WINNERS REPEAT, LOSERS REPEAT

ROB BROWN

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Rob is a senior level investment professional with over 35 years of experience in portfolio management for large, sophisticated foundations, endowments, pensions, and the ultra-high net worth. Today, he serves as Integrated's Chief Investment Officer. Prior to Integrated, he held executive positions with Goldman Sachs, Genworth Financial, SEI, Envestnet, and the CFA Institute. During his tenure with Goldman Sachs, he directed the investment management department, a team that included nine CFA Charterholders who oversaw $18.6 billion. While at Genworth, Rob served as the Chief Investment Officer directing a $7.5 billion institutional portfolio of domestic and international securities. At SEI, he worked as the Managing Director of SEI's Research Department that supported the wealth management needs of over $300 billion of pension, endowment, and foundation assets under advisement. At Envestnet, Rob served as the Chairman - Investment Policy Committee, Executive Vice President, and Senior Managing Director - Consulting Division for PMC International (later acquired by Envestnet), where he led the investment decision-making for a $3.3 billion portfolio. Rob also worked in the public sector, where he held the position of Chief Investment Officer for one of our nation's larger state public pension plans, the Arizona Public Safety Personnel Retirement System. His publications have appeared in the Journal of Derivatives and Hedge Funds, Journal of Investing, Journal of Investment Consulting, Journal of Beta Investment Strategies, Pensions & Investments, FA Magazine, RIA Central, On Wall Street Magazine, Royal Alliance Associates Sourcebook, Bank Investment Consultant, Investment News Magazine, London Financial Times, Financial Planning, Financial Advisor, Journal of Finance and Market, Journal of Financial Planning, and Journal of Wealth Management.

Winners Repeat, Losers Repeat

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KEY FINDINGS

■ The TAA portfolio earned an inflation-adjusted 10.8% over the aggregate period (102.1 years), whereas a comparable passive index earned a lesser 6.7% (one with a similar standard deviation, a 75/25 global stock/bond mix).

■ TAA's performance advantage resulted even after subtracting unusually high transaction costs from the TAA portfolio, while assuming that the comparable passive index could rebalance each month cost-free.

■ The TAA portfolio's greater relative success in achieving the stated investment objective did not diminish with the passage of time. If anything, it may have improved during the most recent period (14.3% of the cases examined drawn from the data spanning 1919–2021).

ABSTRACT

I present a tactical asset allocation proof-of-concept portfolio. It is intended to harvest the non-IID statistical attributes of stocks, bonds, commodities, and currencies, both domestic and international. It has as its objective to benefit from markets' propensity to trend from month to month and during both bull and bear market environments. The proof-of-concept portfolio relies on a simple quantitative rule that allows for rigorous evaluation over the past 102.1 years. The results presented herein suggest that Tactical Asset Allocation (TAA) is an approach worthy of consideration. Moreover, the 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 fixed-weight index benchmarks. Such fixed-weight benchmarks have correlations with TAA strategies that are so low as to make commonly used statistical comparisons irrelevant (i.e., not statistically significant). This article attempts to correct our industry's mischaracterization and overpromising of all things TAA by focusing on the time required for success.

Tactical Asset Allocation (TAA) earned a poor reputation over the past 13 years (since 3/6/2009, the recent bear market low). My objective is to mitigate a portion of the retail industry's TAA skepticism. This is an interesting topic, given the size of the retail industry, TAA's prominence within it, and forecasted future growth in TAA's market share. Direct and indirect, the retail industry is large and growing, currently estimated to be more than $16 trillion.[1] TAA first came into existence back in the 1980s and has grown consistently ever since, with occasional faster growth

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[1] Sources: ICMA (International Capital Market Association) analysis using Bloomberg Data (August 2020), Ned Davis Research, and The Visual Capitalist (https://www.visualcapitalist.com).

and modest shrinkage, strongly associated with S&P 500 bear and bull market cycles, respectively. Today, assets under management within retail TAA strategies are measured in the hundreds of billions of dollars.[2]

Retail skepticism is an outgrowth of TAA's failure to meet investor/adviser expectations. My argument is that this failure is the fault of investors/advisers who adopted incorrect performance expectations for TAA and/or specific TAA managers who relied excessively on forecasts and predictions of the future based on subjective human judgment (or overly complex forecasting/prediction models).

I attempt to support this argument by presenting a new investment performance objective for TAA strategies and a proof-of-concept TAA portfolio designed to reliably meet this objective. The proposed differentiated performance goal is an outgrowth of the investor's desire to meet their own specific future needs as opposed to the investment industry's desire to just sell more product. My objective is not to provide a guide on how to build a successful TAA portfolio; that is a worthy topic, but one that requires a book instead of a brief article. Instead, my objectives are to demonstrate the case for TAA, suggest a possible direction, and strongly recommend that success requires correctly setting the appropriate performance objective (which is not to beat some third-party passive index benchmark).

BACKGROUND

No widely accepted definition of TAA exists within the institutional or retail investment industries. Nevertheless, products proliferate and have grown significantly since first introduced by Bill Fouse and his firm Mellon Capital (founded back in 1983). For those professionals fully cemented within the investment industry, TAA is a little like "art": they know it when they see it. But a widely accepted definition eludes us. For the purposes of this article, I am defining retail TAA strategies as those portfolios that exhibit the following characteristics:

- They are built using commingled vehicles and/or derivatives (as opposed to individual stocks or individual bonds).
- Size of factor or asset class bets is significantly above average.
- Frequency with which the bets are changed is significantly above average.
- Tracking to blended benchmarks consisting of passive indices is exceedingly low.
- Tax efficiency is remarkably poor.
- Modest but relatively dependable bear market mitigation is expected for bear markets lasting at least 8 months.
- They suffer from occasional whipsaw risk.
- They are delivered in the format of a separate account, 1940 Act fund, or insurance subaccount.

Two representative examples of such retail TAA portfolios include the $40 billion of TAA products offered by F-Squared, Wellesley, MA (now defunct for unrelated reasons) and the well-respected Nationwide variable annuity Mozaic Index product line.

Since the bear market low set back on midday March 6, 2009, the S&P 500 as measured by SPY returned +823% and the 7/10-year Treasury as measured by IEF earned +57% (through midday 1/4/2022). Few if any TAA strategies have faired well against these comparative returns. In their study, Morningstar, Inc., examined the "net

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[2] Sources: Investment Company Institute; YCharts; Morningstar; BlackRock, Inc.; and the Insurance Information Institute.

annualized return, standard deviation, Sharpe ratio, and maximum drawdown from July 31, 2010, to December 31, 2011," of 163 tactical funds (Ptak 2012, para. 6). They concluded that only a small percentage of firms outperformed the Vanguard Balanced Index (VBINX), which used a static 60% stock, 40% bond allocation. Updated to June 2013, Morningstar found that 20% of TAA funds beat the Vanguard Balanced Index Fund, and just four had a superior Sharpe ratio.

Retail investor/adviser performance expectations for TAA strategies have been made worse by the investment industry's dysfunctional sales/marketing paradigm focused on comparisons of 1-, 3-, 5-, 7-, and 10-year performance numbers to popular index benchmarks. Unfortunately, such comparisons offer no statistical significance concerning the future performance of a TAA strategy. Worse yet, they encourage selection criteria that have little or nothing to do with the end-investor's actual and specific needs.

Our industry has done a remarkably good job of mischaracterizing, mis-selling, and overpromising 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. One commonly hears the following type of characterization across the industry: "TAA will provide participation and protection. When the market goes up, you get a large bite of the apple. 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 challenges in mind, I am unusually specific and limited, with the objective of sidestepping the well-laid traps placed by our industry's past mischaracterizations.

Again, I remind the reader that my objective is to provide sufficient evidence that TAA is worth pursuing but not to show how one would build a commercially viable product. Nevertheless, the empirical results presented herein suggest that TAA is a portfolio 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.

TAA'S DIFFERENTIATED 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 professions. Because this article's objective is limited to the provisioning of a TAA proof-of-concept portfolio, we have the luxury of simplifying from client-specific real-world investment needs. I assume the hypothetical investor has "spending" needs arriving 10–15 years in the future. Taking the midpoint of this interval, we assume an unimpeded investment time period of 12½ 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, immunization, time segmentation investing, or the bucket approach. The concept is, Identify the investor's "spending" needs. Position those needs 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 the investor's needs into years 0–4, 5–9, 10–14, 15–19, 20–24, and 25 and beyond.

Most investors face spending or liabilities that fluctuate with inflation. For this reason, the analysis presented herein is reported in after-inflation or "real" terms.[3] And this article assumes the following investment objective: Maximize the probability of earning at least 4¼% after-inflation over any and all investment time periods of 12½ years in length. Notice that the operative words here are *at least*. A different way of phrasing this objective would be "Never earn less than 4¼% after-inflation."

One could debate whether 4¼% or some other level is appropriate. As important as this issue is, it is outside the scope of this article. Suffice it to say that by assuming a minimum required after-inflation return of 4¼%, I leave room for practical implementation costs. For example, perhaps advisory fees, custodial costs, and internal exchange-traded fund (ETF) expense ratios consume 125 basis points (bps). In this instance, the client is left with at least 3% over and above inflation.

To recap: The objective is neither to beat a benchmark nor to mitigate the market's decline during a certain time window or event. The objective is not defined by alpha, beta, or omega. As one of my institutional clients is fond of reminding me: "The foundation can't spend relative outperformance, whether risk-adjusted or not. We can only spend what we literally earned, and then only after adjusting for inflation. So, Rob, let's stay focused on the real world. I can't spend alpha, beta, or omega. The foundation's future plans are cast in stone. What I need from you is a solid and defensible estimate as to the probability that we'll meet those future plans. Is it 99.5%, 98%, or just 55%? That's the only framework worth discussing with the foundation's investment committee!"

PROOF-OF-CONCEPT TAA PORTFOLIO

Most of the retail and part of the 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 (i.e., data artifacts). In an IID world, mean variance optimization is likely to be an optimal strategy for portfolio construction.

But what if markets do trend, causal bear/bull 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). In such a world, Markowitz mean variance optimization would be patently suboptimal.

If this is true (i.e., markets aren't IID), then a portfolio construction technique based on overweighting recent relative winners and underweighting recent losers should excel. Such an approach is the basis for the proof-of-concept TAA portfolio examined herein. And, I would argue, it serves as the inherent foundational basis for all successful retail TAA approaches.[4] Similarly—and this is important—if markets fail

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[3]All the results presented in this article are expressed in real (inflation-adjusted) terms. The definition of inflation is the Consumer Price Index, All-Urban, Not Seasonally-Adjusted Index as provided by the U.S. Bureau of Labor Statistics.

[4]However, I do recognize that some TAA strategies also use macroeconomic, monetary, behavioral, market supply/demand, and fundamental valuation metrics. Moreover, many trend-following TAA strategies refine their rules based on reversion to the mean type overlays. Often this last is intended to improve the usefulness of the trend following signals in terms of calibration and timing.

to trend, then constructing a portfolio in such a fashion should deliver performance degradation, instead of enhancement, particularly on a risk-adjusted basis.

Note that a portfolio construction technique designed to harvest asset class trending does not need to be complex to be powerful. The opposite is more likely to hold true. Perhaps the quotes "If you can't explain it to a six-year-old, you don't understand it yourself"[5] and "Life is really simple, but we insist on making it complicated"[6] best capture this practical observation. Or consider the near universally accepted risk premiums of value, small cap, and profitability. The portfolio construction techniques for capturing these three accepted risk-premia are equally simplistic—and that simplicity makes their construction approaches no less valid.

Finally, to evaluate TAA's ability to serve the stated investment objective more robustly than passive indices, 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 (i.e., optimization),
- choosing asset categories that are supportive of the TAA approach,
- assuming zero trading costs,
- using portfolio performance objectives that fail to directly serve the real-world needs of retail and institutional investors, and
- comparing results to inapplicable or nonimplementable index benchmarks.

PORTFOLIO CONSTRUCTION METHODOLOGY

The TAA portfolio is constructed and evaluated using monthly total return indices spanning the period 1/31/1919 through 12/31/2021. Returns are reported after inflation-adjustment using the Consumer Price Index. Data were provided by Global Financial Data, Inc., but were supplemented by the Kenneth R. French—Data Library—Dartmouth College.[7] Twenty-seven asset categories[8] were selected spanning this 102.9-year window. The starting date of 1/31/1919 was selected for the following reasons:

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[5] Attributed to Albert Einstein.

[6] Attributed to Confucius.

[7] The primary data source was Global Financial Data, Inc. (https://globalfinancialdata.com/). The secondary data source was Kenneth R. French—Data Library—Dartmouth College (https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html).

[8] (1) S&P 500 Total Return Index (with GFD Ext), (2) S&P 500 Utilities Total Return Index 55 (with GFD Ext), (3) Dow Jones Industrials Total Return Index (with GFD Ext), (4) Dow Jones Transportation Average Return Index (with GFD Ext), (5) S&P 500 Industrials Total Return Index 20, (6) Energy Industry Sector (1 of 10), French Data Library, market-cap, (7) Hi-Tech Industry Sector (1 of 10), French Data Library, market-cap, (8) UK FTSE All-Share Return Index (with GFD Ext), (9) Japan Topix Total Return Index (with GFD Ext), (10) Germany CDAX Total Return Index (with GFD Ext), (11) Australia ASX Accumulation Index-All Ordinaries (with GFD Ext), (12) Finland OMX Helsinki All-Share Gross Index (with GFD Ext), (13) Sweden OMX Stockholm Benchmark Gross Index (GFD Ext), (14) Denmark OMX Copenhagen All-Share (with GFD Ext), (15) France CAC All-Tradable Total Return Index (with GFD Ext), (16) Belgium Brussels All-Share Return Index (with GFD Ext), (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) Bank of America Merrill Lynch US High Yield Master II, (24) Gold Bullion Price—New York (US$/Ounce) (with GFD Ext), (25) Platinum Cash Price (US$/Ounce) (with GFD Ext), (26) Palladium (USD per Troy Ounce) (with GFD Ext), and (27) World Bank Agriculture Commodity Price Index.

- It includes shocks (in part but not in whole) resulting from the Russian revolution, global pandemic (the Spanish Flu), disaster of the Weimar Republic, Great Florida Land Boom and Bust, Great Depression of 1920, and an era characterized by the most profound decline in US inflation experienced in well over 150 years.
- Almost all of data series started on or before that date.
- In a small number of cases, where the data did not extend back to 1/31/1919, reasonable estimates going back to 1919 could be made that did not impact or otherwise affect the relative statistical comparison between the TAA portfolio and its six competing performance benchmarks.
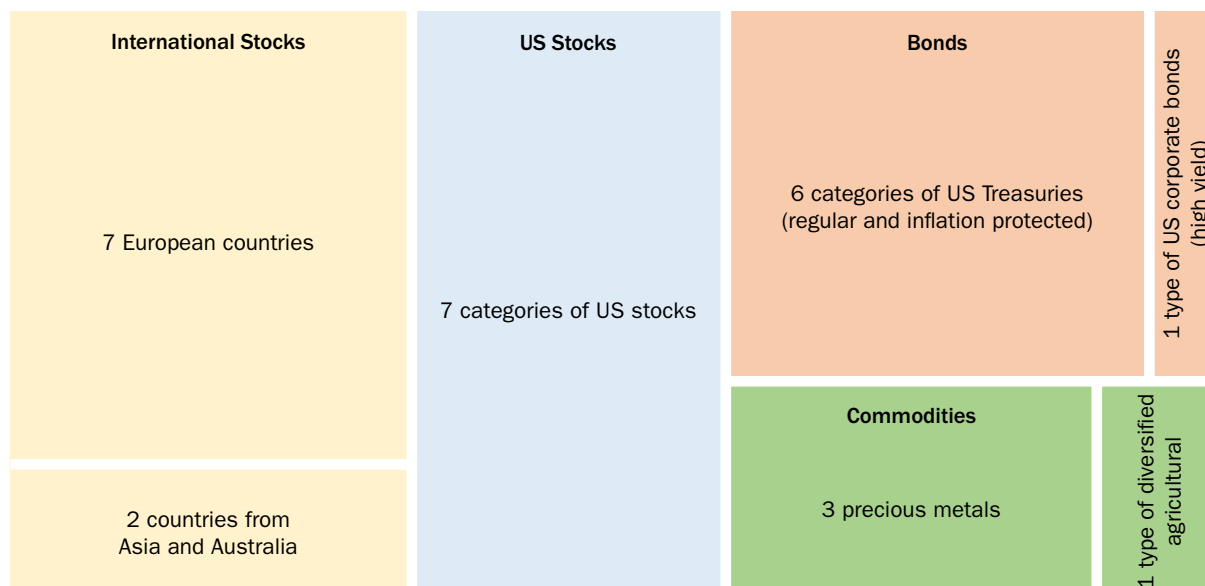
If one is building a commercially viable TAA portfolio, will they select these specific 27 asset categories? Of course not. These 27 were selected because high-quality monthly data exist back to 1/31/1919 and they can be implemented today through the use of sufficiently liquid ETFs and/or derivatives. Today, we find institutional TAA managers using ETFs, derivatives, and related commingled collective trust fund vehicles. Additional asset categories beyond these 27 could have been selected, but they were rejected out of an abundance of caution related to data quality. As mentioned earlier, in a small number of cases, where the data did not extend back to 1/31/1919, reasonable estimates[9] could be made carrying the series back to 1919.

The issues defining how best to go about selecting asset categories for a commercial TAA product are fairly straightforward but are outside the scope of this article. Suffice it to say, the key criteria underlying asset class selection during a commercial build include cross-correlations, time series properties (trending attributes), number of asset categories, vehicle availability, adequate safe harbors (from key macro risks), adequate engines for growth, spanning fundamental nondiversifiable risk factors, comparable granularity levels, and trading costs. The 27 asset categories used in this article are of three types: stocks, bonds, and commodities. Exhibit 1 provides a bird's-eye view of how the 27 break out.

At a more granular level, this article uses seven types of US stocks, nine categories of non-US stocks, six versions of US Treasuries, one type of US corporate bonds (high yield), and four commodity indices. The non-US stocks span Europe, Asia, and Australia. The US Treasuries span maturities (interest rate sensitives from 90 days to 30 years) and inflation protection. Corporate bonds are restricted to high yield. The four commodities are drawn from precious metals and agriculture. Collectively, the 27 assets span risks such as economic growth, interest rates, inflation, US dollar, energy prices, and default.

Once each month, the TAA portfolio is reconstituted so as to be equal-weighted across the eight asset categories exhibiting the highest trending scores. An asset category's trending score is defined to be the current index value (using a total return

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[9]Three indices were estimated prior to their beginning, using stepwise regression. The Hi-Tech Index did not exist prior to 1926. The stepwise regression resulted in an R-square of 0.83, t-statistics ranging from 3.6 to 49.6, p values ranging from .0004 to 0, and the S&P 500 Index as the most significant regressor. The High Yield Bond Index did not exist prior to 1986. The stepwise regression resulted in an R-square of 0.67, t-statistics ranging from 4.6 to 14.8, p values ranging from .000004 to 0, and the Dow Jones Corporate Bond Index as the most significant regressor. The TIPS Bond Index did not exist prior to 1997. The stepwise regression resulted in an R-square of 0.55, t-statistics ranging from 3.4 to 9.0, p values ranging from .0006 to 0, and the 5-year Government Bond Index as the most significant regressor. The 3-year Government Bond Index did not exist prior to 1940. Prior to that date a linear combination of the 5-year Government Bond and the 90-day T-Bill was used. In a couple cases, the present-day index did not go all the way back to 1919 but could be spliced on to a similar index. For example, the Energy Index (Ken French) did not exist prior to 1926. But it was spliced onto the Energy Index provided by the Cowles Commission for Research in Economics prior to that date.

EXHIBIT 1
Twenty-Seven Asset Categories Used

International Stocks	US Stocks	Bonds	1 type of US corporate bonds (high yield)
7 European countries	7 categories of US stocks	6 categories of US Treasuries (regular and inflation protected)	
2 countries from Asia and Australia		Commodities — 3 precious metals	1 type of diversified agricultural

index) divided by the 11-month average index value (using only month-end total return index values). This 11-month average includes the current index value.

As before, if one is building a commercially viable TAA strategy, is this the port-folio construction rule that one would employ? Of course not. How one goes about selecting such a rule or rules is straightforward and of great commercial interest (and therefore will most likely not be published). It is also outside the scope of this article. Suffice it to say, during a commercial build, different assets should be weighted differently (if they are one of the "selected eight") depending upon the role they play within the portfolio. For example, with an investment time horizon of 12½ years, one might assign a reduced weighting to US Treasuries. Importantly, the nature of the weighting scheme will be based on the portfolio's investment time horizon (e.g., 7, 17, or 27 years). Finally, trading costs might be mitigated by preventing the addition of a new asset category (or removal of an already existing asset category) from the portfolio if its trending score is right at the cusp of the inclusion/exclusion divide.

One of the well-placed criticisms against existing commercial TAA portfolios concerns their high trading costs resulting from frequent portfolio turnover and the occasional use of wide bid-ask spread instruments. With the objective of mitigating this concern, transactions costs are imposed on the TAA portfolio but not on the comparative index benchmarks. 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 the 27 asset categories. For example, HYG is the largest/most liquid ETF for high-yield US corporate bonds. It has an unusually tight bid-ask spread and trades dependably and consistently in extremely high-dollar volumes throughout the trading day. As a result, I assume a relatively low one-way trading cost for this asset category (7.42 bps).

In contrast, PALL is the largest/most liquid ETF for palladium. PALL offers a rela-tively wide bid-ask spread and fairly intermittent dollar trading levels throughout the day. As a consequence, this article assumes the highest one-way trading cost for palladium (89 bps). To help place the assumed trading costs in context, the typical mid-day bid-ask spreads for HYG, DBA, and PALL are 1 bps, 10 bps, and 50 bps,

EXHIBIT 2

Assumed One-Way Trading Costs (a BUY or a SELL), Shown in Basis Points

All Stocks and US Treasury Bonds	High-Yield US Corporate Bonds	Gold–Physical (Spot)	Diversified Agricultural Commodities	Platinum– Physical (Spot)	Palladium– Physical (Spot)
1	7.42	22.25	74.17	81.58	89

respectively. If we assume that fair value is located at the midpoint of the bid-ask spread and that all buys/sells are executed at the asks/bids (i.e., no market impact), then this article's assumed trading costs for HYG, DBA, and PALL are 1,176%, 1,377%, and 258% greater than those existing in the market today, respectively. In other words, this article is meaningfully handicapping the TAA portfolio.

Trading costs for TAA portfolios are nontrivial. However, determining the correct transaction cost assumption for each asset category (required when building a commercially viable TAA product) is outside the scope of this article. Suffice it to say, 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 portfolio, leads to an average performance burn of 53.1 basis points per annum across the aggregate time period (geometric mean burn). Realized trading costs over rolling 12-month time windows ranged from a low of 2 bps (for the year ending 4/30/1929) to a high of 164 bps (for the year ending 6/30/1937). The median 12-month window experienced a trading cost burn of 50 bps. Some retail TAA strategies exist that trade once each month and restrict themselves to a handful of highly liquid stock and bond futures contracts. Such strategies experience radically lower trading cost burns than the 53.1 bps assumed herein.

SIX COMPARATIVE INDEX BENCHMARKS

As stated earlier, the objective of the TAA portfolio is to maximize the probability of earning at least 4¼% after-inflation over any and all investment time periods of 12½ 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 client success than the practical index alternatives. When determining success or failure of the proof-of-concept TAA portfolio, or its reward or risk, such determinations must be conducted through the lens of the stated objective. Risk is defined by failure to achieve a predefined client-centric objective and not by standard deviation.

To shed additional light on the impact of including/excluding certain subasset categories from the comparative benchmarks, this article evaluates the TAA portfolio relative to six distinct benchmarks. 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. This approach further handicaps the TAA portfolio.

The benchmarks differ with respect to geography, equity-weighting, and use of commodities. Two purely domestic benchmarks were selected. Two global benchmarks were included. And two benchmarks that added commodities are used. Benchmarks were selected so that three of them would have higher standard deviations than the

EXHIBIT 3

Statistics Over Entire Time Period (102.1 years) Using Inflation-Adjusted Monthly Returns

	TAA Portfolio	65/0/35/0	75/0/25/0	35/30/35/0	40/35/25/0	35/30/26.25/8.75	40/35/18.75/6.25
Real Return	10.80	6.40	6.86	6.19	6.66	6.11	6.60
Correlation with TAA Portfolio	1	0.58	0.58	0.65	0.65	0.67	0.66
Annualized Standard Deviation	11.74	12.56	14.22	10.41	11.73	10.51	11.80
Return per Unit of Volatility	0.92	0.51	0.48	0.59	0.57	0.58	0.56

NOTE: TAA = Tactical Asset Allocation.

TAA portfolio and three would have lower standard deviations. Each benchmark is identified or labeled by four numbers. For example, the 40/35/18.75/6.25 benchmark is allocated 40% to US stocks, 35% to international stocks, 18.75% to bonds, and 6.25% to commodities. Similarly, the 65/0/35/0 benchmark is allocated 65% to US stocks and 35% to bonds. US stocks, international stocks, bonds, and commodities make use of the same asset categories available to the TAA portfolio (i.e., the 27 asset classes) and are equal-weighted across their respective constituencies.

The narrowest benchmark is the 65/0/35/0 index. This benchmark is diversified across 14 purely domestic stock and bond indices and is rebalanced monthly at month-end back to policy weights. The broadest benchmark is the 35/30/26.25/8.75 index. This benchmark is diversified across all 27 asset categories. Keep in mind that the proof-of-concept TAA portfolio is meaningfully disadvantaged relative to these comparative benchmarks because of the subtraction of unusually high trading costs from the portfolio but not from the benchmarks.

EVALUATION RELATIVE TO STATED INVESTMENT OBJECTIVE

When comparing one investment to another, many people 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, as it does not address the invest-ment objective as stated earlier. Nevertheless, to put this question to bed, Exhibit 3 provides the comparative statistics over the entire period in inflation-adjusted terms. The exhibit also reports the correlations for the six comparative benchmarks. These correlations are so low as to emphasize the difficulty of (a) selling/marketing TAA strategies based on relative performance comparisons to popular index benchmarks and (b) drawing statistically significant conclusions based on short periods such as 10 or even 20 years.

The consistency of the TAA portfolio's relative outperformance over the last 102.1 years is shown by plotting the growth of $1 on log scale. Exhibit 4 provides this view. As expected, the 35/30/26.25/8.75 benchmark delivered the lowest cummulative growth because of its underweighing to equities and inclusion of commodities. Sim-ilarly, the 75/0/25/0 benchmark delivered the greatest growth because of its equity overweighting and reliance on purely US asset categories. The two benchmarks that behaved most similarly to the TAA portfolio were the 40/35/25/0 index with a standard deviation of 11.73% (vs. TAA's 11.74%) and the 35/30/26.25/8.75 index with a correlation of 0.67 (the highest correlation to the TAA portfolio from among the six benchmarks).

EXHIBIT 4
Growth of $1 in Inflation-Adjusted Terms, First Invested Back on 11/30/1919
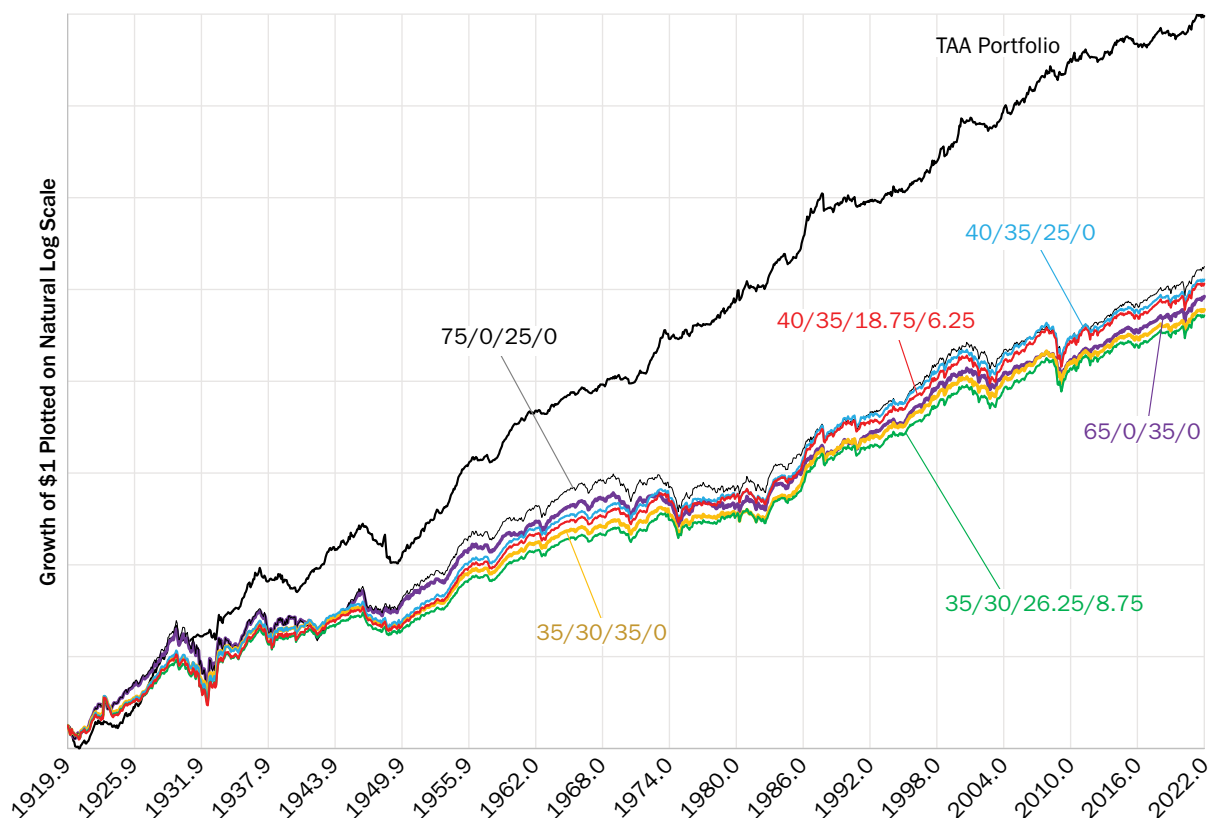
The TAA portfolio's relative outperformance is not surprising for one who already understood the extent to which markets (stocks, bonds, commodities, and currencies) trend. This was demonstrated by the higher return, lower risk, and superior risk-adjusted return. But these summary statistics are misleading in a non-IID world, that is, in a world where markets trend. In such environments, the time series properties of asset class returns become all-important to the investor's liklielhhood of success or failure. Or to put it somewhat differently, no investor has the luxury of waiting 102 years to achieve their personal retail/institutional goal. The correct comparsion is defined by the original investment objective (i.e., examine performance over rolling 12½-year investment periods). Exhibit 5 provides the summary statistics (mean and median) for this length investment holding period—again in inflation-adjusted terms.[10]

Mean and median communicate what is "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 that more substantively reveal the investor's likelihood of success. It is interesting to note that the TAA

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[10] Statistics appearing in Exhibit 5 are based on all possible 12½-year long investment periods, for which there are 1,076 such unique intervals. Some readers might suggest the use of a bootstrapping process to develop more "accurate" summary statistics. However, the use of such bootstrapping techniques would have the opposite impact, as they would hide the non-IID attributes of asset class returns; that is, bootstrapping would mask markets' trending behaviors. The use of bootstrapping techniques would generate erroneous and misleading statistics.

EXHIBIT 5

Annualized Inflation-Adjusted Return for the Typical 12.5-Year Investment Period

Statistic	TAA Portfolio	65/0/35/0	75/0/25/0	35/30/35/0	40/35/25/0	35/30/26.25/8.75	40/35/18.75/6.25
Mean 12.5-Year Inflation-Adjusted Return (in %) over 1,076 Different Rolling Time Windows	11.32	6.04	6.47	6.09	6.57	6.04	6.53
Median 12.5-Year Inflation-Adjusted Return (in %) over 1,076 Different Rolling Time Windows	11.04	6.36	6.88	5.85	6.49	5.88	6.44

NOTE: TAA = Tactical Asset Allocation.

EXHIBIT 6

Percentile Outcomes Expressed as Annualized Inflation-Adjusted Returns for a Random 12.5-Year-Long Period

Percentile	TAA Portfolio	65/0/35/0	75/0/25/0	35/30/35/0	40/35/25/0	35/30/26.25/8.75	40/35/18.75/6.25
99.5	1.50	−1.00	−1.13	0.03	0.20	0.19	0.31
99	2.43	−0.78	−0.84	0.28	0.55	0.59	0.76
98	3.74	−0.60	−0.70	0.57	0.82	1.08	1.22
97	4.59	−0.42	−0.52	0.80	1.01	1.45	1.57
96	5.08	−0.22	−0.34	1.25	1.47	1.70	1.81
95	5.51	0.03	−0.16	1.43	1.65	1.88	2.00
90	7.70	1.04	1.08	2.05	2.37	2.51	2.69
85	8.37	2.20	2.29	2.61	2.98	2.91	3.19
80	8.86	3.30	3.22	3.24	3.52	3.56	3.75
75	9.12	3.89	3.98	3.83	3.93	3.99	4.09
70	9.54	4.31	4.76	4.28	4.47	4.43	4.55
65	9.87	4.83	5.33	4.86	5.16	4.81	5.16

NOTE: TAA = Tactical Asset Allocation.

portfolio delivered positive returns for all percentile levels. The same cannot be said for the benchmark indices.

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 1.50% (annualized and inflation adjusted) over a randomly selected 12½-year investment period. In contrast, the 75/0/25/0 benchmark delivers a less attractive −1.13% loss. Or at the 65th percentile, the TAA portfolio has a 65% probability of earning more than 9.87% after-inflation per annum as opposed to the 75/0/25/0 benchmark's 5.33%. The reader should keep in mind that these results do not imply that there is a 65% probability that the TAA portfolio will earn more than 9.87% over and above inflation over the next 12½ years. This is because the next 12½ years is not a randomly selected period. Instead, it is conditioned on current-day valuation issues.

EXHIBIT 7

Annualized Inflation-Adjusted Return for the 14 Worst-Ever 12.5-Year Investment Periods (drawn from 1,076)

Different 12.5-Year-Long Investment Periods	TAA Portfolio	65/0/35/0	75/0/25/0	35/30/35/0	40/35/25/0	35/30/26.25/8.75	40/35/18.75/6.25
Worst ever	0.89	−1.70	−1.80	−0.37	−0.29	−0.38	−0.30
2nd worst	1.00	−1.47	−1.75	−0.26	−0.11	−0.15	−0.03
3rd worst	1.18	−1.16	−1.58	−0.15	−0.01	−0.12	0.03
4th worst	1.21	−1.10	−1.43	−0.14	0.07	−0.09	0.04
5th worst	1.31	−1.09	−1.16	−0.07	0.14	0.08	0.22
6th worst	1.45	−1.02	−1.14	−0.03	0.16	0.15	0.27
7th worst	1.59	−0.97	−1.12	0.14	0.27	0.25	0.38
8th worst	1.99	−0.90	−0.97	0.15	0.38	0.28	0.48
9th worst	2.04	−0.82	−0.91	0.20	0.42	0.53	0.67
10th worst	2.08	−0.82	−0.90	0.22	0.43	0.56	0.69
11th worst	2.39	−0.81	−0.87	0.25	0.43	0.57	0.73
12th worst	2.44	−0.78	−0.84	0.29	0.59	0.59	0.77
13th worst	2.67	−0.76	−0.80	0.35	0.61	0.66	0.83
14th worst	2.86	−0.75	−0.79	0.35	0.64	0.72	0.86

NOTE: TAA = Tactical Asset Allocation.

Exhibit 6 provides a comprehensive view as to the distributional properties of the TAA portfolio and its six comparative benchmarks—far more than is revealed by standard deviation or some other simple summary statistics, which generally hide the inherent time series properties of most asset class returns. But to complete the comparison, we must examine tail risk issues. Essentially, addressing the black swan concern, when the unexpected happens, just how bad will it get? By using data spanning 1/31/1919 through 12/31/2021, this article explores 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 presents the 14 worst-ever 12½-year-long investment holding periods. These periods are the worst for the TAA portfolio and for each of the comparative benchmarks; for this reason, they are located at different points in time.

The worst 12½-year period for the TAA portfolio ended 8/31/1949 and generated a +0.89% annual return over and above inflation. In contrast, the worst intervals for the 75/0/25/0 and 35/30/26.25/8.75 benchmarks ended 3/31/1942 and 9/30/1949, respectively . . . during which they returned losses of −1.80% and −0.38% per annum, respectively. Keep in mind that the TAA portfolio never delivered a negative return over any 12½-year window. The same cannot be said for any of the comparative benchmarks. But returning to the stated investment objective of earning at least 4¼% net of inflation over rolling time windows of 12½ years, the more practical question is the probability of success for the TAA portfolio and its six benchmarks. Exhibit 8 provides the results.

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 72% for the 40/35/25/0 benchmark (the index with the most similar standard deviation) or 73% for the 35/30/26.25/8.75 benchmark (the index with the highest correlation). Evaluation of the proof-of-concept TAA portfolio must be conducted through the lens of the stated investment objective. In other words, how likely is it to achieve the investor's goals? And if it fails to achieve those goals, just how badly will it fail? The results provided by Exhibits 5–8 best answer this need.

EXHIBIT 8

Likelihood of Success Relative to Stated Objective

	TAA Portfolio	65/0/35/0	75/0/25/0	35/30/35/0	40/35/25/0	35/30/26.25/8.75	40/35/18.75/6.25
Probability of Earning More Than 4.25% Inflation-Adjusted over a Random 12.5-Year Period	97.7	70.7	73.0	70.2	71.5	72.8	73.1

NOTE: TAA = Tactical Asset Allocation.

PATIENCE—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.[11]

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 products during the hypershort market decline of February/March 2020 and the 3-month bear market of late 1987 (the shortest bear market in history[12]). In both cases, the industry's TAA portfolios generally performed quite poorly. If the fuel that drives TAA's superior performance (as communicated by Exhibits 3–8) is winners/losers repeat (i.e., 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 period from our original 12½ years down to a single month. Exhibit 9 answers this inquiry. It provides the probability of success (likelihood of earning more than 4¼%, annualized and inflation adjusted) for different investment holding periods (ranging from 1 month to 15 years).

For investment periods as short as 1, 2, or even 3 years, the benefits of TAA relative to passive index benchmarks is highly questionable. In contrast, a sweet spot is reached at the 9-year mark. Returning to the Chinese proverb, TAA requires many years for it to sprout, grow, mature, and be successfully harvested—perhaps 9 or 10. At 10 years, the TAA portfolio has a 98% probability of success in contrast to the 75/0/25/0 benchmark offering a miserly 72% likelihood of doing so, or the

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[11] Attributed to Confucius.

[12] The February/March 2020 stock market decline lasted just 33 calendar days. It bounced back and fully recovered its loss in a similar number of days. It appears to have had no impact on investor's (both retail and institutional) appetite for risk, which is an attribute universal to all prior bear markets. If anything, it served to meaningfully reinforce investor's willingness to "buy on the dip." It is difficult to define such a decline as a bear market when taken in the context of bear market declines over the past 175 years. The bear market decline of late 1987 appears to satisfy traditional bear market definitions and remains consistent with bear markets over the past 175 years. Moreover, it appears to be the shortest bear market on record (Brown 2021b).

EXHIBIT 9

Impact of Investment Time Period on the Portfolio's Likelihood of Success
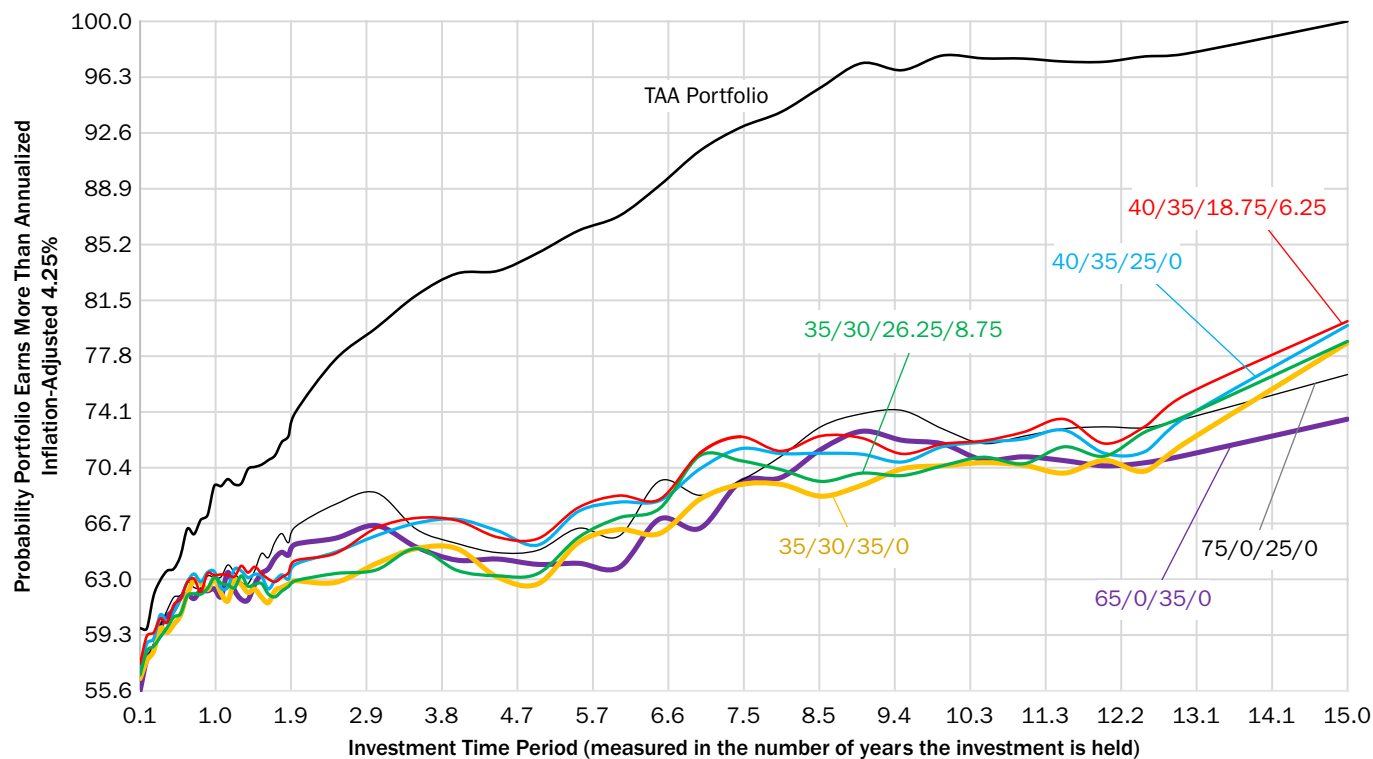
35/30/26.25/8.75 benchmark at just 71%. And these results assume unusually high transactions costs for the TAA portfolio and none for the six index benchmarks (even though they trade every single month so as to maintain their constant fixed-weight allocations).

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 commonly used index benchmarks as demonstrated by the correlations reported in Exhibit 3. Second, TAA takes several years to prove its worth as demonstrated by Exhibit 9. 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 behavioral attribute of TAA.

A final observation can be drawn from Exhibit 9. Observe how all six passive index benchmarks cluster together. Essentially, whether one allocates 65% or 75% to stocks, whether one stays domestic or goes global, whether one adds commodities or leaves them out . . . makes very little difference. The probabilities of success are just not meaningfully different. The difference in likelihood of success between these six benchmarks is remarkably small. This observation is noteworthy and speaks to the weakness of traditional mean-variance optimization approaches (Michaud 1989).

OBJECTIONS

I often hear three objections, and I address each in turn. The first is the fear that TAA is a strategy designed for bear markets but not for bull markets. The concern is

EXHIBIT 10

Performance During Bull and Bear Markets Periods (as defined for the S&P 500 Index)

Market Environment	Statistic	TAA Portfolio	65/0/35/0	75/0/25/0	35/30/35/0	40/35/25/0	35/30/26.25/8.75	40/35/18.75/6.25
For All Periods Ending During an S&P Bull Market	Median inflation-adjusted return (in %) for a 12.5-year period	11.21	6.70	7.21	6.02	6.62	5.97	6.64
	Probability of earning more than 4.25% (annualized inflation-adjusted) for a 12.5-year period	97.3	71.7	74.1	70.1	71.1	72.7	73.4
For All Periods Ending During an S&P Bear Market	Median inflation-adjusted return (in %) for a 12.5-year period	9.87	4.88	5.30	5.26	5.76	5.27	5.75
	Probability of earning more than 4.25% (annualized inflation-adjusted) for a 12.5-year period	100.0	64.7	66.7	70.7	74.0	73.3	71.3

NOTE: TAA = Tactical Asset Allocation.

that TAA outperforms during bears and underperforms during bulls. To address this objection, I examine the relative success of the TAA portfolio during two alternate environments, that is, during periods ending during bear markets and those ending during bull markets,[13] Using index data since January 1919, there are 1,076 unique 12½-year-long investment periods; 150 of these ended during bear markets, and the remaining 926 ended during bull markets (as defined by the S&P 500 Index). Exhibit 10 reports the results during these two alternate market environments.

These results suggest that the relative likelihood of success for TAA versus the comparative benchmarks is just as good during bull markets as it is during bear markets, and potentially slightly better. To be practical, this result is not surprising to anyone who starts with the understanding that markets trend just as strongly during bull as they do during bear markets, and it is this trending behavior that serves as TAA's primary fuel. For example, consider the 40/35/25/0 benchmark (the index with a near-identical standard deviation as the TAA portfolio). During bear markets, the TAA portfolio offers an annual return enhancement of 411 bps and an increase in likelihood of success of 26.0%. But during bull markets, both of these metrics improve, moving to an annual return enhancement of 459 bps and increase in likelihood of success of 26.2%.

A second objection is that the TAA portfolio will be unbalanced or sharp-edged at just the wrong moment in time. Yes, the proof-of-concept TAA portfolio trounces all six comparative benchmarks over rolling time windows of 12½ years in length, that is, relative to the stated investment objective. But human beings are susceptible to behavioral or psychological flaws. Perhaps if the investor experiences a sufficiently disastrous 12-month window, they'll react by selling out of the portfolio at the exact wrong time—failing to wait out the requisite 12½-year investment holding period.

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[13] 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 (2021b).

EXHIBIT 11
Behavioral Knockout Risk: Worst 12-Month Time Windows Ever Experienced (drawn from 1,214 cases)

Different 12-Month Long Investment Periods	TAA Portfolio	65/0/35/0	75/0/25/0	35/30/35/0	40/35/25/0	35/30/26.25/8.75	40/35/18.75/6.25
Worst ever	−33.5	−47.9	−53.5	−35.0	−39.5	−36.0	−39.6
2nd worst	−31.0	−41.7	−47.2	−33.4	−37.8	−35.0	−39.5
3rd worst	−28.6	−37.0	−42.4	−31.4	−34.5	−32.1	−35.5
4th worst	−28.2	−35.4	−39.7	−30.6	−34.4	−31.7	−35.2
5th worst	−26.1	−33.1	−38.2	−30.2	−34.2	−30.9	−34.5
6th worst	−24.5	−32.1	−37.0	−29.5	−33.7	−29.5	−33.6
7th worst	−24.3	−32.1	−35.6	−29.4	−33.6	−29.0	−33.0
8th worst	−24.2	−30.4	−35.0	−28.0	−32.4	−28.8	−32.6
9th worst	−24.0	−29.7	−34.3	−28.0	−31.7	−28.1	−31.6
10th worst	−22.6	−28.7	−32.5	−27.7	−30.5	−27.5	−31.4

NOTE: TAA = Tactical Asset Allocation.

To address this so-called behavioral knockout risk, Exhibit 11 provides the 10 worst-ever 12-month results for the TAA portfolio and its comparative benchmarks. These data demonstrate that the TAA portfolio is, without exception, meaningfully less susceptible to behavioral knockout risk than any of the six comparative benchmarks.

Third, 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 dimmish 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, be processed, and eventually be reflected across portfolios; different types of investors operate at different speeds and on different cycles.
- **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 relative success over time, when compared with the six index benchmarks. Exhibit 12 sheds light on this issue.

This article took the aggregate time period and broke it into seven equal-length windows. Each window contains 154 (or 153) possible 12 ½-year-long investment periods. Exhibit 12 reports the likelihood of success (meeting the stated investment objective) for the TAA portfolio and the six benchmarks. The first row shows the results for the most recent period, that is, the 154 rolling periods spanning the window March 2009 through December 2021 (i.e., terminating within this window). This most recent interval provided the second strongest relative period (of the seven) on record for TAA versus the six index alternatives. TAA succeeded, and its relative success has not diminished.

BUT ARE THESE RESULTS ROBUST?

It is impossible to prove a negative. So, the question of robustness can never be fully answered. Instead, it can only be addressed. Skeptics will always raise another

EXHIBIT 12

Probability of Earning More Than 4.25% Inflation-Adjusted During a Random 12.5-Year-Long Investment Period

Number of Unique 12.5-Year-Long Investment Periods that End During the Date Range Shown to the Right	Date Range	TAA Portfolio	65/0/35/0	75/0/25/0	35/30/35/0	40/35/25/0	35/30 26.25/8.75	40/35 18.75/6.25
154	Mar 2009–Dec 2021	100	66	66	64	65	79	77
153	Jun 1996–Feb 2009	100	98	98	98	98	99	98
154	Aug 1983–May 1996	100	81	81	81	81	81	81
154	Oct 1970–Jul 1983	100	18	19	21	24	23	26
154	Dec 1957–Sep 1970	100	99	100	99	100	100	100
153	Mar 1945–Nov 1957	84	63	78	37	43	38	44
154	May 1932–Feb 1945	100	71	69	91	90	90	86

NOTE: TAA = Tactical Asset Allocation.

objection. Next, I address three such objections: (a) choice of the required minimal return, (b) length of the investment holding period, and (c) alternate asset class weighting schemes. Let's begin with the first of these: choice of the required minimal return. Exhibit 13 provides the results (likelihood of success) if different return requirements are specified. In all cases the TAA portfolio trounces all six comparative benchmarks. TAA works.

The second objection is that results are sensitive to the choice of an investment holding period. In large measure, this objection was previously addressed in the previous section, Patience—A Chinese Proverb. Nevertheless, Exhibit 14 provides the results (likelihood of success) for four alternate investment holding periods ranging from 7½ years to 15 years. These data emphasize TAA's dominance over all six benchmarks remains constant no matter what time period (of sufficient length) is chosen.

The third objection is that the results are sensitive to the choice of a weighting scheme. This is a particularly interesting objection, as traditional portfolio construction approaches such as mean-variance optimization start from the most corrupted position. Essentially, mean-variance optimization adopts a weighting scheme based on what worked best in the past (i.e., it cherry-picks). Such an approach would be acceptable if return distributions were both IID and stable. Unfortunately, neither of these holds true in the real world.

In contrast, this article makes no attempt to adopt a weighting scheme based on what worked well in the past. This article strictly avoids any attempt to optimize. Instead, it just equal-weights those asset categories that trended most strongly. However, to address the concern that the proof-of-concept TAA portfolio results are overly sensitive to weighting scheme selection, I explore four weighting scheme modifications. Exhibit 15 provides the results.

The approach taken here is to overweight or underweight certain specific asset categories (or types of asset categories). This is accomplished by applying a "weighting factor" to the portfolio's asset class allocation (should it be selected). This approach is consistent with what many tactical asset allocation managers employ

EXHIBIT 13

Probability of Success When Different Minimum Returns Are Specified (for rolling 12.5-year time windows)

Minimum Return	TAA Portfolio	65/0/35/0	75/0/25/0	35/30/35/0	40/35/25/0	35/30/26.25/8.75	40/35/18.75/6.25
3.25	98	80	80	80	83	82	85
4.25	98	71	73	70	71	73	73
5.25	96	62	66	59	64	60	65
6.25	94	51	56	46	53	45	53

NOTE: TAA = Tactical Asset Allocation.

EXHIBIT 14

Probability of Success when Different Investment Periods Are Considered (still requiring one earns at least 4.25%)

Investment Period	TAA Portfolio	65/0/35/0	75/0/25/0	35/30/35/0	40/35/25/0	35/30/26.25/8.75	40/35/18.75/6.25
7.5 Years	93	69	70	69	72	71	72
10 Years	98	72	73	71	72	71	72
12.5 Years	98	71	73	70	71	73	73
15 Years	100	74	77	79	80	79	80

NOTE: TAA = Tactical Asset Allocation.

EXHIBIT 15

Statistical Results When Different Weighting Schemes Are Considered (as opposed to equal weighting)

Statistic	Existing Model Using Equal Weights	Overweight TIPS Bonds (if it is selected) by Applying a Multiplicative Weighting Factor of 3.5×	Overweight Precious Metals (if they are selected) by Applying a Multiplicative Weighting Factor of 2.5×	Underweight Nonprecious Metal Commodities (if it is selected) by Applying a Multiplicative Weighting Factor of 0.4×	Underweight High-Yield Bonds (if it is selected) by Applying a Multiplicative Weighting Factor of 0.4×
Probability of Earning More Than 4.25% Inflation-Adjusted over a Random 12.5-Year Period	97.7	97.8	97.9	97.7	97.8
Mean 12.5-Year Inflation-Adjusted Return (in %) over 1,076 Different Rolling Time Windows	11.32	11.40	11.12	11.36	11.33
Median 12.5-Year Inflation-Adjusted Return (in %) over 1,076 Different Rolling Time Windows	11.04	11.06	10.60	11.04	10.99

in practice. And it dovetails well with the understanding that the length of the investment time horizon (e.g., 7 years as opposed to 17 years) and the role that different asset categories play within the portfolio are powerfully related. Lest the reader become overly concerned with the use of an equal-weighting scheme by the proof-of-concept TAA portfolio, I do note that the two well-known TAA managers to which I referred earlier in this article (i.e., F-Squared and Nationwide) both use/ used equal-weighting schemes.

CONCLUSION

The proof-of-concept TAA 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 outside the scope of this article. But let me attempt to close this issue out with a tentative suggestion as to causality.

- **Markets Trend:** Historical data suggest 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 twofold. 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). This longevity provides the basis for backward-looking trend-following strategies to outperform relative to passive fixed-weight alternatives. Exhibit 16 sheds light on this observation by providing the results of timing[14] between stocks and cash (or between stocks and bonds). This exhibit shows that even getting the timing wrong (i.e., always getting out of stocks too late and getting back in too late), one still comes out ahead versus passive alternatives. The causality or driver underlying this exhibit's results is nothing more than the longevity of bear markets.
- **Episodic Eras Exist:** Data suggest that two such episodic eras might be characterized by the bond bull market (interest rates falling) running from November 1865 through December 1908 (43.1 years) and the more recent bond bull market starting September 1981 and ending July 2020 (38.8 years; Brown 2021a).

However, even if markets exhibit the three attributes just listed, 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 portfolio presented herein experienced average monthly portfolio turnover of 21% bidirectional (or 43% 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 1 year, 2, or 3 (as suggested earlier, the TAA portfolio presented herein had a sweet spot of perhaps 9 or 10 years). 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 continuously reinforce more relevant and achievable investment outcomes, whether for the $1 million retail client or the $100 million small local foundation/endowment/pension.

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[14] "Cash" is defined as 90-day T-bills. "Treasury bond" is defined as a 10-year constant-maturity US Treasury bond. "US stocks" are defined as the S&P 500 Index; however, prior to 1871 the Dow Jones Transportation Index was used. Only month-end total return data were used throughout. The start and end of stock bear and bull markets were as defined by Brown (2021a). Statistics presented in the table are based on data that started on 12/31/1846 and ended on 12/31/2021. How to read the table? For example, consider the eighth row in the table. This row shows how moving between stocks and cash, but always getting out of stocks 3 months *after* the bear market has already begun, and then subsequently getting back into stocks 3 months *after* the bull market has already begun, would have delivered a 92.2% probability of success.

EXHIBIT 16
Bear and Bull Markets Last Such a Long Time That Even Shifting Nine Months Late Still Adds Significant Value

Portfolio Ingredients	Shift Between Stocks and Cash (or bonds) after the Bull (or Bear) Market Has Already Begun. BUT with this Time Delay (always being late to the party and leaving late)	Probability of Earning more than 4.25% Inflation-Adjusted During a Random 12.5-Year-Long Investment Period
Permanent fixed-weight portfolios		
US stocks	NA	73.4
60% US stocks, 40% 90-day T-Bills	NA	60.3
60% US stocks, 40% 10-year Treasury bond	NA	65.8
Perfect timing between stocks and cash	NA	96.3
Perfect timing between stocks and Treasury bond	NA	95.0
Imperfect timing between stocks and cash (always shifting late, after the bull/bear has already started)	1 month	95.1
	2 months	93.6
	3 months	92.2
	4 months	88.6
	5 months	86.4
	6 months	82.4
	7 months	80.7
	8 months	75.4
	9 months	75.7
Imperfect timing between stocks and Treasury bond (always shifting late, after the bull/bear has already started)	1 month	91.1
	2 months	90.0
	3 months	89.3
	4 months	86.2
	5 months	85.1
	6 months	82.2
	7 months	82.0
	8 months	77.1
	9 months	77.3

Finally, if the numbers are really as good as presented in this article, 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 outside the scope of this article. But it is not some obscure mystery, and I attempt to close this last issue out by suggesting that it is all about tracking error, the length of time it takes for the crop to mature and be ready for harvest, and the lack of a colorful emotion-laden marketing story (markets being non-IID is not a particularly engaging narrative).

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