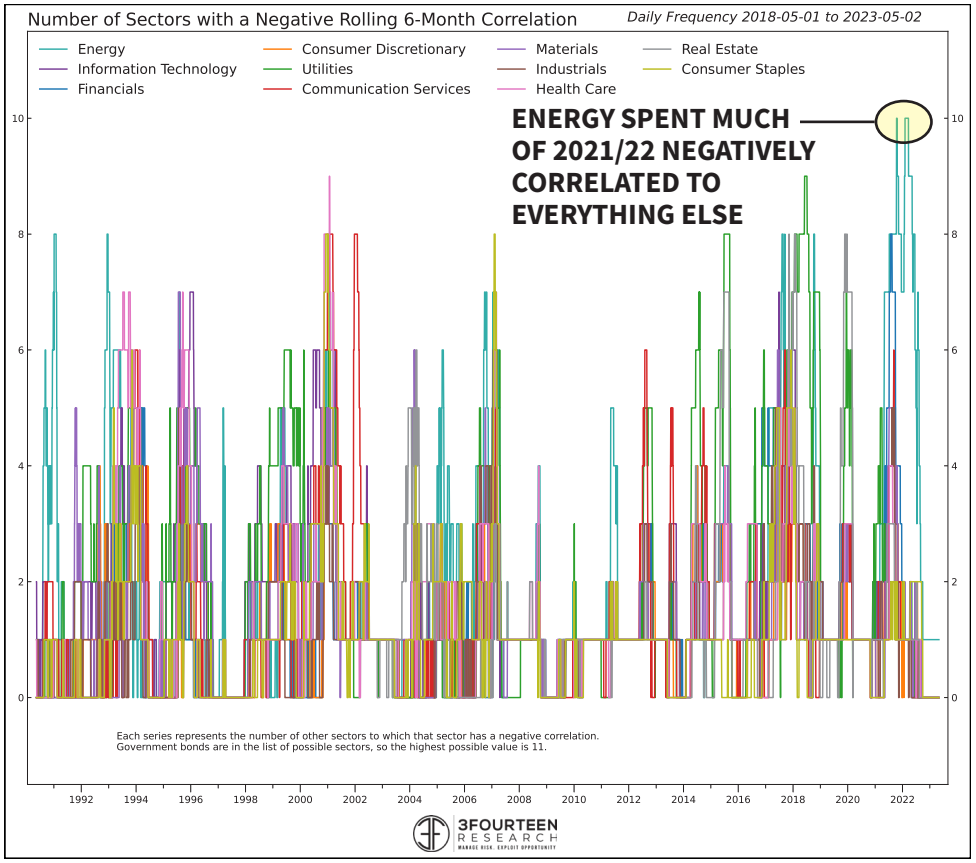
To prepare for a future that may not resemble the (backtested) past, 3Fourteen created the Real Asset Allocation Model (RAAM). Our model begins with a high-level benchmark allocation of 50% stocks/30% bonds/20% alternatives. Within these three broad buckets lies an expanded 20-asset menu (table right). **From a quant's perspective, success is less about picking the one "right" asset and more about finding the best mix of assets. The more assets to choose from, the better our odds of finding the optimal mix.** Because we are worried that the stock/bond correlation is headed higher, our first goal is to find options that are unlikely to be correlated in this potential backdrop. Commodities are an obvious choice. In the chart below, we plot the long-term performance of stocks (top clip) vs commodities (bottom clip).

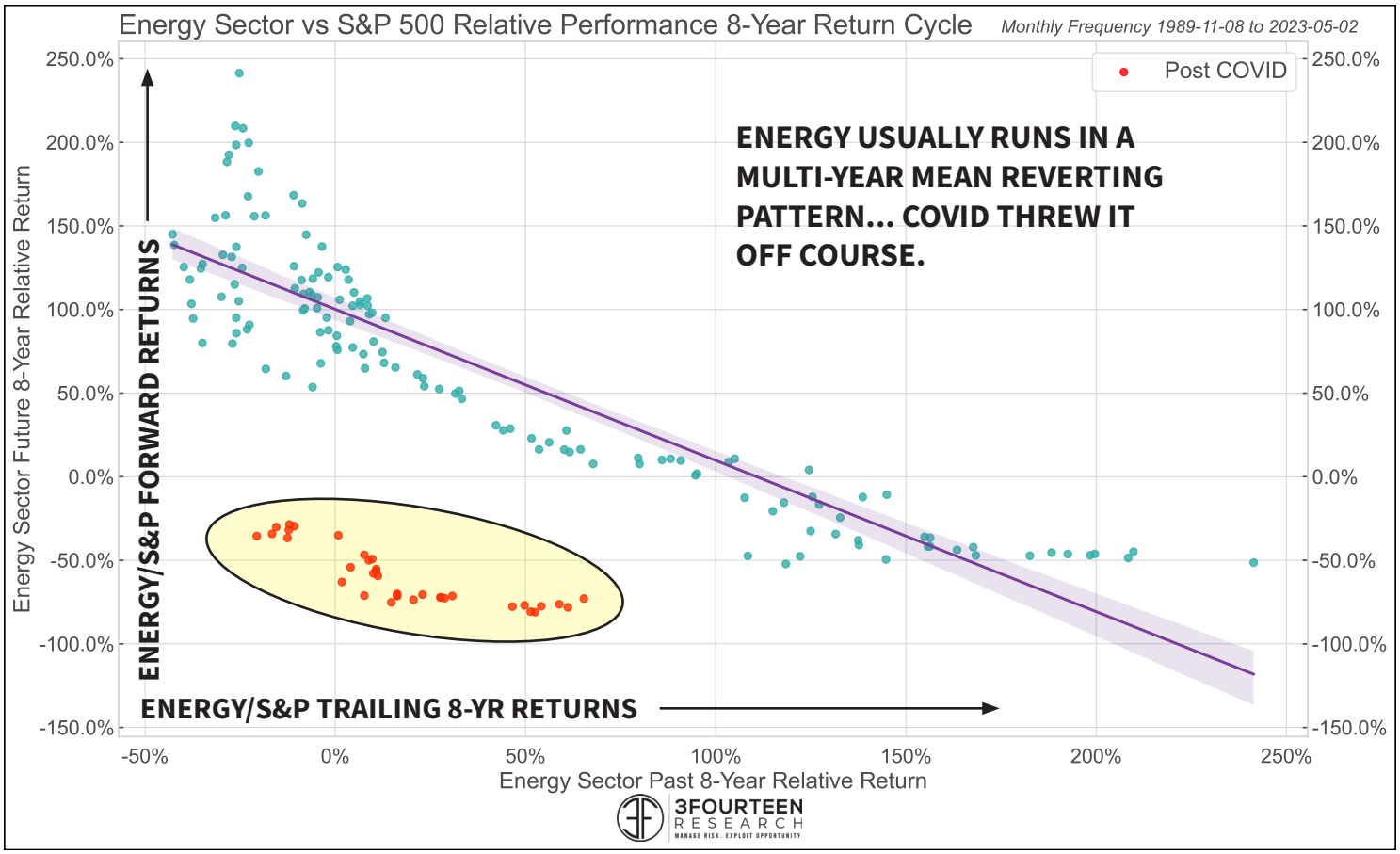
RAAM: ASSET MENU

ASSET	BENCHMARK	MAX WGT	OFFICIAL INDEX
Alternatives	**20%**		
Bitcoin	2%	3%	XBTUSD Spot Exchange Rate - Price of 1 XBT in USD
Commodities	4%	16%	S&P GSCI Index Spot
Energy	2%	10%	S&P 500 Energy Sector GICS Level 1 Index
Gold	2%	10%	XAUUSD Spot Exchange Rate - Price of 1 XAU in USD
Managed Futures	6%	16%	SG Trend Index
Miners	2%	10%	MSCI World Metals & Mining Index
Real Estate	2%	16%	FTSE NAREIT All Equity REITS Index
Equities	**50%**		
Dividend Payers	5%	10%	S&P 500 Dividend Aristocrats Price Index
Emerging Ex. China	1%	10%	MSCI Emerging Markets ex China Price Return USD Index
Europe	1%	10%	MSCI Europe Index
Japan	1%	10%	MSCI Japan Index
Nasdaq	20%	40%	NASDAQ Composite Index
US Large Cap	20%	40%	S&P 500 INDEX
US Small Cap	2%	10%	Russell 2000 Index
Fixed Income	**30%**		
Corporate Bonds	10%	30%	Bloomberg US Corporate Total Return Value Unhedged USD
Emerging Mkt Bonds	2%	10%	Bloomberg EM USD Aggregate Total Return Index Value Unhedged
High Yield	6%	20%	Bloomberg US Corporate High Yield Total Return Index Value Unhedged USD
Long-Term Treasuries	10%	40%	Bloomberg U.S. Government: Long Total Return Index Value Unh
T-Bills	0%	20%	Bloomberg US Treasury Bills Total Return Index Value Unhedge
TIPS	2%	40%	Bloomberg US Treasury Inflation Notes TR Index Value Unhedged USD



In the past, we have shown that commodity secular bull markets correspond with stock bears (chart previous page). This is the message of over 100 years of data. Intuitively, it makes sense. Commodity inflation crowds out productivity and cuts into margins. During bouts of rapid commodity price appreciation, stocks suffer. Bonds also will languish. Investors received a small taste of what could lie ahead last year. In 2022, Energy was the only positive sector (+65%) in the S&P 500. Moreover, throughout much of the year, Energy had a negative correlation to every other sector in the market AND bonds (chart right). Going back to 1990, no other sector has done this.



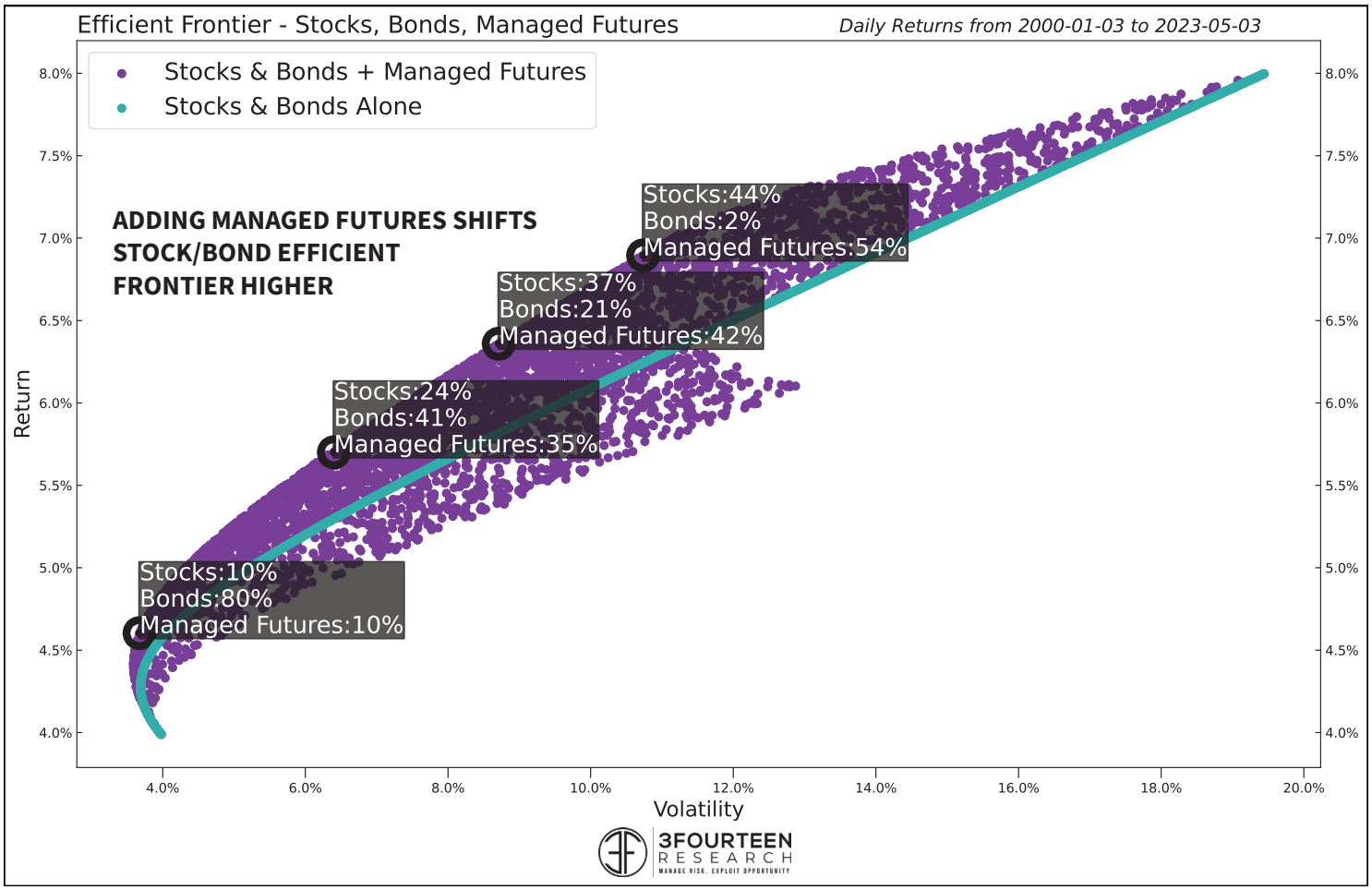


There is a decent chance that 2022 will prove to be only the beginning. Historically, the Energy Sector (and oil) moves in multi-year boom-bust cycles. The scatter plot on page 7 makes this tendency clear. Here, we compare the Energy Sector/S&P 500 trailing eight-year returns to its forward eight-year returns. The downward sloping linear relationship tells us that, traditionally, eight bad years for Energy are generally followed by eight good years (and vice versa). In the recent past, COVID intervened to break this relationship. We delineate the post-pandemic period on the chart in red dots. In early 2022, we made the secular case for Energy: "*Political leaders are moving toward a massive energy transition. Financial firms are divesting from traditional energy. At some point, years of long-cycle underinvestment will bite.*" When the next commodity bull arrives, portfolios without exposure will undoubtedly suffer.

Finally, within the alternatives bucket of the RAAM, we have separated metals miners from energy equities. Our reasoning here is that—moving forward—these two segments will have different drivers. For energy, undersupply will be the primary driver. On the other hand, demand—catalyzed by the Green Revolution—will drive the metals segment. With different forces driving these two commodity segments, odds are good that they will move asynchronously. Thus, we have broken them out within the Model. In total, the RAAM carries a 10% benchmark weight to commodity-related assets (commodities + energy stocks + metals miners).

MANAGED FUTURES

Outside of commodities, managed futures carry the largest weight within the RAAM's alternatives sleeve. The benchmark weight for Managed Futures is 6% (the highest of any single asset within the alternatives universe), but we allow the Model to boost the weight as high as 16% at opportune times. For the uninitiated, Managed Futures are trend following strategies employed by hedge funds. These strategies trade across a wide array of markets (commodities, currencies, stocks, and fixed income) and can go long or short. Plus, they move fast. **For asset allocators, managed futures offer an interesting option. In the chart below, we plot the efficient frontier of a three-asset portfolio: Stocks, bonds and managed futures. As you move farther out on the efficient frontier, a healthy managed futures position begins to displace the bond allocation found in lower vol portfolios.**

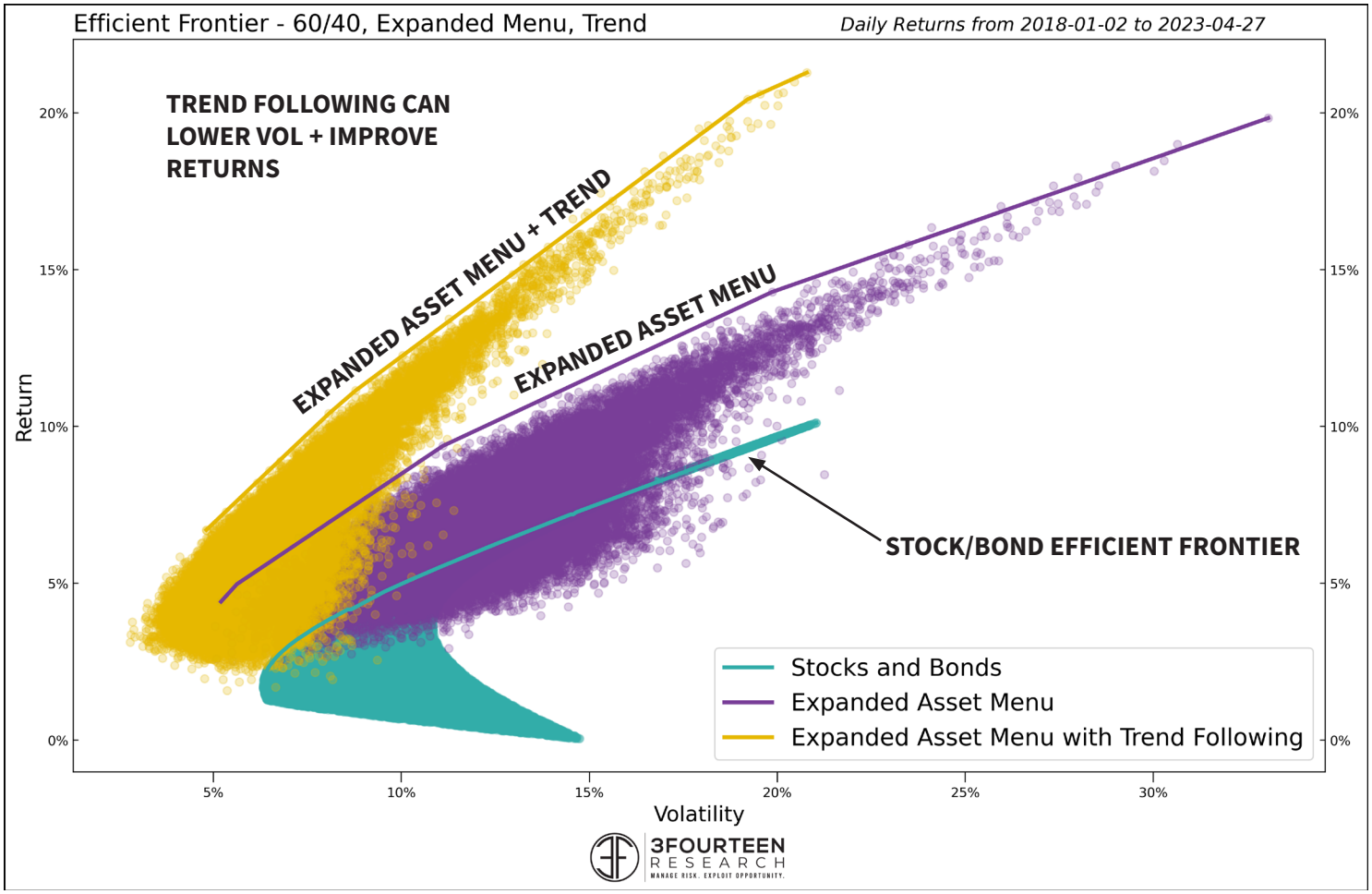


To be clear, we are not creating our own long/short hedge fund trading strategy within the RAAM. Neither are we trying to pick the "right" individual managed futures strategy. Rather, we simply want the "beta" to these strategies as they exist in an index (the RAAM tracks the SocGen Trend Index). Their overarching characteristics—trade across many markets, long and short, more frequent shifts—make managed futures a good fit with other assets on our menu. **Remember, the premise of the RAAM is that the core pillars of a portfolio—stocks and bonds—are becoming increasingly connected. This means volatility will increase (Sharpe Ratios down—see page 5). Our job is to layer new uncorrelated assets into the mix to dampen portfolio volatility.** With this goal in mind, managed futures offer an appealing option. In the past, we have made a similar case for Bitcoin. As a standalone asset, we are unenthused. But, within a portfolio, it is intriguing.

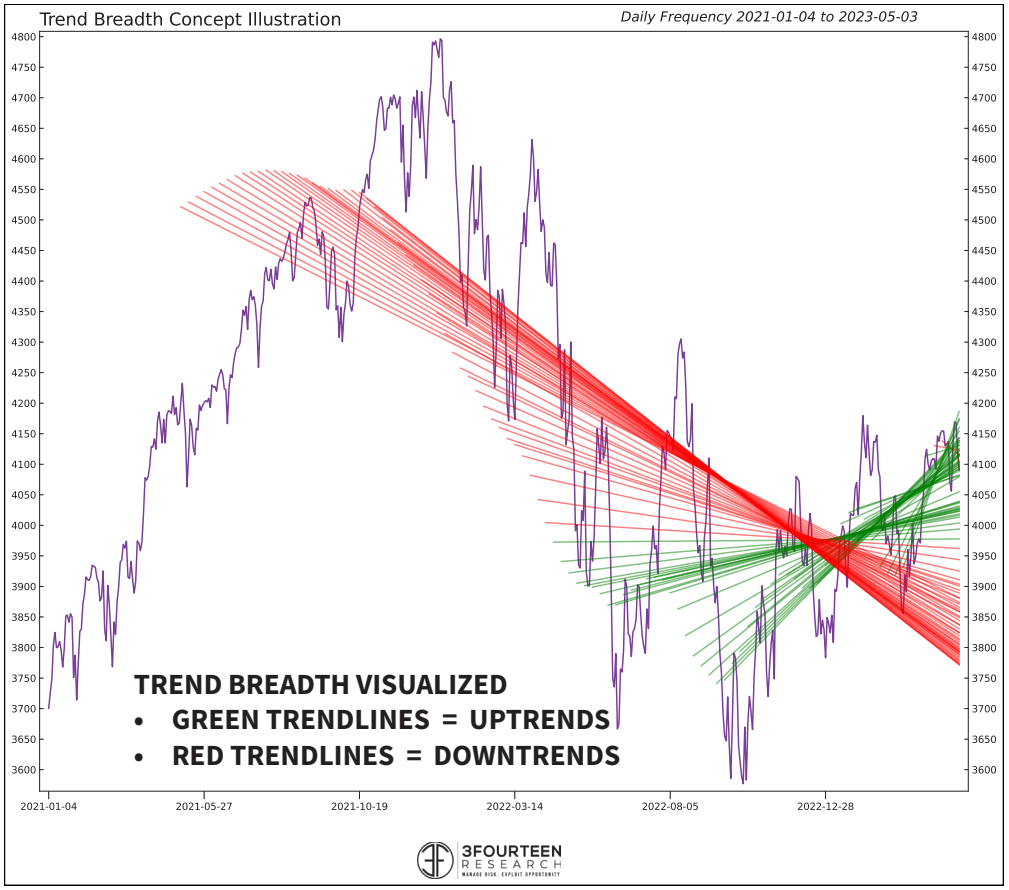
One final note on Bitcoin specifically and backtesting in general: At 3Fourteen, we work hard to produce realistic backtests (using in and out of sample testing). Overfit models that look good on paper, but fall apart in reality help no one. A critique of version 1 of the RAAM was that our backtest included Bitcoin too early to be realistic (no sane person would have placed a 5% weight in BTC back in 2011). We agreed with this criticism. In the current version, BTC enters the asset menu at the beginning of 2018. Our reasoning here is twofold: First, at this point, BTC was widely available through GBTC. Second, we wanted to include one of BTC's epic drawdowns (BTC was down ~75% in 2018) in our backtested period.

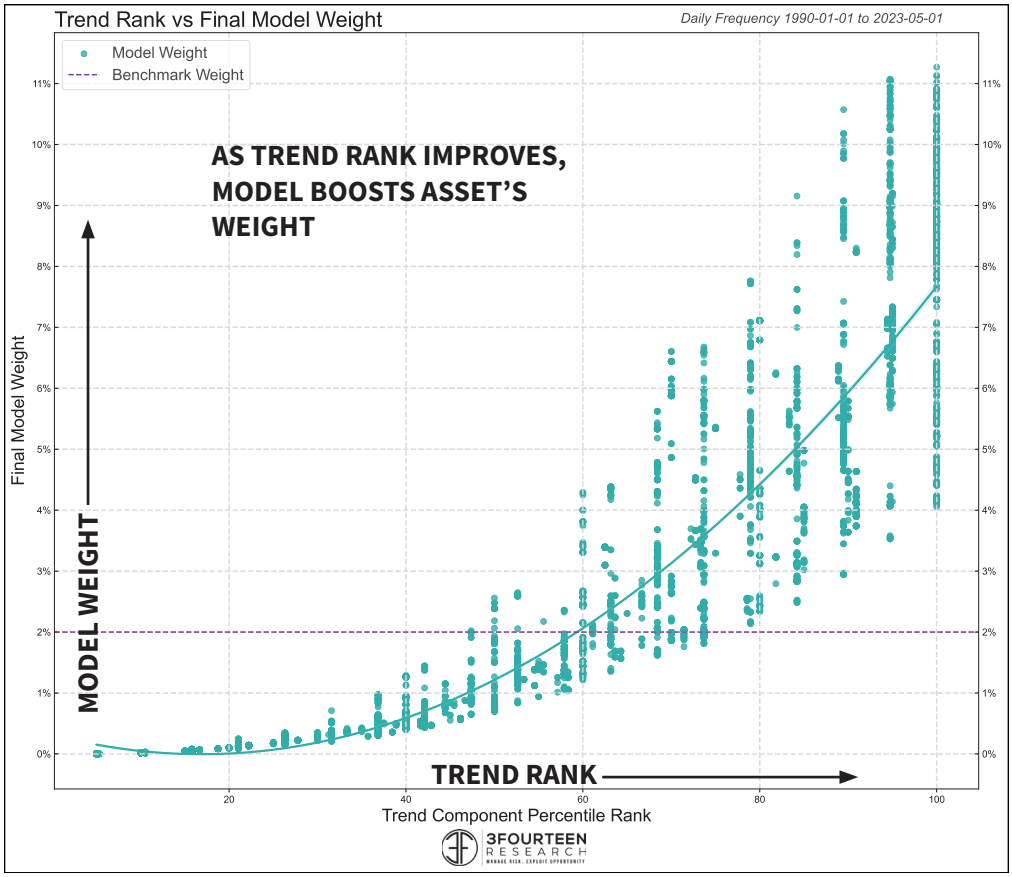
STEP 2—RANK BY TREND

An expanded asset menu is (roughly) half of the battle. Going back to the mid-90s. Our 20-asset benchmark has outperformed 60/40 by about 140 basis points annually. While returns improve, volatility and (more importantly) max drawdown of the benchmark are roughly in line with 60/40. **By adding a trend component, we can improve both returns and volatility. In the chart below, we display the efficient frontier of three different portfolios: 60/40 (blue), our 20-asset benchmark (purple), and a multi-asset portfolio with a trend overlay (gold). Each step of the process shifts the efficient frontier higher.**



As a concept, a trend overlay is straightforward. However, the devil is in the details. Traditionally, there are a couple ways to measure trend. Academics prefer to measure trend through a straightforward rate of change measure (e.g. last 12 month return). Technicians use moving averages (e.g. only buy assets above their x-day SMA). In our view, neither of these traditional approaches are satisfactory. Academic momentum operates on only two pieces of data (starting price and ending price—missing all intervening data points). Moving average strategies are binary (above a given SMA = buy; below = sell) and are subject to whipsaws. We attempt to improve upon common trend-based strategies by running regression trendlines through price data across a wide variety of timeframes. We call this approach "Trend Breadth." In the chart to the right, we illustrate the concept.





In this example, we focus on the S&P 500. Red trendlines show timeframes over which the S&P 500 is in a downtrend. Green lines equal uptrends. We prefer regression trendlines to moving averages and traditional momentum. Unlike a classic "rate of change" approach, a regression trendline uses all intervening data. Each regression provides a treasure trove of information, including trend magnitude (slope) and mean reversion (residual score). Compared to the binary moving average approach, regression trendlines allow us to incrementally dial exposure up and down as the underlying slope improves. This incrementalism is key to the cross-sectional trend system that underlies the RAAM. The chart to the left provides a peak into how an asset's trend ranking impacts its overall model weight. In this example, we use energy.

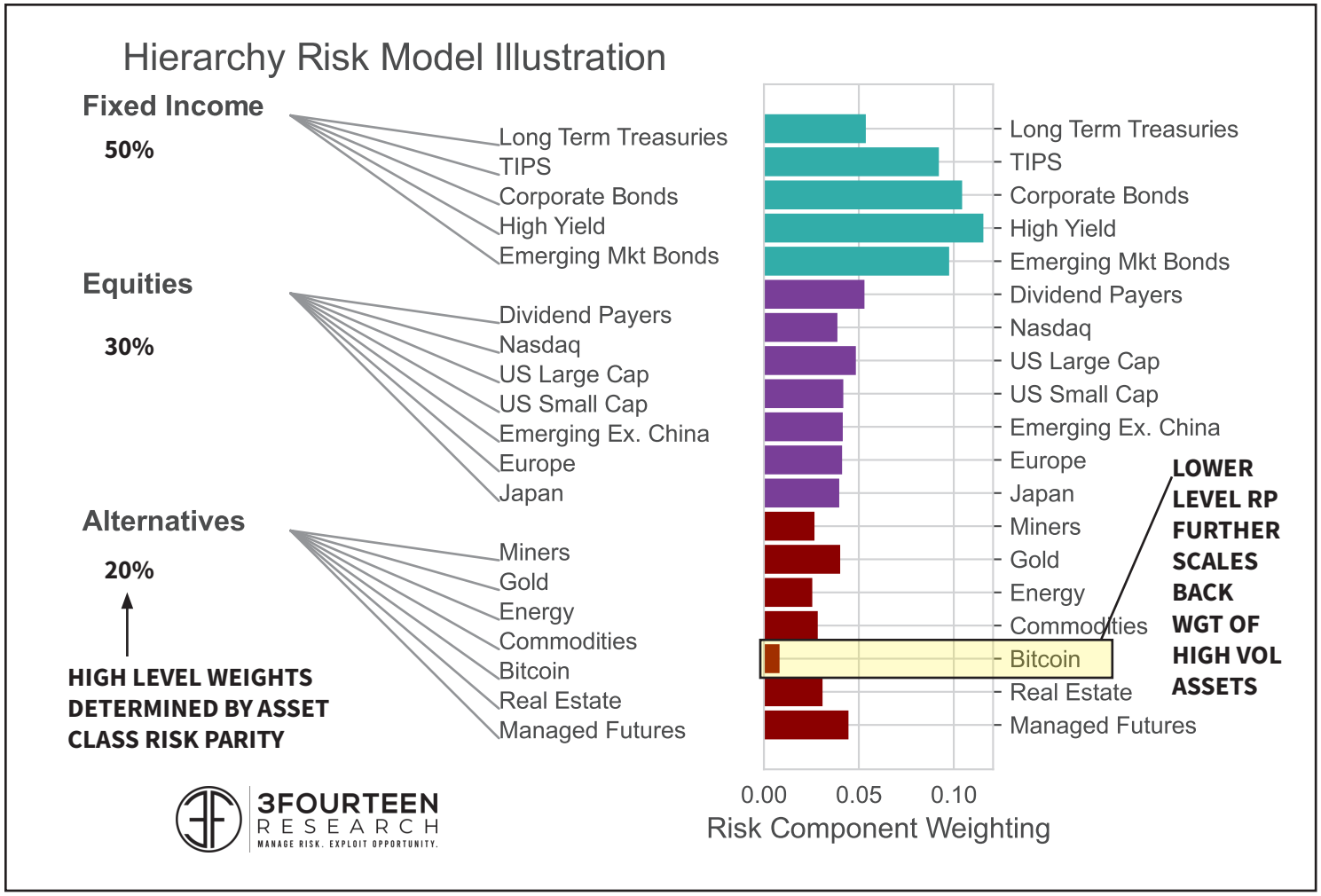
From this chart, we can see how the asset's trend rank (x-axis) corresponds to a higher model weight (y-axis). The shifts in weight move around Energy's 2% benchmark weight (horizontal purple line). The diagrams from the previous page can help us understand how the RAAM's trend component works. It has three parts—all derived from the same regression trendline approach:

1. TREND BREADTH RANK: Rank assets on Trend Breadth (i.e. % of relevant timeframes the asset is in an uptrend - percentage of green trendlines, chart pg 11).
2. TREND STRENGTH RANK: Cross-sectionally rank all 20 assets based on trend magnitude across the most statistically meaningful time horizons (e.g. rank all assets based on 252-day slope).
3. MEAN REVERSION RANK: Inverse rank all assets based on short-term trends.

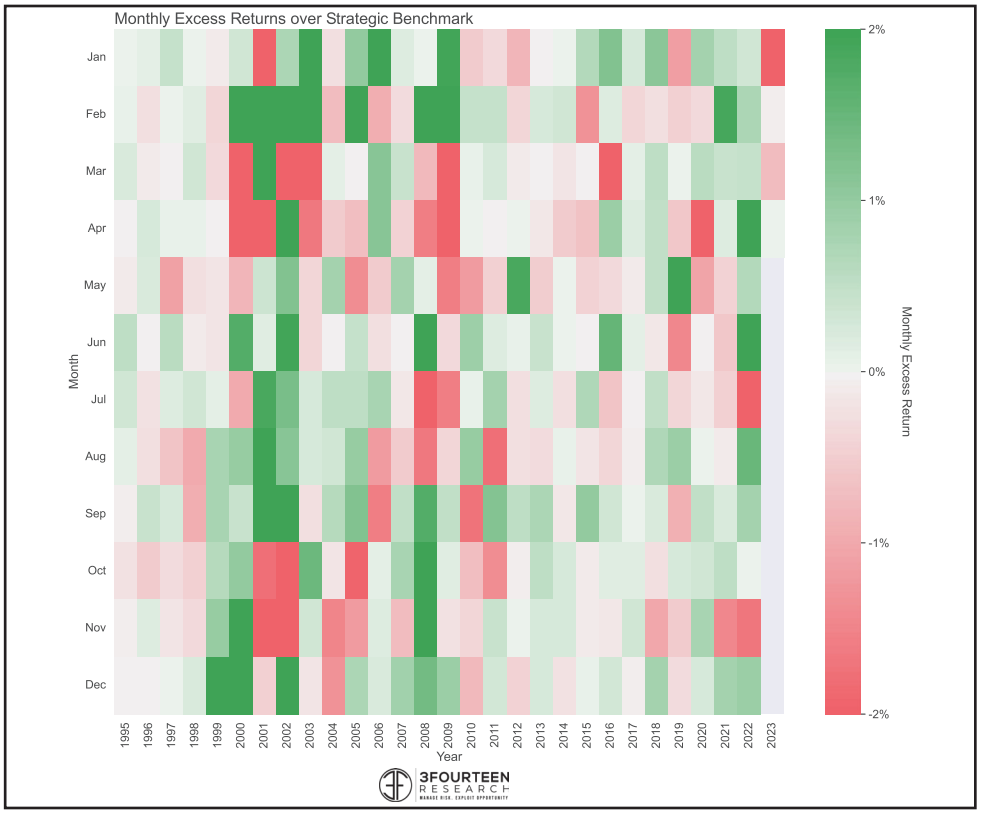
These three systems combine to provide a final cross-sectional trend ranking for every asset. That ranking then shifts each asset around its benchmark.

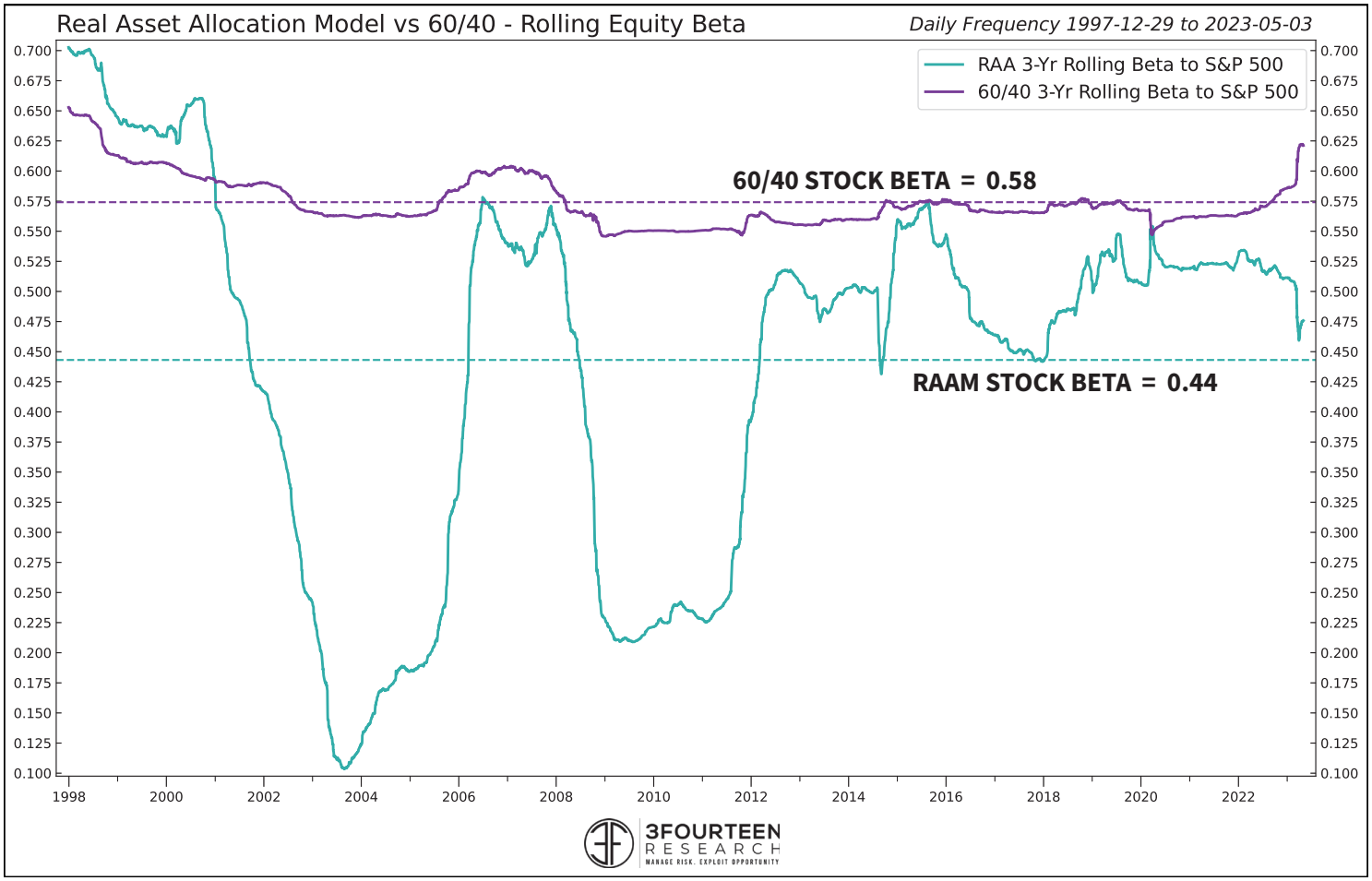
STEP 3: REDUCE VOL THROUGH HRP

A pure trend rank will structurally overweight higher volatility assets. For example, even a historically strong bond trend will not match the magnitude of an average Bitcoin rally. To combat this tendency, in the final step of the RAAM's process, we scale back the weighting of the most volatile assets. We do this by applying hierarchical risk parity (HRP). We first discussed HRP as a concept more than two years ago in the context of our Yield Optimizer Model. As opposed to classic risk parity, HRP clusters all assets into their own high-level bucket. From there, each asset must compete for a piece of that category's overall "risk budget". To determine each asset class's weight, HRP first applies risk parity at the high level (allocating broadly between Alternatives, Fixed Income, and Equities). We then perform risk parity once again within each bucket to determine the individual asset weights. The final result is risk optimization *across* and *within* each major asset class.



For the RAAM, we explicitly define the hierarchy based on our categorization of Alternatives, Fixed Income, and Equities. The chart on the previous page provides an illustration. In effect, we are applying risk parity twice (first at the high level and then a second time within each asset class). Our high-level application nets out a broad weighting of 50% Fixed Income/30% Equities/20% Alternatives. (These are example weights based on historic averages. Within the model, weights change with volatility). The next pass determines what share of that broad risk budget each asset receives. Notice that higher vol categories (Alternatives) and higher vol assets (Bitcoin) are penalized. This is by design. In the final step, we blend this HRP weight with our Trend System. The result is a multi-asset trend following framework with dampened volatility.





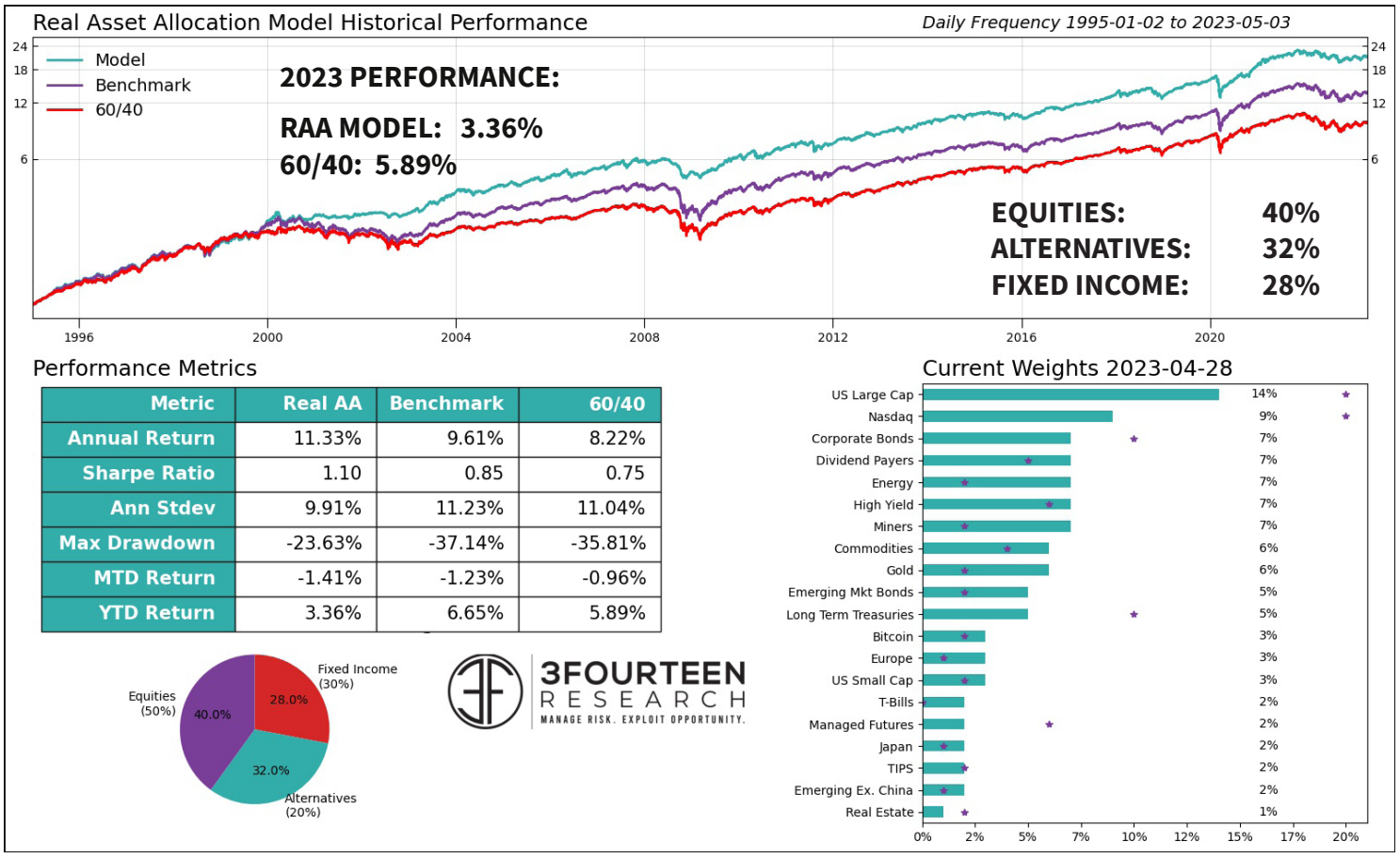
The combination of trend + HRP improves the final RAAM's performance over the 20-asset benchmark by ~175 basis points (310 over 60/40). More importantly, this step lowers portfolio volatility and max drawdown. The RAAM's max drawdown is -23.6%, a 13.5% improvement over the benchmark (-37.1%). Annualized volatility moves below 10% (11.2% for benchmark). The Sharpe Ratio shifts higher to 1.1. The heatmap on the previous page compares the RAAM's performance to our strategic benchmark for every month. Historically, the RAAM outperforms the benchmark 55% of all months. Finally, the RAAM's rolling equity beta (3-year rolling daily returns to the S&P 500) averages about 0.44, which is significantly below 60/40's average equity beta (0.58). In the appendix, we include a full suite of historic stats.

Statistics and backtests (see below) are important, but the truth is that the 60/40 has performed admirably over the past 25 years. If the next quarter century looks the same as the previous, then all of this is likely overkill. We believe that the change we pondered in early 2021 is now upon us. The time to prepare is here.

SIX-PART VISION

1. **1998-2021 = Golden Era of 60/40:** From 1998 through 2021, a historic combination of disinflationary forces combined to usher in the golden era of the 60/40 portfolio. Without the concern of inflation, bonds became a natural hedge to stocks.
2. **Post COVID, Everything Changed:** Since 2022, stocks and bonds have begun moving together. We believe this will persist. All else equal, rising stock/bond correlations will hurt the performance of the traditional 60/40 portfolio.
3. **To Survive Expand Asset Menus:** To survive in this new era, investors must widen their asset menu to include alternatives that are not traditionally included in portfolios. Commodities and managed futures are excellent candidates for inclusion.
4. **Novel Trend Following Is Necessary:** How the future unfolds is uncertain. Trend systems identify strength and ride it while avoiding structural losers.
5. **Dampen The Vol Inherent in Trend Following:** A downside to trend ranking is its tendency to overweight higher volatility assets. To combat this tendency, investors should consider scaling back high vol asset weights by apply risk parity strategies (e.g. hierarchical risk parity).
6. **Real Asset Allocation = Solution:** The RAAM combines these major principles: Expanded asset menu, trend following, and volatility scaling.

[1] REAL = Robust, Expanded exposure, Active, and Low volatility

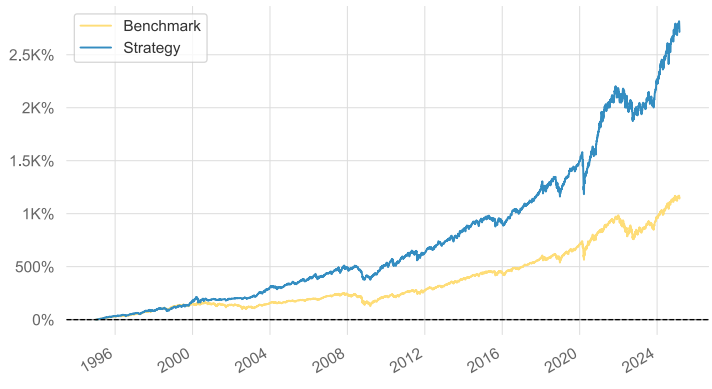


Metric	Real AA	Benchmark	60/40
Annual Return	11.33%	9.61%	8.22%
Sharpe Ratio	1.10	0.85	0.75
Ann Stdev	9.91%	11.23%	11.04%
Max Drawdown	-23.63%	-37.14%	-35.81%
MTD Return	-1.41%	-1.23%	-0.96%
YTD Return	3.36%	6.65%	5.89%

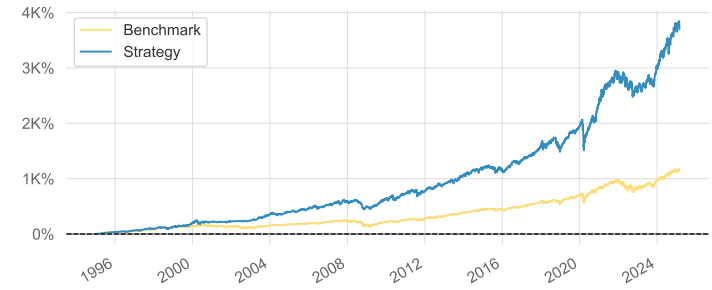
Real Asset Allocation Model Backtest 2 Jan, 1995 - 27 Feb, 2025

Benchmark is 60% S&P 500/40% US Agg

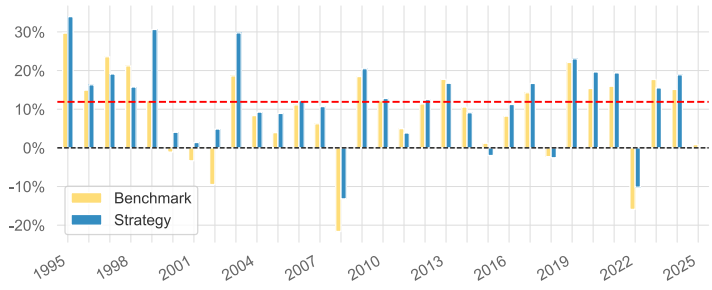
Cumulative Returns vs Benchmark



Cumulative Returns vs Benchmark (Volatility Matched)



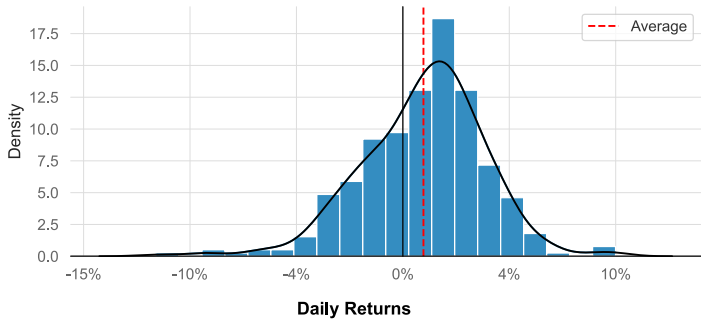
EOY Returns vs Benchmark



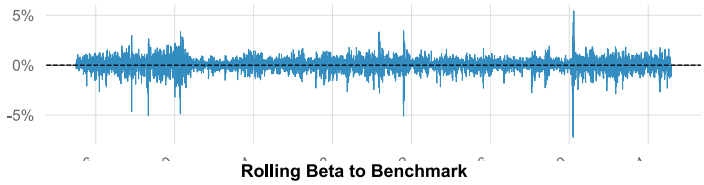
Distribution of Monthly Returns

Key Performance Metrics

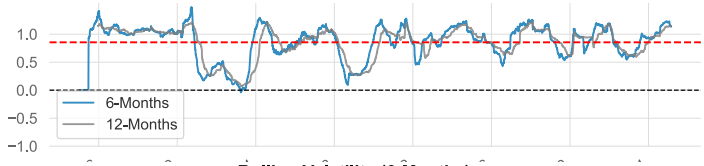
Metric	Strategy	Benchmark
Risk-Free Rate	0.0%	0.0%
Time in Market	100.0%	97.0%
Cumulative Return	2,714.92%	1,142.38%
CAGR%	11.7%	8.71%
Sharpe	1.13	0.8
Prob. Sharpe Ratio	100.0%	100.0%
Smart Sharpe	1.12	0.79
Sortino	1.59	1.14
Smart Sortino	1.57	1.13
Sortino/√2	1.12	0.81
Smart Sortino/√2	1.11	0.8
Omega	1.23	1.23
Max Drawdown	-23.63%	-35.07%
Longest DD Days	1041	1238
Volatility (ann.)	9.85%	10.78%
R^2	0.64	0.64
Information Ratio	0.02	0.02
Calmar	0.49	0.25
Skew	-0.87	-0.27
Kurtosis	10.84	8.0
Expected Daily	0.04%	0.03%
Expected Monthly	0.93%	0.7%
Expected Yearly	11.37%	8.47%
Kelly Criterion	10.97%	4.87%
Risk of Ruin	0.0%	0.0%
Daily Value-at-Risk	-0.98%	-1.08%
Expected Shortfall (cVaR)	-0.98%	-1.08%
Max Consecutive Wins	12	12



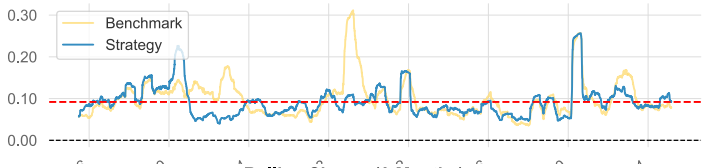
Daily Returns



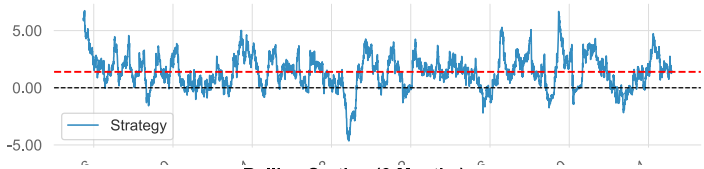
Rolling Beta to Benchmark



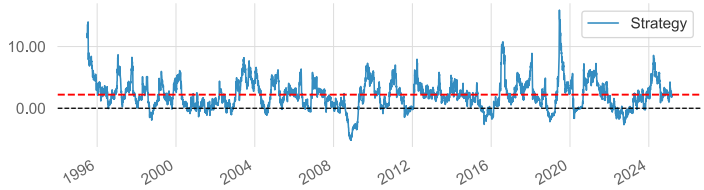
Rolling Volatility (6-Months)



Rolling Sharpe (6-Months)

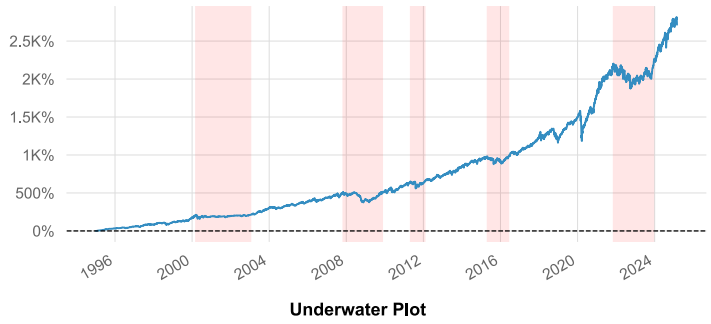


Rolling Sortino (6-Months)

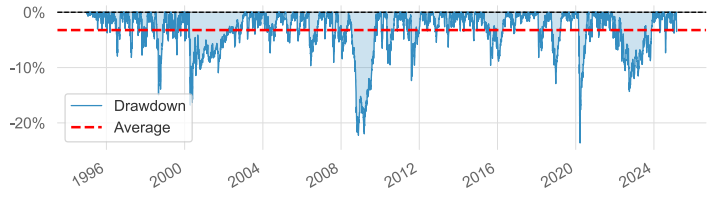


Worst 5 Drawdown Periods

Metric	Strategy	Benchmark
Max Consecutive Losses	11	9
Gain/Pain Ratio	0.23	0.16
Gain/Pain (1M)	1.33	1.0
Payoff Ratio	0.96	0.91
Profit Factor	1.23	1.16
Common Sense Ratio	1.24	1.15
CPC Index	0.66	0.58
Tail Ratio	1.01	0.99
Outlier Win Ratio	4.04	3.86
Outlier Loss Ratio	4.02	3.67
MTD	-1.93%	-1.02%
3M	-0.89%	-0.92%
6M	4.54%	3.07%
YTD	0.33%	0.84%
1Y	14.61%	12.55%
3Y (ann.)	7.62%	6.85%
5Y (ann.)	15.02%	11.48%
10Y (ann.)	10.13%	8.42%
All-time (ann.)	11.7%	8.71%
Best Day	5.44%	6.25%
Worst Day	-7.23%	-6.23%
Best Month	9.99%	8.4%
Worst Month	-11.6%	-11.02%
Best Year	33.95%	29.68%
Worst Year	-13.19%	-21.63%
Avg. Drawdown	-1.31%	-1.16%
Avg. Drawdown Days	20	20
Recovery Factor	114.9	32.57
Ulcer Index	0.05	0.07
Serenity Index	35.12	7.83
Avg. Up Month	2.64%	2.37%
Avg. Down Month	-2.68%	-2.56%
Win Days	56.49%	54.7%
Win Month	68.23%	67.13%



Underwater Plot



Metric	Strategy	Benchmark
Win Quarter	76.86%	75.21%
Win Year	87.1%	80.65%
Beta	0.73	-
Alpha	0.05	-
Correlation	80.01%	-
Treynor Ratio	3713.49%	-

EOY Returns vs Benchmark

Year	Benchmark	Strategy	Multiplier	Won
1995	29.68%	33.95%	1.14	+
1996	14.94%	16.32%	1.09	+
1997	23.58%	19.12%	0.81	-
1998	21.22%	15.75%	0.74	-
1999	12.21%	30.63%	2.51	+
2000	-1.10%	4.03%	-3.66	+
2001	-3.35%	1.39%	-0.41	+
2002	-9.49%	4.87%	-0.51	+
2003	18.63%	29.75%	1.60	+
2004	8.35%	9.25%	1.11	+
2005	3.94%	8.91%	2.26	+
2006	11.13%	12.22%	1.10	+
2007	6.23%	10.68%	1.71	+
2008	-21.63%	-13.19%	0.61	+
2009	18.45%	20.48%	1.11	+
2010	12.19%	12.77%	1.05	+
2011	4.97%	3.85%	0.77	-
2012	11.36%	12.49%	1.10	+
2013	17.72%	16.71%	0.94	-
2014	10.55%	9.09%	0.86	-
2015	1.19%	-1.98%	-1.67	-
2016	8.21%	11.22%	1.37	+
2017	14.26%	16.67%	1.17	+
2018	-2.27%	-2.56%	1.13	-
2019	22.10%	23.03%	1.04	+
2020	15.36%	19.63%	1.28	+
2021	15.94%	19.39%	1.22	+

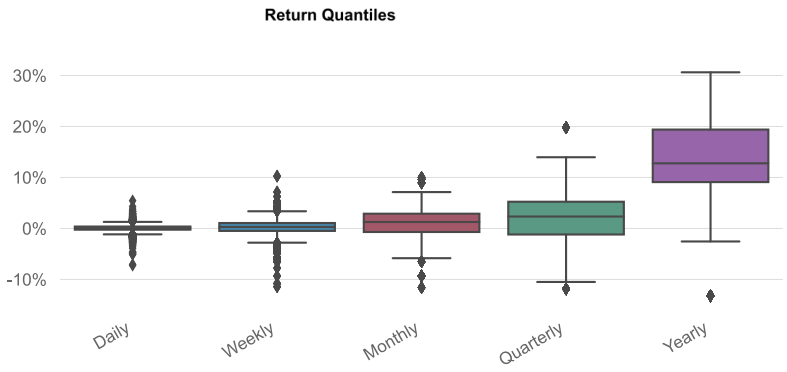
Monthly Returns (%)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1995	1.55	3.71	2.59	2.46	3.57	3.65	3.39	1.34	2.49	-0.06	3.07	1.89
1996	1.56	0.49	0.40	3.07	2.29	-0.59	-4.52	2.05	5.25	1.11	5.61	-1.09
1997	4.11	-1.30	-3.77	3.38	4.75	3.28	7.13	-3.01	4.82	-2.48	1.14	0.27
1998	1.52	4.85	3.27	0.82	-2.26	2.86	-1.29	-11.60	6.54	2.56	4.12	4.65
1999	4.37	-4.48	3.84	3.34	-2.31	3.48	-1.22	1.43	0.63	4.04	4.68	9.99
2000	-1.69	8.93	0.07	-7.29	-3.34	6.69	-2.54	6.60	-4.02	-1.21	0.63	2.43
2001	1.03	-1.41	-1.57	0.30	1.00	-0.30	1.03	0.46	-3.00	1.82	1.98	0.16
2002	0.48	0.95	0.59	0.02	0.70	-0.10	-2.25	2.83	0.06	-2.11	2.28	1.45
2003	2.22	3.44	-2.97	3.44	5.83	0.11	1.01	3.13	0.08	5.36	1.52	3.49
2004	1.44	0.73	0.15	-4.06	1.99	1.24	-1.37	1.06	3.01	2.27	1.88	0.72
2005	-0.68	3.73	-1.46	-2.41	1.86	1.72	3.31	1.89	1.68	-3.90	1.75	1.39
2006	5.20	-1.58	2.53	2.27	-3.19	-0.20	0.79	0.87	-0.50	2.89	2.67	0.10
2007	1.26	-0.44	0.82	2.45	2.80	-0.59	-1.59	0.14	4.31	3.84	-3.47	0.92
2008	-3.26	1.91	-1.22	1.90	1.99	-0.51	-3.59	-1.34	-5.84	-9.32	1.11	4.99
2009	-3.35	-2.88	3.26	2.68	3.35	0.44	4.17	1.92	4.38	-1.05	4.02	2.24
2010	-3.03	2.94	4.38	2.31	-6.51	-1.33	4.76	-0.49	4.84	2.31	-0.88	3.48
2011	0.48	3.19	0.34	3.03	-1.30	-1.60	1.49	-4.40	-3.32	5.62	-0.24	0.93
2012	3.54	2.48	0.73	0.30	-1.86	2.37	1.68	1.66	1.88	-1.74	0.75	0.18
2013	2.53	0.64	2.02	1.50	-0.70	-1.96	3.76	-1.63	3.16	3.49	1.42	1.51
2014	-1.05	3.78	-0.56	-0.08	2.11	2.10	-1.36	3.22	-2.23	1.98	1.92	-0.87
2015	0.84	1.78	-0.91	-0.07	-0.03	-2.25	1.42	-4.03	-0.97	4.95	-0.54	-1.90
2016	-1.62	1.07	2.74	2.03	0.51	3.18	2.49	-0.41	0.88	-2.01	0.38	1.60
2017	2.07	2.12	0.02	1.18	1.01	-0.07	2.02	0.94	0.81	2.11	1.98	1.37
2018	4.49	-3.40	-0.85	1.49	2.08	-0.09	2.30	2.81	-0.07	-5.76	-1.32	-3.76
2019	4.57	1.78	2.62	2.24	0.03	4.31	0.44	1.40	-0.87	1.80	1.00	1.75
2020	1.95	-4.61	-9.36	6.39	3.06	2.38	5.08	3.58	-2.53	-0.84	9.64	4.84
2021	0.56	4.19	1.84	3.96	-0.21	1.39	1.42	1.67	-2.58	5.71	-2.63	2.87
2022	-3.51	0.02	2.89	-3.31	0.24	-4.80	3.11	-1.75	-6.51	3.81	2.53	-2.76
2023	4.29	-2.61	2.39	0.80	-2.37	4.83	2.58	-2.16	-2.33	-1.55	6.66	4.58
2024	0.57	4.35	3.16	-2.95	3.23	2.46	1.58	0.99	2.42	-1.15	4.87	-1.77
2025	2.31	-1.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Year	Benchmark	Strategy	Multiplier	Won
2022	-15.92%	-10.18%	0.64	+
2023	17.69%	15.51%	0.88	-
2024	15.12%	18.91%	1.25	+
2025	0.84%	0.33%	0.40	-

Worst 10 Drawdowns

Started	Recovered	Drawdown	Days
2020-02-20	2020-08-05	-23.63%	167
2007-11-01	2009-11-16	-22.24%	746
2000-03-10	2003-01-15	-16.79%	1041
1998-07-21	1998-12-23	-14.94%	155
2021-11-10	2023-12-13	-14.33%	763
2018-10-02	2019-05-03	-12.90%	213
2011-05-02	2012-01-30	-12.36%	273
2006-05-11	2006-11-22	-9.67%	195
2015-04-27	2016-06-03	-9.59%	403
2010-04-26	2010-10-05	-9.51%	162


Return Quantiles
30%
20%
10%
0%
-10%
Daily
Weekly
Monthly
Quarterly
Yearly

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