

Winners Repeat, Losers Repeat

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ABSTRACT

This article provides a tactical asset allocation (hereafter referred to as “TAA”) demonstration portfolio, one that shows proof-of-concept. It also offers practical evidence that TAA, when properly executed, is a purely backward-looking, reactive approach to investment management, and to the extent that it eschews forecasting or prediction, could be deemed a form of passive management, but one that makes richer use of the time series properties of asset class returns. The empirical results presented herein, suggest that TAA is an investment management approach that warrants serious consideration. Moreover, this article suggests that a necessary condition for TAA success lies in correctly specifying its rather differentiated investment objective - one that may be unrelated to comparisons with popular third-party index benchmarks. Our industry has done a remarkably good job of mischaracterizing, mis-selling, and over-promising all-things TAA. And doing so with a profound willingness to compare or “evaluate” TAA portfolios using inappropriate and/or dysfunctional comparative measures - serving to guarantee inevitable dissatisfaction. This article attempts to correct these misspecifications.

KEY TAKEAWAYS

- Net of transaction costs, the TAA demonstration portfolio earned an inflation-adjusted 11.46% over the aggregate time period (101.6 years). Whereas, a comparable passive index with identical average asset weightings earned a lesser 6.68%.
- The TAA portfolio’s relative greater success of achieving the stated investment objective did not diminish with the passage of time. In fact, the most recent period (14.3% of the cases examined) was the third strongest on record.
- The causality underlying TAA’s success is attributable to three behaviors: trending, bear market longevity, and presence of episodic eras. Trending results from the time it takes for information to be reflected in portfolios and the herding behaviors of market participants.

KEYWORDS

- Tactical Asset Allocation
- Trending
- Passive Investment Management
- Investment Objective

INTRODUCTION

My objective is twofold. First, to provide a tactical asset allocation (hereafter referred to as “TAA”) demonstration portfolio, one that shows proof-of-concept. Second, to offer practical evidence that TAA, when properly executed, is a purely backward-looking, reactive approach to investment management, and to the extent that it eschews forecasting or prediction, could be deemed a form of passive management, but one that makes richer use of the time series properties of asset class returns.

This article does not suggest how to construct a commercially viable TAA portfolio. Nor does it address a range of important TAA issues. When these are encountered, I will place them in the parking lot¹, while attempting to provide a brief but minimal response. Nevertheless, the empirical results presented herein, suggest that TAA is an investment management approach that warrants serious consideration. Moreover, this article suggests that a necessary condition for TAA success lies in correctly specifying its rather differentiated investment objective - one that may be unrelated to comparisons with popular third-party index benchmarks.

My experience has been, that I’m opening a can of worms by just raising the topic of TAA. Our industry has done a remarkably good job of mischaracterizing, mis-selling, and over-promising all-things TAA. And doing so with a profound willingness to compare or “evaluate” TAA portfolios using inappropriate and/or dysfunctional comparative measures - serving to guarantee inevitable dissatisfaction. For example: *“TAA will provide participation and protection. When the market goes up, you get almost all of the market. When the market goes down, you’re protected. But TAA didn’t protect during the 33-day collapse in Feb/Mar of 2020, therefore TAA is a failure.”* With these worms in mind, I will be unusually specific and limited (placing many sub-topics in the parking lot), with the objective of sidestepping the well-laid traps placed by our industry’s past mischaracterizations.

INVESTMENT OBJECTIVE

I begin by setting the table with an appropriate investment objective. One that is implementable and a direct outgrowth of the retail and institutional financial/investment planning communities. Since this article’s objective is to provide a TAA demonstration portfolio, proof-of-concept, we have the luxury of simplifying from real world investment needs.

I assume the investor has “spending” needs arriving ten to fifteen years in the future. Taking the midpoint of this interval, we assume an unimpeded investment time period of 12 ½ years. Moreover, I assume that the investor faces then-current prices, in other words, they are subject to the vagaries of consumer price inflation.

This characterization is well-grounded within both the institutional and retail communities. And has been most frequently referred to as asset/liability matching, time segmentation investing, or the bucket approach. The concept being, identify the investor’s “spending” needs. Position them in time. Break the investor’s portfolio into a series of distinct and relatively independent portfolios, each designed to serve/support the investor’s future “spending” needs during different future date ranges. For example, using six buckets, one might segment into years 0-4, 5-9, 10-14, 15-19, 20-24, and 25 and greater.

Most investors face spending or liabilities that fluctuate with inflation. For this reason, the analysis presented herein is reported in after-inflation or “real” terms². And this article assumes the following investment objective: “*Maximize the probability of earning at least 4 ¼% after-inflation over any and all investment time periods of 12 ½ years in length.*” One could debate whether 4 ¼% or some other level is appropriate. As important as this issue is, it is not the objective of this article. Therefore, I am placing it in the parking lot¹. Suffice it to say that by assuming a minimum required after-inflation return of 4 ¼%, I leave room for practical implementation costs.

PROOF-OF-CONCEPT DEMONSTRATION PORTFOLIO

Most of the retail and institutional communities rely on portfolio construction techniques (mean variance optimization, scenario analysis, Monte Carlo simulation, etc.) that most frequently assume iid-probability distributions (independent and identically distributed periodic asset class returns). In an iid-world, markets don’t trend, bull and bear markets don’t exist, and episodic eras are absent.

To the extent such behaviors arise, they are strictly accidental outcomes resulting from random processes. In an iid-world, mean variance optimization is likely to be an optimal strategy for portfolio construction.

But what if markets do trend, bear markets exist, and episodic eras occasionally unfold? Under such a circumstance, there would be a tendency for winners and losers to repeat. More specifically, there would be a tendency for those asset categories that performed most strongly (weakly) relative to others, to perform well (poorly) for just one more period. Essentially, winners repeat, losers repeat (Asness et al 2014), (Gupta and Kelly 2019), (Hurst, Ooi, and Pedersen 2017), (Ilmanen et al 2019).

If this is true, then a portfolio construction technique based on over-weighting recent relative winners and under-weighting recent losers, should excel. Such an approach is the basis for the proof-of-concept TAA demonstration portfolio examined herein. And, I would argue, serves as the inherent basis for all successful TAA approaches. Similarly, if markets fail to trend, then constructing a portfolio in such a fashion should deliver performance degradation.

Finally, to evaluate TAA’s ability to serve the stated investment objective more robustly than traditional investment approaches, I attempt to avoid the following traps:

- Ignoring application of the Scientific Method (i.e., Observation, Question, Hypothesis, Experiment, Results, and Conclusion),
- Cherry picking a time period designed to support the TAA methodology,
- Selecting portfolio construction rules based on what worked well in the past,
- Choosing asset categories that are supportive of the TAA approach,
- Assuming zero trading costs,
- Utilizing portfolio performance objectives that fail to directly serve the real world needs of retail and institutional investors, and
- Comparing results to inapplicable or non-implementable index benchmarks.

PORTFOLIO CONSTRUCTION

The TAA portfolio is constructed and evaluated using monthly total return indices spanning the time period 1/31/1919 through 6/30/2021. Return indices are inflation-adjusted using the CPI (Consumer Price Index)². Data were provided primarily by Global Financial Data, Inc., but were supplemented by the Kenneth R. French - Data Library - Dartmouth College³.

28 asset categories⁴ were selected spanning this 102.4-year time window. The starting date of 1/31/1919 was selected for the following reasons:

- It includes shocks (in part but not in whole) resulting from the Russian revolution, global pandemic (The Spanish Flu), disaster of the Weimar Republic, and the Great Depression of 1920,
- Almost all of data series started on or before that date, and
- In a small number of cases, where the data did not extend back to 1/31/1919, I felt that reasonable estimates could be made⁵.

The 28 asset categories are of three types, stocks, bonds, and commodities. Exhibit 1 provides a bird's-eye view of how the 28 break out.

Exhibit 1
28 asset categories utilized

Stocks		Bonds	
U.S. categories	Europe	U.S. Treasury	Other U.S.
	Asia and Australia	Commodities	Diversified industrial and agricultural
		Precious metals	

At a more granular level, this article uses seven types of U.S. stocks, nine categories of non-U.S. stocks, six versions of U.S. Treasuries (ranging from 90-Day T-Bills to TIPS), three additional bond categories, two precious metals, and one definition of diversified commodities⁴. Once each month, the TAA portfolio is reconstituted so as to be equally-weighted across the eight asset categories that trended most strongly over the eleven months just ended. Trending scores are calculated to be the percentage that an index (total return and inflation-adjusted) is above its eleven-month average level (using only month-end index values).

Transactions costs are assumed for the TAA portfolio but not for the comparative index benchmarks. Specifically, it is assumed that stocks and U.S. Treasuries can be traded cost-free. However, all other asset categories incur significant trading costs. Exhibit 2 provides the assumed one-way trading costs by asset category. These were based on an examination of dollar trading volumes and bid/ask spreads for the largest and most liquid ETFs currently available for each of these asset categories. For example, HYG is the largest/most liquid ETF for high yield bonds. It has an unusually tight bid/ask spread and trades in high dollar volumes throughout the trading day. As a result, I assume a relatively low trading cost for this asset category (8 basis points). In contrast, PALL is the largest/most liquid ETF for palladium. PALL offers a relatively wide bid/ask spread and fairly intermittent dollar trading levels throughout the day. As a consequence, this article assumes the highest trading cost for palladium (83 basis points).

Exhibit 2

Assumed one-way trading (a BUY or a SELL) costs, shown in basis points

Government/Corporate U.S. Bond Index (50% U.S. Treasury and 50% Investment Grade U.S. Corporate)	Dow Jones Corporate Bond Return Index	Bank of America Merrill Lynch US High Yield Master II Total Return Index Value	Gold Spot Price- London PM Fixing (US\$/ounce)	Palladium (USD per Troy Ounce)	Reuters CRB Total Return Index (w/GFD extension)	All stocks and U.S. Treasury bonds
38	53	8	23	83	68	0

Trading costs for TAA portfolios are non-trivial. However, determining the correct transaction cost assumption for each asset category (needed when building a commercially viable TAA product) is not the objective of this article, and is therefore placed in the parking lot¹. Suffice it to say that the correct level will depend on many factors including the size of the portfolio being managed, the use of derivatives versus physicals, the asset categories employed, and the ability or inability to rebalance/trade at less crowded moments in time. Application of Exhibit 2’s assumed trading costs to the TAA demonstration portfolio, leads to an average performance burn of 35.15 basis point per annum across the aggregate time period (geometric mean burn).

COMPARATIVE INDEX BENCHMARKS

As stated earlier, the objective of the TAA portfolio is to “*Maximize the probability of earning at least 4 ¼% after-inflation over any and all investment time periods of 12 ½ years in length.*” This objective is an outgrowth of the real-world financial planning process, whether retail or institutional. Thus, the objective of the TAA Portfolio is not to earn more than (or otherwise “beat”) some index benchmark. Instead, it is to deliver a higher probability of success than the practical index alternatives.

To shed additional light on the impact of including/excluding certain sub-asset categories from the comparative benchmarks, this article evaluates the TAA portfolio relative to four distinct benchmarks⁶, described in Exhibit 3. As stated earlier, transactions costs have not been subtracted from these benchmarks and it is assumed that they rebalance cost-free once each month, back to their assigned weightings.

Exhibit 3

Portfolio and comparative benchmark definitions

TAA portfolio	Benchmark - Exact same asset mix	Benchmark - U.S. stocks/bonds only	Benchmark - Global stocks/bonds only	Benchmark - S&P 500/10-year U.S. Treasuries only
Tactical asset allocation portfolio described in this article. Assumes significant trading costs for all asset categories other than stocks and U.S. Treasury bonds.	Passive benchmark that exactly matches the average asset allocation of the referenced TAA portfolio. Uses all 28 asset categories. Assumes zero trading costs, zero transactions costs, zero internal expenses, and monthly rebalancing.	Passive benchmark allocated 80.611% to stocks and 19.389% to bonds. Stocks are equal-weighted across 7 US stock indices. Bonds are equal-weighted across 9 US bond indices (6 Treasury and 3 other). Assumes zero trading costs, zero transactions costs, zero internal expenses, and monthly rebalancing.	Passive benchmark allocated 80.611% to stocks and 19.389% to bonds. Stocks are equal-weighted across 16 stock indices (7 are US and 9 are non-US). Bonds are equal-weighted across 9 US bond indices (6 Treasury and 3 other). Assumes zero trading costs, zero transactions costs, zero internal expenses, and monthly rebalancing.	Passive benchmark allocated 80.611% to S&P 500 Index and 19.389% to 10-year constant-maturity US Treasury bonds. Assumes zero trading costs, zero transactions costs, zero internal expenses, and monthly rebalancing.

These four benchmarks differ with respect to the breadth of their respective asset class diversification. Ranging from, at one extreme, diversification across the 28 asset categories used by the TAA portfolio (but using the average weights experienced by the TAA portfolio), to a benchmark restricted to the S&P 500 and 10-year Treasuries.

COMPARISON

Many people when comparing one investment relative to another will immediately jump to cumulative return over the aggregate time period (geometric mean return per annum). Such a comparison is not relevant to this analysis since it does not address the investment objective as stated earlier. Nevertheless, to put this question to bed, Exhibit 4 provides the comparative statistics over the entire period in inflation-adjusted terms.

Exhibit 4

Geometric mean inflation-adjusted return (in %) over the entire time period (101.6 years)

TAA portfolio	Benchmark - Exact same asset mix	Benchmark - U.S. stocks/bonds only	Benchmark - Global stocks/bonds only	Benchmark - S&P 500/10-year U.S. Treasuries only
11.46	6.68	7.12	6.86	6.81

The TAA portfolio’s relative outperformance is not surprising for one who already understood the extent to which markets (stocks, bonds, and commodities) trend. Nevertheless, no investor has the luxury to wait for over a hundred years to achieve their intended objective.

The correct comparison is defined by the original investment objective, i.e., examine performance over rolling 12 ½-year investment periods. Exhibit 5 provides the summary statistics (mean and median) for this length investment holding period - again in inflation-adjusted terms.

Exhibit 5

Anticipated annualized inflation-adjusted return for the typical 12.5-year investment time period

Statistic	TAA portfolio	Benchmark - Exact same asset mix	Benchmark - U.S. stocks/bonds only	Benchmark - Global stocks/bonds only	Benchmark - S&P 500/10-year U.S. Treasuries only
Mean 12.5-year inflation-adjusted return (in %) over 1,070 different rolling time windows	11.81	6.61	6.71	6.82	6.28
Median 12.5-year inflation-adjusted return (in %) over 1,070 different rolling time windows	11.40	6.21	7.13	6.48	6.51

Mean and median are helpful communicating the “typical.” But they tell us nothing about the dispersion of results or the frequency of that which is atypical. Exhibit 6 addresses this greater need by presenting the percentile outcomes.

Exhibit 6

Percentile outcomes expressed as annualized inflation-adjusted returns for a random 12.5-year long time period

Percentile	TAA portfolio	Benchmark - Exact same asset mix	Benchmark - U.S. stocks/bonds only	Benchmark - Global stocks/bonds only	Benchmark - S&P 500/10-year U.S. Treasuries only
99.5	1.97	0.27	-1.36	0.28	-1.91
99	2.62	0.70	-1.00	0.67	-1.74
98	3.85	1.56	-0.72	1.10	-1.65
97	4.76	2.09	-0.55	1.64	-1.37
96	5.52	2.33	-0.30	1.92	-1.16
95	6.03	2.46	-0.17	2.20	-0.88
90	8.43	3.06	0.99	2.74	0.39
85	8.92	3.40	2.38	3.21	0.97
80	9.20	3.88	3.11	3.71	1.82
75	9.55	4.37	3.91	4.09	3.22
70	10.02	4.67	4.98	4.59	4.41
65	10.50	5.16	5.58	5.23	5.05
60	10.81	5.63	6.14	5.76	5.62
55	11.13	5.94	6.51	6.10	6.09

The first row of Exhibit 6 reports the 99.5th percentile outcomes. In other words, 99.5% of the time, the TAA portfolio will return more than 1.97% (annualized and inflation-adjusted) over a randomly selected 12 ½-year investment time period. In contrast, the S&P 500/10-year Treasury benchmark delivers a less attractive -1.91%. Or at the 55th percentile, the TAA portfolio has a 55% probability of earning more than 11.13% after-inflation per annum as opposed to the S&P 500/10-year Treasury benchmark’s 6.09%.

But to complete the comparison, we must examine tail risk issues. Essentially, addressing the black swan concern, when the unexpected happens, just how bad can it get. By utilizing data

spanning 1/31/1919 through 6/30/2021, this article is able to explore some of the most problematic market episodes drawn from war, pandemic, financial crises, depressions, terrorist acts, assassinations, bank runs, inflation, deflation, and market failures. Exhibit 7 shows the 16 worst-ever 12 ½-year long investment holding periods. These are the 16 worst for the TAA portfolio and for each of the comparative benchmarks, and for this reason they are located at different points in time.

Exhibit 7

Annualized inflation-adjusted return for the sixteen worst-ever 12.5-year investment time periods (drawn from 1,070)

Different 12.5-year long investment time periods	TAA portfolio	Benchmark - Exact same asset mix	Benchmark - U.S. stocks/bonds only	Benchmark - Global stocks/bonds only	Benchmark - S&P 500/10-year U.S. Treasuries only
worst	1.11	-0.35	-2.61	-0.38	-2.58
2nd worst	1.27	-0.02	-2.40	0.03	-2.49
3rd worst	1.31	0.03	-1.68	0.07	-2.19
4th worst	1.41	0.14	-1.61	0.15	-2.05
5th worst	1.77	0.18	-1.52	0.18	-1.98
6th worst	1.90	0.27	-1.37	0.26	-1.92
7th worst	2.12	0.28	-1.33	0.31	-1.90
8th worst	2.20	0.52	-1.29	0.49	-1.89
9th worst	2.27	0.57	-1.08	0.55	-1.86
10th worst	2.30	0.57	-1.06	0.63	-1.77
11th worst	2.45	0.68	-1.02	0.64	-1.77
12th worst	2.69	0.71	-0.98	0.68	-1.73
13th worst	2.88	0.73	-0.97	0.72	-1.73
14th worst	2.89	0.78	-0.97	0.76	-1.71
15th worst	3.05	0.78	-0.96	0.78	-1.71
16th worst	3.07	0.87	-0.84	0.84	-1.71

Returning to the stated investment objective of earning at least 4 ¼% net of inflation over rolling time windows of 12 ½ years, the more practical question is what is the probability of success for the TAA portfolio and the four benchmarks. Exhibit 8 provides the results.

Exhibit 8

Likelihood of success

	TAA portfolio	Benchmark - Exact same asset mix	Benchmark - U.S. stocks/bonds only	Benchmark - Global stocks/bonds only	Benchmark - S&P 500/10-year U.S. Treasuries only
Probability of earning more than 4.25% inflation-adjusted over a randomly selected 12.5-year long investment time period	97.7	76.2	73.6	73.2	70.7

Few data more powerfully support the notion of a TAA portfolio than those presented herein. The TAA portfolio offers a 98% probability of success versus just 71% for the S&P 500/10-year Treasury benchmark with an identical average stock/bond mix.

A CHINESE PROVERB

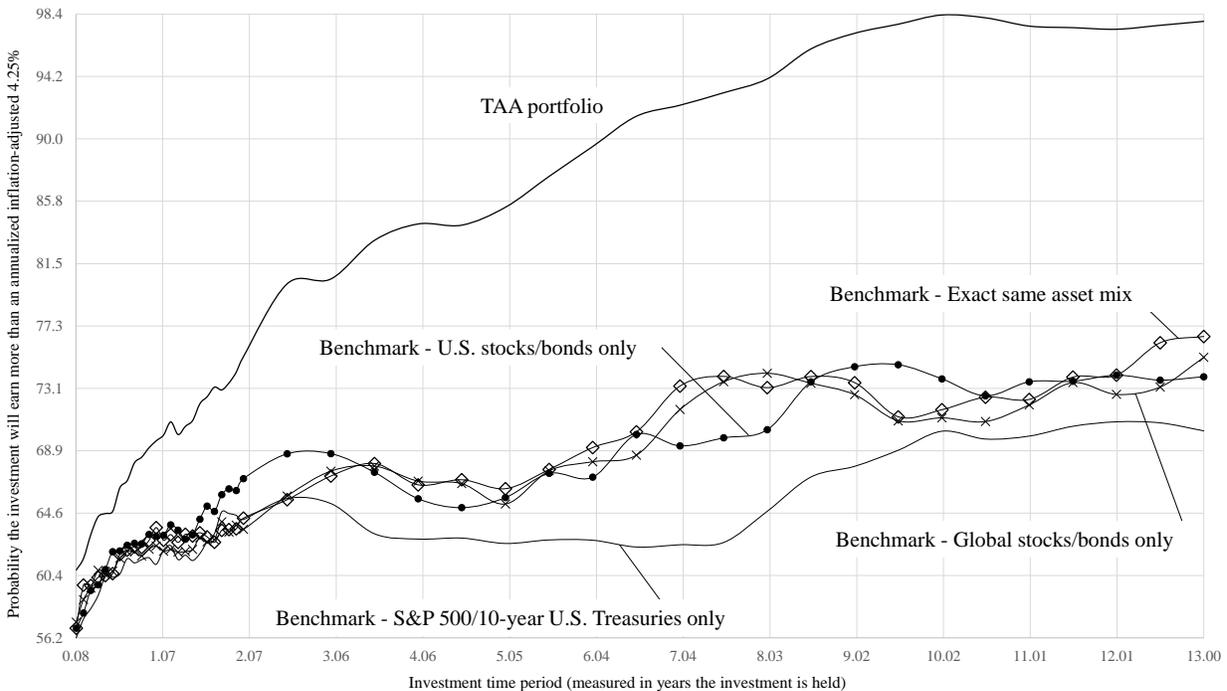
“If your plan is for one year plant rice. If your plan is for ten years plant trees. If your plan is for one hundred years educate children.”⁷”

This proverb reminds us that different types of investments require different lengths of time to sprout, grow, mature, bear fruit, and eventually be harvested successfully. Our industry is rife with the mis-selling and mis-characterization of TAA. Often this takes the form of leading the unsuspecting investor to believe that TAA will both participate and protect. That it will rise along with the market, while avoiding market declines. Such an outcome is a bridge too far, if the fuel that drives TAA’s success is nothing more than market trending, bear market longevity, and the existence of episodic eras.

Front of mind examples of this challenge are provided by the investment industry’s TAA portfolios during the hyper-short market collapse of Feb/Mar 2020 and the three-month bear market of late-1987 (the shortest bear market in history⁸). In both cases, live TAA portfolios generally performed quite poorly. If the fuel that drives TAA’s superior performance (as communicated by Exhibits 4-8) is winners/losers repeat (markets trend), then this should show up in the data. In other words, we should expect that TAA’s relative advantage disappears as we shorten the investment time period from our original 12 ½ years down to a single month. Exhibit 9 addresses this question. It provides the probability of success (likelihood of earning more than 4 ¼%, annualized and inflation-adjusted) for different investment holding periods (ranging from 1 month to 13 years).

Exhibit 9

Impact of investment time period on the likelihood of success



For investment periods as short as one, two, or three years, the benefits of TAA relative to passive index benchmarks is highly questionable. In contrast, a sweet spot is reached at the ten-

year mark - perhaps giving trending the time it requires to sprout, grow, mature, and be harvested successfully. At ten years, the TAA portfolio has a 98.4% probability of success in contrast to the S&P 500/10-year Treasury benchmark offering a miserly 70.0% likelihood of doing so. And these results assume transactions costs for the TAA portfolio and none for the four index benchmarks (even though they also trade every single month so as to maintain their constant fixed-weight allocations).

Exhibit 9 also sheds light on why some of the largest investment management organizations shy away from offering TAA products within the retail channel. First, TAA does not track popular widely used index benchmarks. Second, TAA takes several years to prove its worth as demonstrated by Exhibit 9. When combined together, these two attributes disrupt and/or undermine the traditional selling/buying behaviors across retail channels. To oversimplify, “*what sells is what has outperformed the S&P 500 over the last 1-, 3-, and 5-years,*” and that is just not the inherent design feature of TAA.

OBJECTIONS

I often here the objection: “*Yes, TAA worked in the past, but it won’t work in the future because everything is moving more quickly and as a result trending will diminish and cycles will shorten.*” I remain a devout skeptic. My understanding is that trending occurs for two primary reasons:

Information - Information takes time to develop, be noticed, processed, and eventually reflected across portfolios.

Herding - Market participants have a tendency to herd. The development, growth, and eventual dispersion of herds, takes time.

I see no evidence that either of these two potential causal elements is dissipating. If they are, then one would expect to see some diminishment in TAA’s success over time relative to the four index benchmarks. Exhibit 10 sheds light on this issue. I took the aggregate time period and broke it into seven equal-length time windows. Each window contains 153 (or 152) possible 12 ½-year long investment time periods. Exhibit 10 reports the likelihood of success (meeting the stated investment objective) for the TAA portfolio and the four index benchmarks.

Exhibit 10

Probability of earning more than 4.25% inflation-adjusted during a random 12.5-year long investment time period

Number of unique 12.5-year long investment time periods that end during the date range shown to the right	Date range	TAA portfolio	Benchmark - Exact same asset mix	Benchmark - U.S. stocks/bonds only	Benchmark - Global stocks/bonds only	Benchmark - S&P 500/10-year U.S. Treasuries only
153	10/31/08 to 6/30/21	100.0	79.7	64.7	63.4	55.6
153	1/31/96 to 9/30/08	100.0	100.0	100.0	100.0	99.3
153	4/30/83 to 12/31/95	100.0	86.9	79.1	81.7	75.8
153	7/31/70 to 3/31/83	100.0	33.3	21.6	26.1	20.9
153	10/31/57 to 6/30/70	100.0	100.0	100.0	100.0	100.0
153	1/31/45 to 9/30/57	83.7	41.8	81.7	45.8	75.2
152	5/31/32 to 12/31/44	100.0	91.4	68.4	95.4	68.4
1,070	5/31/32 to 6/30/21	97.7	76.2	73.6	73.2	70.7

The first row shows the results for the most recent time period, i.e., the 153 rolling time periods ending from 10/31/08 through 6/30/21. This most recent interval, provides one of the strongest relative time periods for TAA versus the four index alternatives. TAA succeeded.

A second objection sometimes voiced, is the fear that the next bear market is imminent and the relative success of TAA portfolios may be in doubt during such challenging periods. To address this concern, this article examines the relative success of the TAA portfolio during investment time periods ending during bear markets. Using index data since January 1919, exactly 150 of the available 1,070 investment time periods (12 ½-years in length) ended during a bear market (as defined by the S&P 500 Index⁹). Exhibit 11 reports the results during these specific intervals.

Exhibit 11

150 investment intervals of 12.5-years in length, ending during an S&P 500 bear market - How did they perform?

Statistic	TAA portfolio	Benchmark - Exact same asset mix	Benchmark - U.S. stocks/bonds only	Benchmark - Global stocks/bonds only	Benchmark - S&P 500/10-year U.S. Treasuries only
Mean 12.5-year inflation-adjusted return (in %) over 150 different rolling time windows	11.31	5.87	5.45	6.01	5.28
Median 12.5-year inflation-adjusted return (in %) over 150 different rolling time windows	10.72	5.73	5.51	5.97	5.19
Probability of earning more than 4.25% (annualized inflation-adjusted) if your investment time period ends during a bear market	100.0	79.3	68.7	77.3	64.0

These results suggest that the TAA portfolio’s likelihood of success improves relative to the four index benchmarks for investment time periods that end during a bear market. To be practical, this result is not surprising to anyone who starts with the presumption that markets trend and bear markets last for a considerable number of months.

CONCLUSION

The TAA demonstration portfolio worked. Such an observation is helpful but insufficient. We must also have some appreciation for why it worked, so that we have a firmer basis for concluding that past success is likely to continue into the future. Answering the causal question of “why” is not the objective of this article, so once again I place it in the parking lot¹. But let me attempt to close this issue out with a tentative suggestion as to causality.

Markets Trend - Historical data suggests that stock, bond, commodity, and currency markets trend, in the sense that winners and losers repeat in a relative sense. The causality underlying this trending pattern may be two-fold. First, it takes time for information to be reflected in markets. Second, herding behavior arises from time to time. It takes time for herds to form, establish a direction, and subsequently de-herd.

Bear Markets Last - Bear markets are not short-lived events. By one measure, the mean (median) bear market lasts 19.8 months (17.5 months) (Brown 2021a).

Episodic Eras Exist - Data suggests that two such episodic eras might be characterized by the bond bull market (interest rates falling) running from Nov 1865 through Dec 1908 (43.1 years) and the more recent bond bull market starting Sep 1981 and ending Jul 2020 (38.8 years) (Brown 2021b).

However, even if markets exhibit the three attributes listed above, a commercially viable TAA portfolio requires two additional elements. First, adequate reflection of transactions costs incurred as a result of TAA's inordinately high portfolio turnover. The TAA demonstration portfolio presented herein experienced average monthly portfolio turnover of 22.9% bi-directional (or 45.9% one-directional, a buy or a sale).

Second, the portfolio must be sold/communicated with the correctly stated investment objective. The successful harvesting of markets' non-iid trending attributes requires time. And time is not a year, two, or three. This last issue will be a challenge for the largest investment management organizations. However, it leaves opportunity for the small and for the retail advisory community who have the opportunity to specify and subsequently continuously reinforce more relevant and achievable investment outcomes - whether for the \$1 million retail client or the \$100 million small local foundation/endowment/pension. That is also a subtle or not so subtle way of saying "*shame on our industry.*"

My experience has been trust but verify. Echoing a phrase popularized by one of our nation's past presidents. Before dismissing or disputing the findings herein, I encourage you to examine the data. If I can help in your examination, then reach out and I will provide any assistance possible within the strictures of existing data licensing agreements. There are no secrets here. It's all pretty obvious and transparent.

Finally, if the numbers are really as good as presented herein, then the largest investment management organizations should be all over TAA product design and delivery. Once again, the reasons why this is not happening are not the objective of this article and therefore go into the parking lot¹. But I will attempt to close this last issue out by suggesting it is all about tracking error, length of time it takes for the crop to mature and be ready for harvest, and the lack of a colorful emotion-driven marketing story (markets being non-iid is not particularly engaging).

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FOOTNOTES

1. The parking lot. There are many pertinent issues related to TAA. But the objective of this article is quite narrow and therefore does not seek to cover any and all issues related to TAA. Important sub-issues related to TAA not addressed by this article are placed in this parking lot. These issues include (but are not limited to): (i) What is the correct minimum inflation-adjusted annualize return objective, (ii) What are the correct transaction costs to be assumed when building out a commercially viable TAA product, (iii) What is the causal basis for TAA, i.e., why does it work, and (iv) Why don't the largest investment management organizations build and offer TAA products?
2. All of the results presented in this article are expressed in real (inflation-adjusted) terms. The definition of inflation that was used is the Consumer Price Index, All-Urban, Not Seasonally-Adjusted Index as provided by the U.S. Bureau of Labor Statistics.
3. The primary data source was Global Financial Data, Inc. at <https://globalfinancialdata.com/>. The secondary data source was Kenneth R. French - Data Library - Dartmouth College at https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.
4. The 28 asset categories that were used to construct the TAA portfolio were as follows: (1) S&P 500 Total Return Index (w/GFD extension), (2) S&P 500 Utilities Total Return Index 55, (3) Dow Jones Industrials Total Return Index, (4) Dow Jones Transportation Average Return Index, (5) S&P 500 Industrials Total Return Index 20, (6) Energy Industry Sector (Kenneth R. French Data Library) market-cap weighted, (7) Hi-Tech Industry Sector (Kenneth R. French Data Library) market-cap weighted, (8) UK FTSE All-Share Return Index (w/GFD extension), (9) Japan Topix Total Return Index, (10) Germany CDAX Total Return Index (w/GFD extension), (11) Australia ASX Accumulation Index-All Ordinaries, (12) Finland OMX Helsinki All-Share Gross Index, (13) Sweden OMX Stockholm Benchmark Gross Index (GFD extension), (14) Denmark OMX Copenhagen All-Share Gross Index, (15) France CAC All-Tradable Total Return Index, (16) Belgium Brussels All-Share Return Index (w/GFD extension), (17) GFD Indices USA Total Return T-Bill Index, (18) USA 30-year Government Bond Return Index, (19) USA 5-year Government Note Total Return Index, (20) USA 3-year Government Note Return Index, (21) GFD Indices USA 10-year Government Bond Total Return Index, (22) BofA Merrill Lynch US Inflation-Linked Treasury Total Return Index, (23) Government/Corporate U.S. Bond Index (50% U.S. Treasury and 50% Investment Grade U.S. Corporate), (24) Dow Jones Corporate Bond Return Index, (25) Bank of America Merrill Lynch US High Yield Master II Total Return Index Value, (26) Gold Spot Price-London PM Fixing (US\$/ounce), (27) Palladium (USD per Troy Ounce), and (28) Reuters CRB Total Return Index (w/GFD extension).
5. Four indices had to be estimated in order to bring them back to 1/31/1919. Energy was estimated using S&P 500, Spot oil, Industrial production, Diversified commodities, and S&P 500 Gold Index. Technology was estimated using S&P 500, S&P Utilities, Spot palladium, TIPS, and Dow Jones Transportation. TIPS were estimated using Dow Jones Corporate Bond, 5-year U.S. Treasuries, Platinum, and the CPI. High yield bonds were estimated using Small cap stocks, Dow Jones Corporate Bonds, the CPI, 30-year U.S. Treasuries, and Belgium stocks. For each estimation, the components underlying the estimation were listed in order of importance. Stepwise regression was used as the estimation procedure.
6. "Benchmark - Exact same asset mix" uses all 28 asset categories. The weight on each asset category is the average experienced by the TAA portfolio over its entire life. The remaining three benchmarks exclude

exposure to commodities. Their weightings to stocks and bonds correspond to the average stock/bond weighting experienced by the TAA portfolio over its entire life.

7. This quotation is attributed to Confucius.
8. The Feb/Mar 2020 stock market decline lasted 33 calendar days. It bounced back and fully recovered its loss in a similar number of days. It appears to have no affect on investor's (both retail and institutional) appetite for risk. If anything, it served to meaningfully reinforce investor's willingness to "buy on any dip." It is difficult to define such a decline as a bear market when taken in the context of bear market declines over the last 150 years. The bear market decline of late-1987 appears to satisfy traditional bear market definitions and remains consistent with bear markets over the last 150 years. Moreover, it appears to be the shortest bear market on record (Brown 2021a).
9. Bear markets are defined herein using the inflation-adjusted total returns on the S&P 500 Index restricted to month-end values. This article adopts the definition provided by Brown 2021a.