# Case for TAA - Backward quantitative view

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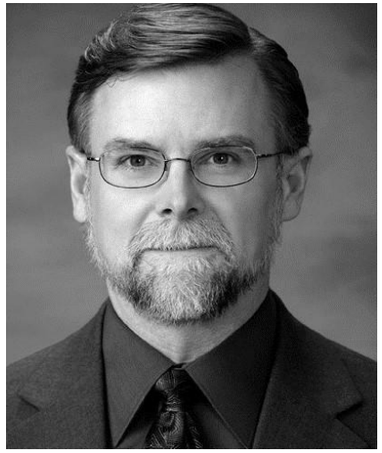

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***"No, no! The adventures first, explanations take such a dreadful time"***

Lewis Carroll, Alice's Adventures in Wonderland

# TAA working paper - Available via the Julex website

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## Winners Repeat, Losers Repeat

Rob Brown, PhD, CFA at www.robbrownonline.com

**ABSTRACT**

This article presents a tactical asset allocation ("TAA") proof-of-concept portfolio. It is intended to successfully harvest the non-iid statistical attributes of stocks, bonds, commodities, and currencies, both domestic and international. In other words, 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 last 102 years. The results presented herein, suggest that TAA is an approach worthy of serious 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 passive 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. 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 by more properly associating TAA with a specific real world client need.

**KEY TAKEAWAYS**

- The TAA portfolio earned an inflation-adjusted 11.1% over the aggregate time period (101.9 years). Whereas, a comparable passive index earned a lesser 6.7% (one that adopted the average asset weights experienced by the TAA portfolio, itself).
- 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 cost-free.
- The TAA portfolio's greater relative success in achieving the stated investment objective did not dimmish with the passage of time. If anything, it may have improved during the most recent time period (14.3% of the cases examined, Feb 2009 - Oct 2021).
- The causality underlying TAA's relative 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
- Systematic Investing
- Trending
- Momentum
- Client-Based Investment Objective

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# Based on a playing field consisting of 27 distinct asset categories

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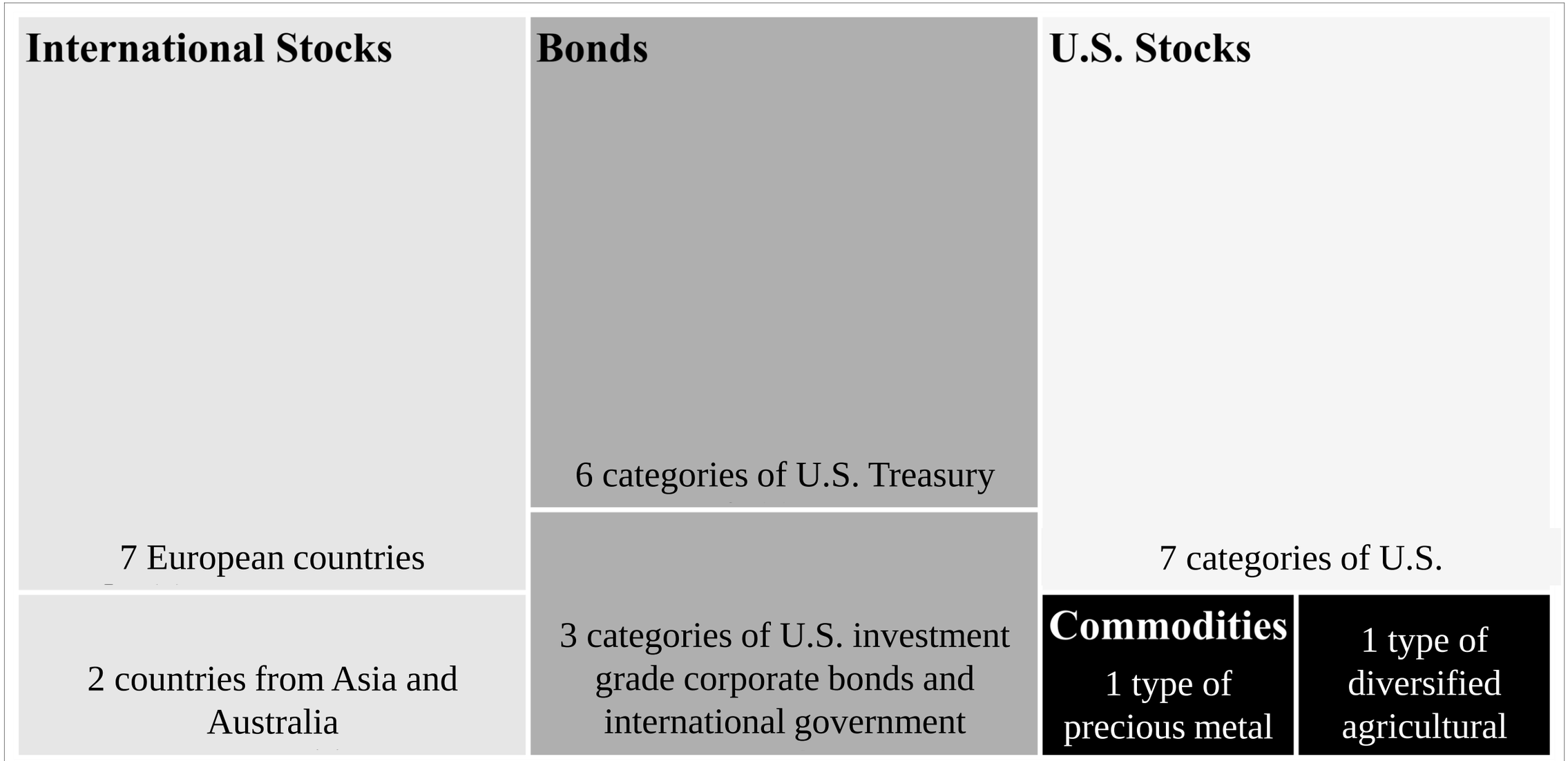
**Exhibit 1**
**27 asset categories utilized**



# Why these 27 asset categories?

- Because high-quality monthly total returns exist all of the way back to Jan 1919
- The markets for each . . . floated freely without government intervention

# How is the portfolio constructed?

- Once each month
- Select the 8 asset categories that experienced the greatest level of trending
- Weight them equally
- Repeat again . . . the following month

- Why this rule . . . . seems pretty simple

- Two reasons
  - Simple is not bad, think of value, smallcap, and profitability
  - No one can accuse me of “backfitting” or just selecting a rule that would work well

# Assumed an unusually high level of trading costs

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**Exhibit 2**

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

| All stocks and U.S. Treasury bonds | Intermediate-term U.S. investment grade corporate bonds | International treasury bonds | Long-term U.S. high-grade corporate bonds | Diversified agricultural commodities | Physical palladium |
|---|---|---|---|---|---|
| 1 | 18 | 67 | 76 | 84 | 101 |

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# Five comparative index benchmarks were developed

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**Exhibit 3**

**Comparative passive benchmark definitions**

| Benchmark - Exact same asset mix | Benchmark - U.S. stocks/bonds only | Benchmark - Global stocks/bonds only | Benchmark - S&P 500/10-year U.S. Treasury only | Benchmark - 60/40 global stocks/bonds only |
|---|---|---|---|---|
| 35.43% U.S. stocks, 40.78% international stocks, 5.03% U.S. Treasuries with maturities between 0 and 5 years, 6.85% in TIPS bonds and U.S. Treasuries with maturities greater than 5 years, 4.38% U.S. investment grade corporate bonds, 2.19% international treasuries, 5.34% commodities | 80.5% U.S. stocks, 19.5% U.S. bonds | 80.5% global stocks, 19.5% global bonds | 80.5% U.S. stocks, 19.5% U.S. bonds | 60% global stocks, 40% global bonds |
| Exactly matches the average asset allocation experienced by the TAA portfolio, using the 27 asset categories | U.S. stocks are equal-weighted across the 7 U.S. stock indices | Global stocks are equal-weighted across the 7 U.S. and 9 international stock indices | U.S. stocks are defined as the S&P 500 Index | Global stocks are equal-weighted across the 7 U.S. and 9 international stock indices |
| | U.S. bonds are equal-weighted across the 8 U.S. bond indices (6 Treasury and 2 investment grade corporate) | Global bonds are equal-weighted across the 8 U.S. bond indices (6 Treasury and 2 investment grade corporate) and 1 international treasury index | U.S. bonds are defined as the constant maturity 10-year Treasury bond | Global bonds are equal-weighted across the 8 U.S. bond indices (6 Treasury and 2 investment grade corporate) and 1 international treasury index |

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# Returns and related stats over the entire time period

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## Exhibit 4

## Geometric mean inflation-adjusted return (in %) over entire time period (101.9 years) - And related statistics

| | 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. Treasury only | Benchmark - 60/40 global stocks/bonds only |
|---|---|---|---|---|---|---|
| Real return | 11.08 | 6.70 | 7.12 | 6.84 | 6.82 | 5.90 |
| Correlation with TAA portfolio | 1 | 0.68 | 0.60 | 0.66 | 0.60 | 0.67 |
| Annualized standard deviation | 11.60 | 11.87 | 15.09 | 12.42 | 15.11 | 9.70 |
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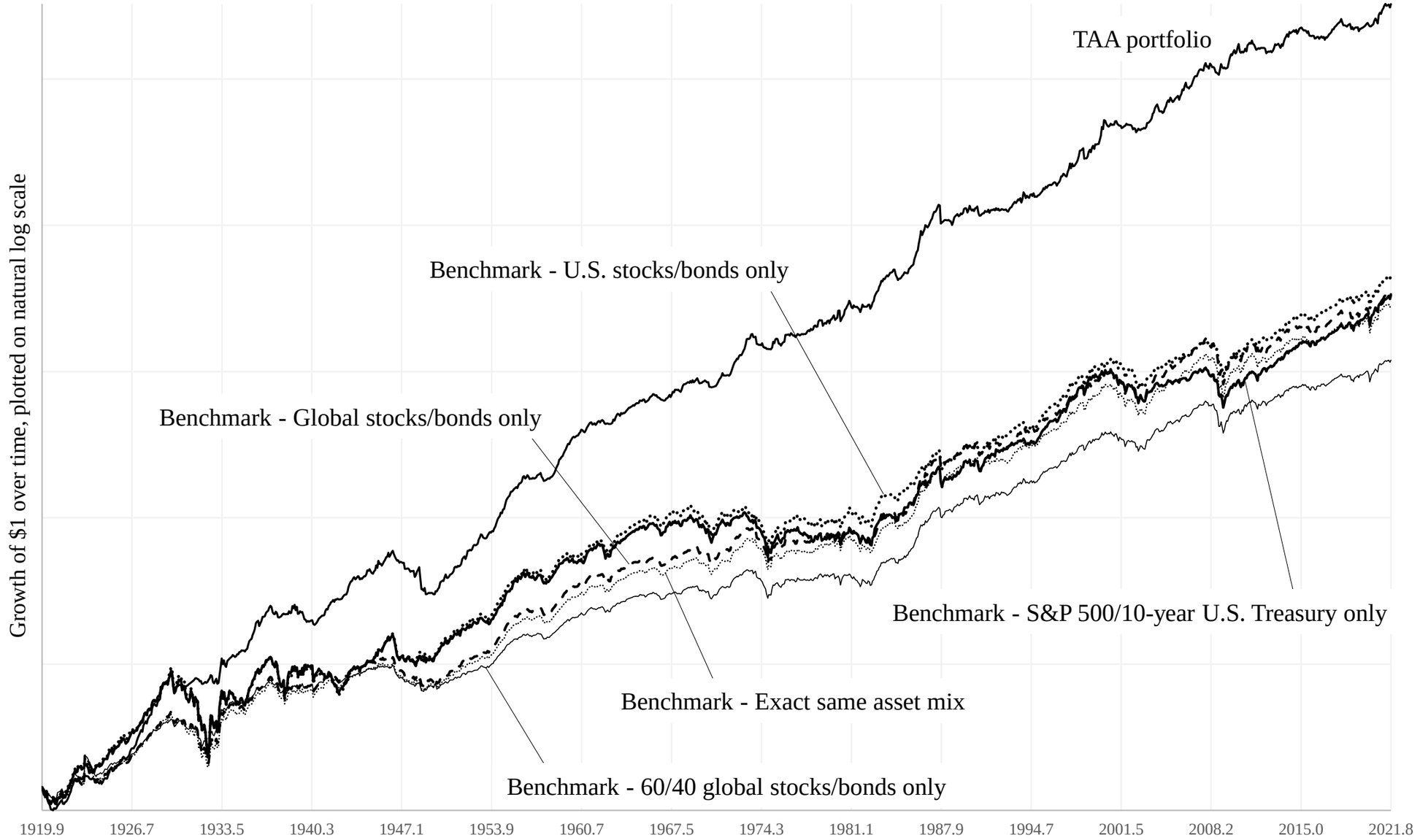
**Growth of $1 in inflation-adjusted terms, first invested back on 11/30/1919**



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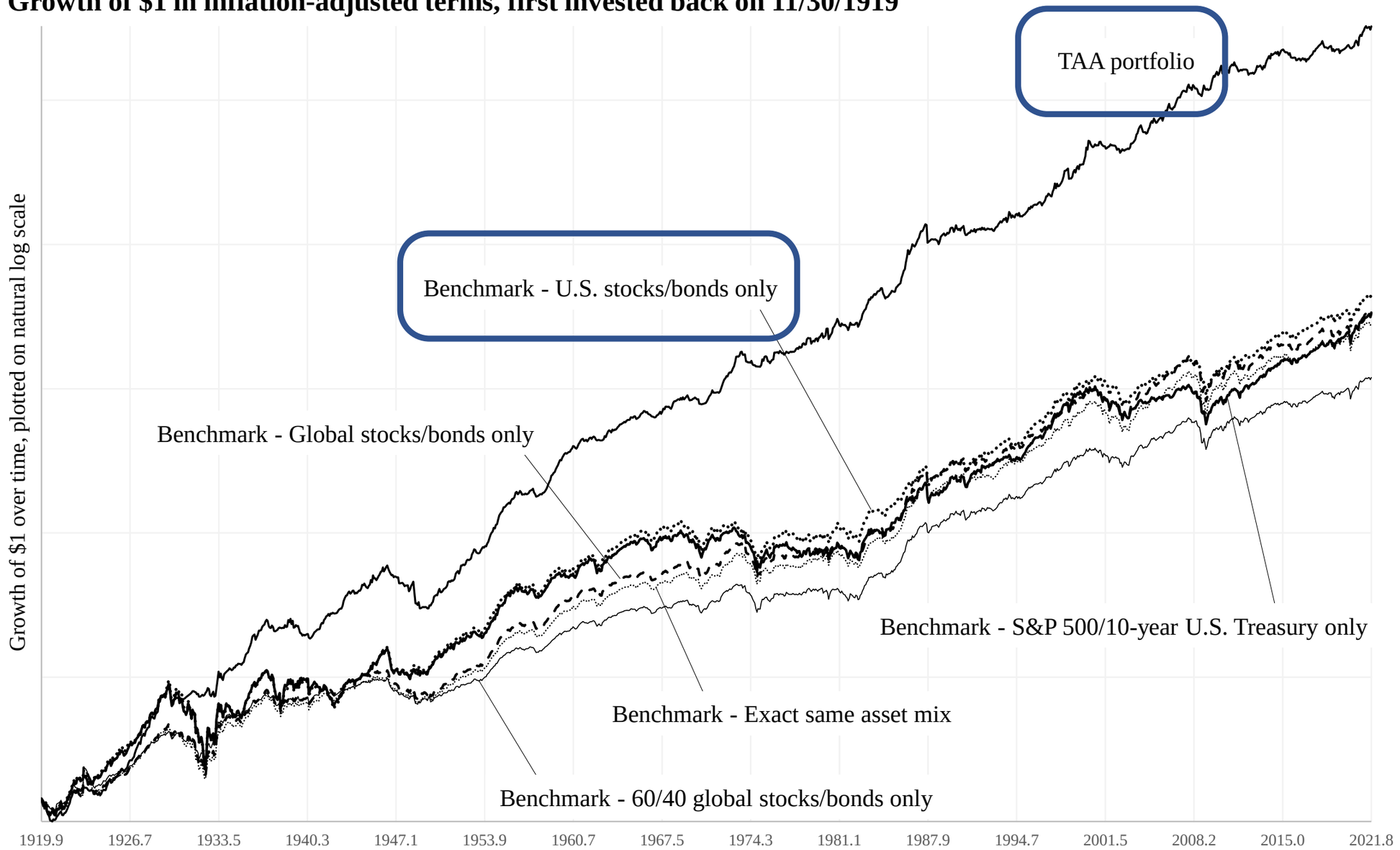

# But . . . What is the correct investment objective for the TAA portfolio?

Over rolling time periods of 12 ½ years . . . Earn at least 4.25% above inflation

Or, the other way around . . .

NEVER earn less than 4.25% above inflation over any 12 ½ year long time window

# Where does this investment objective come from?

- Individual or institution
- Needs that arrive during years 10 through 15
- Take the mid-point of that time interval, i.e., 12 ½ years
- Future needs are based on actual costs at that time, in other words, after inflation has been accounted for
- An assumed “minimum return” of 4.25% above inflation
  - Leaves adequate room for fees/expenses
  - Delivers significant compound growth

# Results for the typical 12 ½ year long investment window

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**Exhibit 6**

**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. Treasury only | Benchmark - 60/40 global stocks/bonds only |
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| **MEAN 12.5-year inflation-adjusted return (in %) over 1,074 different rolling time windows** | 11.50 | 6.64 | 6.69 | 6.81 | 6.30 | 5.82 |
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# Percentile outcomes provide more meaningful understanding

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**Exhibit 7**

**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. Treasury only | Benchmark - 60/40 global stocks/bonds only |
|---|---|---|---|---|---|---|
| 99.5 | 2.35 | 0.06 | -1.35 | 0.00 | -1.91 | -0.38 |
| 99 | 2.99 | 0.45 | -1.11 | 0.38 | -1.74 | -0.14 |
| 98 | 4.12 | 1.13 | -0.81 | 0.97 | -1.65 | 0.31 |
| 97 | 4.66 | 1.65 | -0.67 | 1.53 | -1.37 | 0.84 |
| 96 | 5.10 | 1.94 | -0.45 | 1.82 | -1.15 | 1.01 |
| 95 | 5.40 | 2.14 | -0.24 | 2.06 | -0.88 | 1.21 |
| 90 | 7.92 | 2.68 | 0.95 | 2.61 | 0.39 | 1.77 |
| 85 | 8.43 | 3.15 | 2.31 | 3.10 | 0.98 | 2.21 |
| 80 | 8.79 | 3.67 | 3.12 | 3.60 | 1.83 | 2.91 |
| 75 | 9.11 | 4.23 | 3.91 | 4.07 | 3.25 | 3.66 |
| 70 | 9.40 | 4.62 | 4.95 | 4.61 | 4.42 | 4.14 |
| 65 | 9.90 | 5.22 | 5.52 | 5.24 | 5.06 | 4.51 |
| 60 | 10.45 | 5.68 | 6.11 | 5.73 | 5.62 | 4.85 |
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# Tail risk - The worst that ever happened !!

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**Exhibit 8**

**Annualized inflation-adjusted return for the sixteen worst-ever 12.5-year investment time periods (drawn from 1,074)**

| 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. Treasury only | Benchmark - 60/40 global stocks/bonds only |
|---|---|---|---|---|---|---|
| worst-ever | 1.49 | -0.58 | -2.49 | -0.67 | -2.59 | -0.91 |
| 2nd worst | 1.62 | -0.17 | -2.27 | -0.23 | -2.49 | -0.60 |
| 3rd worst | 1.70 | -0.13 | -1.83 | -0.18 | -2.19 | -0.51 |
| 4th worst | 1.80 | -0.07 | -1.49 | -0.15 | -2.05 | -0.48 |
| 5th worst | 2.08 | -0.03 | -1.45 | -0.07 | -1.98 | -0.42 |
| 6th worst | 2.22 | 0.04 | -1.38 | -0.04 | -1.92 | -0.38 |
| 7th worst | 2.58 | 0.10 | -1.28 | 0.05 | -1.90 | -0.37 |
| 8th worst | 2.59 | 0.29 | -1.25 | 0.19 | -1.89 | -0.35 |
| 9th worst | 2.61 | 0.33 | -1.22 | 0.24 | -1.85 | -0.22 |
| 10th worst | 2.68 | 0.40 | -1.18 | 0.34 | -1.78 | -0.18 |
| 11th worst | 2.90 | 0.44 | -1.14 | 0.36 | -1.77 | -0.15 |
| 12th worst | 3.02 | 0.45 | -1.09 | 0.39 | -1.73 | -0.14 |
| 13th worst | 3.22 | 0.49 | -0.93 | 0.42 | -1.72 | -0.14 |
| 14th worst | 3.31 | 0.55 | -0.92 | 0.47 | -1.71 | -0.06 |
| 15th worst | 3.36 | 0.56 | -0.91 | 0.53 | -1.71 | 0.00 |
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# Selecting a random time interval, what's the probability of success?

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**Exhibit 9**

**Likelihood of success relative to stated objective**

| | 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. Treasury only | Benchmark - 60/40 global stocks/bonds only |
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| **Probability of earning more than 4.25% inflation-adjusted over a randomly selected 12.5-year long investment time period** | 97.8 | 74.8 | 73.6 | 73.1 | 70.9 | 68.1 |

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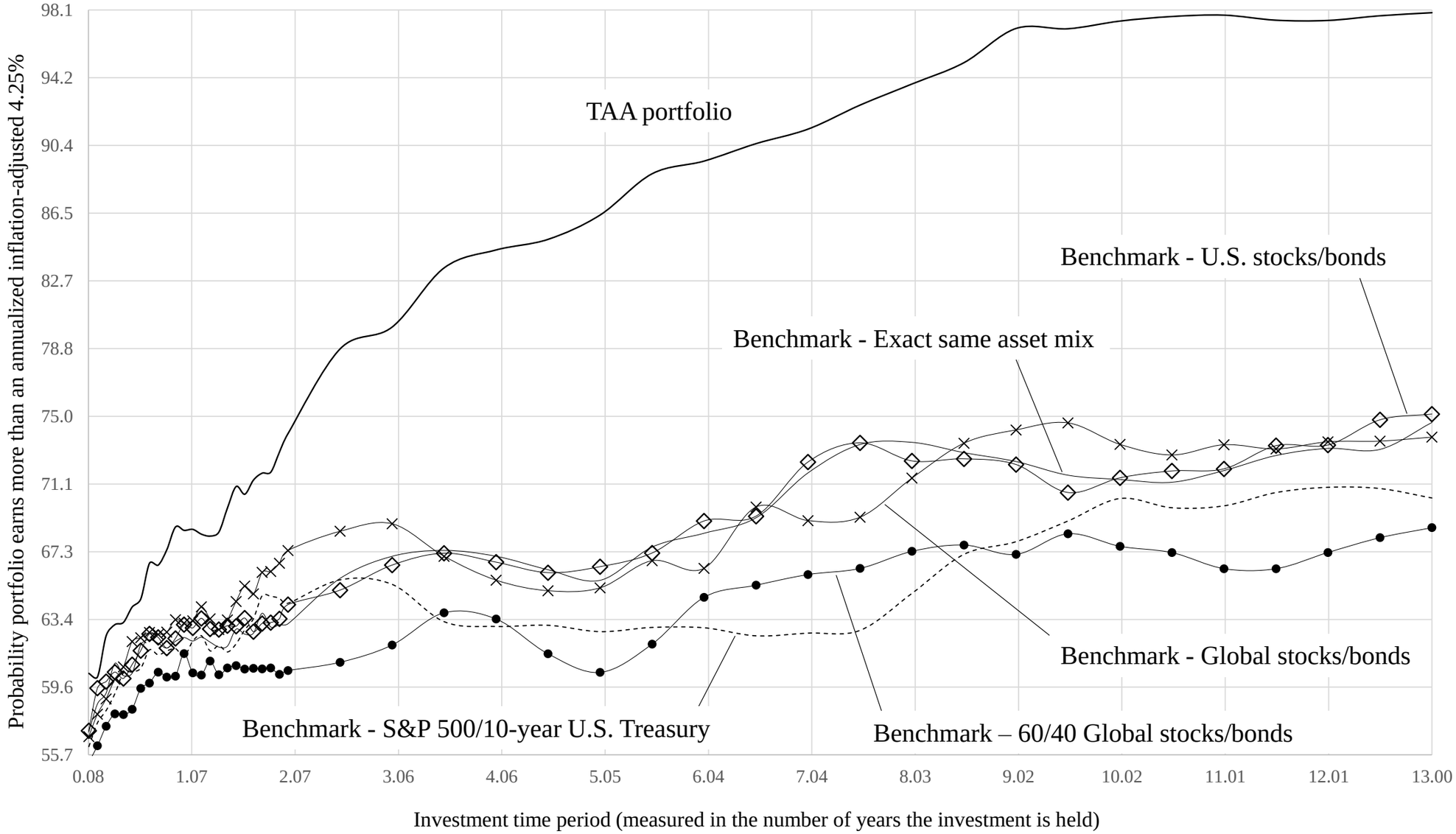

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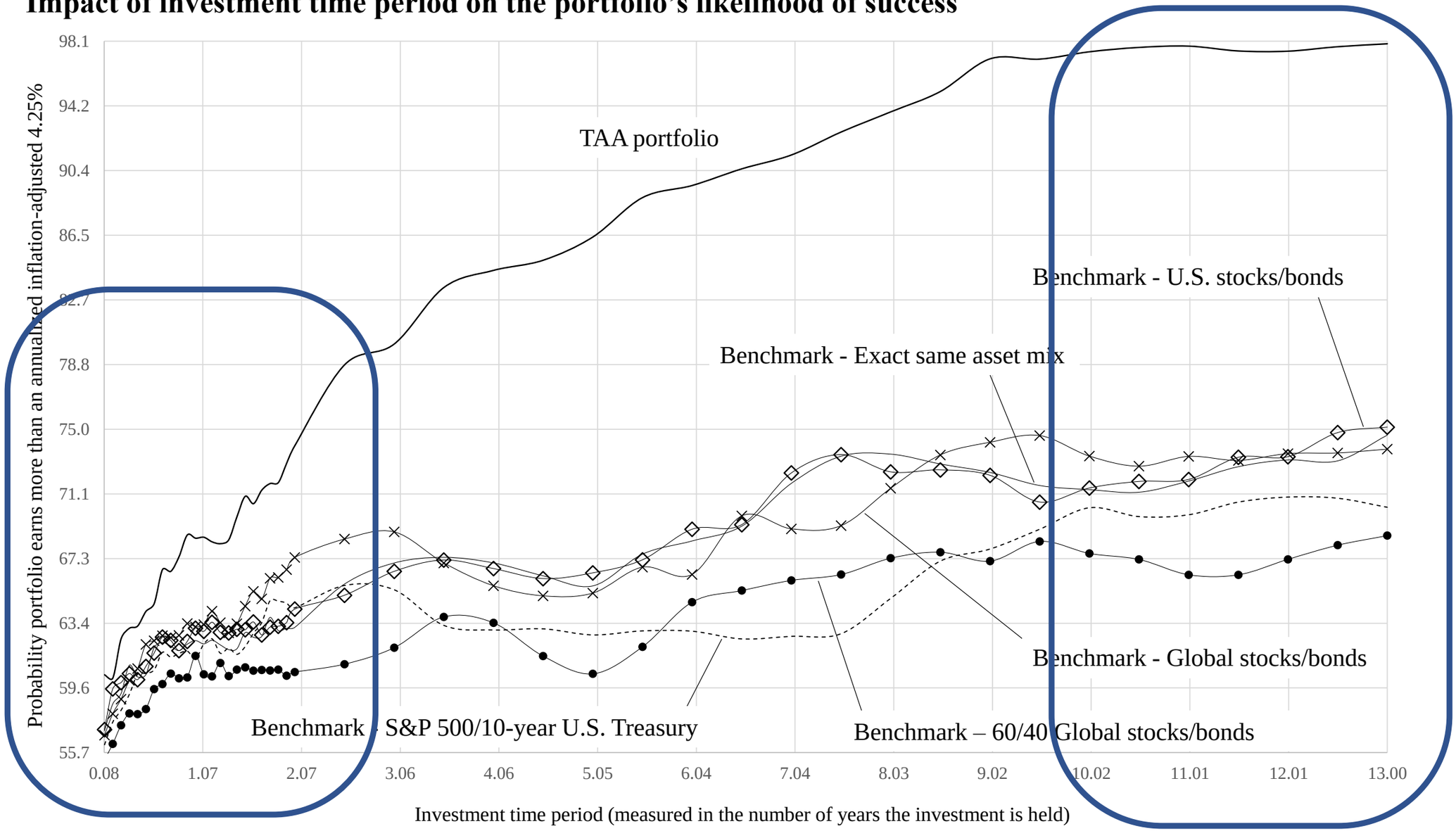

# TAA is not just for bear markets !!

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**Exhibit 11**

**Performance during bull and bear markets (as defined for the S&P 500 Index)**

| Market environment | 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. Treasury only | Benchmark - 60/40 global stocks/bonds only |
|---|---|---|---|---|---|---|---|
| **For all periods ending during a BULL market** | Median inflation-adjusted return (in %) for a 12.5-year period | 11.46 | 6.45 | 7.47 | 6.62 | 7.05 | 5.76 |
| | Probability of earning more than 4.25% (annualized inflation-adjusted) for a 12.5-year period | 97.4 | 74.1 | 74.5 | 72.7 | 72.0 | 66.9 |
| **For all periods ending during a BEAR market** | Median inflation-adjusted return (in %) for a 12.5-year period | 10.74 | 5.86 | 5.32 | 6.03 | 5.18 | 5.31 |
| | Probability of earning more than 4.25% (annualized inflation-adjusted) for a 12.5-year period | 100.0 | 78.7 | 68.0 | 75.3 | 64.0 | 75.3 |

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**Exhibit 11**

**Performance during bull and bear markets (as defined for the S&P 500 Index)**

| Market environment | 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. Treasury only | Benchmark - 60/40 global stocks/bonds only |
|---|---|---|---|---|---|---|---|
| **For all periods ending during a BULL market** | Median inflation-adjusted return (in %) for a 12.5-year period | 11.46 | 6.45 | 7.47 | 6.62 | 7.05 | 5.76 |
| | Probability of earning more than 4.25% (annualized inflation-adjusted) for a 12.5-year period | 97.4 | 74.1 | 74.5 | 72.7 | 72.0 | 66.9 |
| **For all periods ending during a BEAR market** | Median inflation-adjusted return (in %) for a 12.5-year period | 10.74 | 5.86 | 5.32 | 6.03 | 5.18 | 5.31 |
| | Probability of earning more than 4.25% (annualized inflation-adjusted) for a 12.5-year period | 100.0 | 78.7 | 68.0 | 75.3 | 64.0 | 75.3 |

**23.3% advantage for TAA *!!***

**21.3% advantage for TAA *!!***

# BUT . . . What is the client bails at the worst possible moment

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**Exhibit 12**

**Behavioral knockout risk - Worst 12-month time windows ever experienced (drawn from 1,212)**

| Different 12-month 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. Treasury only | Benchmark - 60/40 global stocks/bonds only |
|---|---|---|---|---|---|---|
| worst-ever | -29.7 | -40.9 | -56.2 | -40.9 | -55.1 | -31.5 |
| 2nd worst | -27.2 | -38.2 | -49.9 | -38.4 | -49.9 | -30.0 |
| 3rd worst | -27.1 | -36.7 | -45.0 | -37.7 | -44.5 | -29.5 |
| 4th worst | -26.9 | -36.3 | -41.7 | -36.8 | -40.5 | -29.0 |
| 5th worst | -25.6 | -35.7 | -40.7 | -36.8 | -39.8 | -27.8 |
| 6th worst | -25.3 | -33.9 | -39.4 | -35.7 | -39.4 | -27.6 |
| 7th worst | -24.9 | -33.7 | -38.2 | -34.6 | -37.1 | -27.4 |
| 8th worst | -24.2 | -32.7 | -36.6 | -33.8 | -37.0 | -25.8 |
| 9th worst | -24.0 | -32.2 | -36.5 | -32.6 | -35.4 | -25.2 |
| 10th worst | -23.4 | -32.1 | -34.0 | -32.6 | -34.6 | -24.2 |

# BUT . . . What is the client bails at the worst possible moment

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|---|---|---|---|---|---|---|
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| 3rd worst | -27.1 | -36.7 | -45.0 | -37.7 | -44.5 | -29.5 |
| 4th worst | -26.9 | -36.3 | -41.7 | -36.8 | -40.5 | -29.0 |
| 5th worst | -25.6 | -35.7 | -40.7 | -36.8 | -39.8 | -27.8 |
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# No, the benefits of TAA are NOT weakening over time *!!*

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**Exhibit 13**

**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. Treasury only | Benchmark - 60/40 global stocks/bonds only |
|---|---|---|---|---|---|---|---|
| 153 | Feb 2009 - Oct 2021 | 99.3 | 79.1 | 66.0 | 69.3 | 58.2 | 69.3 |
| 153 | May 1996 - Jan 2009 | 100.0 | 100.0 | 98.7 | 99.3 | 96.7 | 100.0 |
| 154 | Jul 1983 - Apr 1996 | 100.0 | 82.5 | 81.2 | 80.5 | 77.9 | 79.9 |
| 153 | Oct 1970 - Jun 1983 | 100.0 | 29.4 | 19.6 | 26.1 | 19.0 | 20.9 |
| 154 | Dec 1957 - Sep 1970 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 92.2 |
| 153 | Mar 1945 - Nov 1957 | 85.0 | 39.9 | 80.4 | 40.5 | 75.2 | 15.0 |
| 154 | May 1932 - Feb 1945 | 100.0 | 92.2 | 68.8 | 95.5 | 68.8 | 98.7 |

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|---|---|---|---|---|---|---|---|
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| 153 | Mar 1945 - Nov 1957 | 85.0 | 39.9 | 80.4 | 40.5 | 75.2 | 15.0 |
| 154 | May 1932 - Feb 1945 | 100.0 | 92.2 | 68.8 | 95.5 | 68.8 | 98.7 |

20.2% advantage for TAA !!

17.5% advantage for TAA !!

0.0% advantage for TAA !!

7.8% advantage for TAA !!

# Why does TAA work?

- Markets trend
- Bear and bull markets are not short affairs . . . they last a long time
- Episodic eras exist . . . long drawn out eras, such as interest rates falling for 39 years

# Arriving seriously late to the party . . . Still works

**Exhibit 14**

**Bear and bull markets last such a long time, that even shifting nine months late still adds value**

| Portfolio ingredients | Get out of stocks AFTER the BEAR market has already begun - with this time delay | Get back into stocks AFTER the BULL market has already begun - with this time delay | Probability of earning more than 4.25% inflation-adjusted during a random 12.5-year long investment time period |
|---|---|---|---|
| U.S. stocks | na | na | 73.4 |
| 60% U.S. stocks, 40% 90-day T-Bills | na | na | 60.2 |
| 60% U.S. stocks, 40% 10-year Treasury bond | na | na | 65.7 |
| Perfect timing between stocks and cash | na | na | 96.3 |
| Perfect timing between stocks and Treasury bond | na | na | 95.0 |
| Imperfect timing between stocks and cash (always shifting late, after the bull/bear has started) | 1 month | 1 month | 95.1 |
| | 2 months | 2 months | 93.6 |
| | 3 months | 3 months | 92.2 |
| | 4 months | 4 months | 88.6 |
| | 5 months | 5 months | 86.4 |
| | 6 months | 6 months | 82.4 |
| | 7 months | 7 months | 80.7 |
| | 8 months | 8 months | 75.4 |
| | 9 months | 9 months | 75.6 |
| Imperfect timing between stocks and Treasury bond (always shifting late, after the bull/bear has started) | 1 month | 1 month | 91.1 |
| | 2 months | 2 months | 89.9 |
| | 3 months | 3 months | 89.3 |
| | 4 months | 4 months | 86.1 |
| | 5 months | 5 months | 85.1 |
| | 6 months | 6 months | 82.1 |
| | 7 months | 7 months | 81.9 |
| | 8 months | 8 months | 77.1 |
| | 9 months | 9 months | 77.3 |

# Arriving seriously late to the party . . . Still works

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| 60% U.S. stocks, 40% 10-year Treasury bond | na | na | 65.7 |
| Perfect timing between stocks and cash | na | na | 96.3 |
| Perfect timing between stocks and Treasury bond | na | na | 95.0 |
| Imperfect timing between stocks and cash (always shifting late, after the bull/bear has started) | 1 month | 1 month | 95.1 |
| | 2 months | 2 months | 93.6 |
| | 3 months | 3 months | 92.2 |
| | 4 months | 4 months | 88.6 |
| | 5 months | 5 months | 86.4 |
| | 6 months | 6 months | 82.4 |
| | 7 months | 7 months | 80.7 |
| | 8 months | 8 months | 75.4 |
| | 9 months | 9 months | 75.6 |
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| | 2 months | 2 months | 89.9 |
| | 3 months | 3 months | 89.3 |
| | 4 months | 4 months | 86.1 |
| | 5 months | 5 months | 85.1 |
| | 6 months | 6 months | 82.1 |
| | 7 months | 7 months | 81.9 |
| | 8 months | 8 months | 77.1 |
| | 9 months | 9 months | 77.3 |

# Bottom line

If you are not using TAA . . . Why not?

# Bottom line

- Successful TAA does not rely on forecasting, prediction, or crystal ball gazing
- Works even better during bull markets than during bear markets
- Has a considerably higher probability of success than fixed-weight portfolios
- Delivers more consistent results
- Has lower tail risk
- Has lower knockout risk
- Delivers greater return per unit of volatility

# So why don’t the BIG investment managers offer TAA?

Two really simple reasons

# Returns and related stats over the entire time period

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**Exhibit 4**

**Geometric mean inflation-adjusted return (in %) over entire time period (101.9 years) - And related statistics**

| | 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. Treasury only | Benchmark - 60/40 global stocks/bonds only |
|---|---|---|---|---|---|---|
| Real return | 11.08 | 6.70 | 7.12 | 6.84 | 6.82 | 5.90 |
| Correlation with TAA portfolio | 1 | 0.68 | 0.60 | 0.66 | 0.60 | 0.67 |
| Annualized standard deviation | 11.60 | 11.87 | 15.09 | 12.42 | 15.11 | 9.70 |
| Return per unit of volatility | 0.96 | 0.56 | 0.47 | 0.55 | 0.45 | 0.61 |

# TAA lacks an emotion-laden sexy marketing story

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 lot[3]. 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-laden marketing story (markets being non-iid is not a particularly engaging narrative).

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# Will real estate values fall when interest rates rise?

Why is this the single most important question to ask/answer?

Friday, December 17th at 11:00 a.m. EASTERN

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