

# Optimizing Allocations for Long-Term Sustainability

Albert Chui, Aarti Garaye, Moira Keating, Jack Trujillo

Please note that all information shown is based on assumptions and simulated data created using an economic scenario generator.

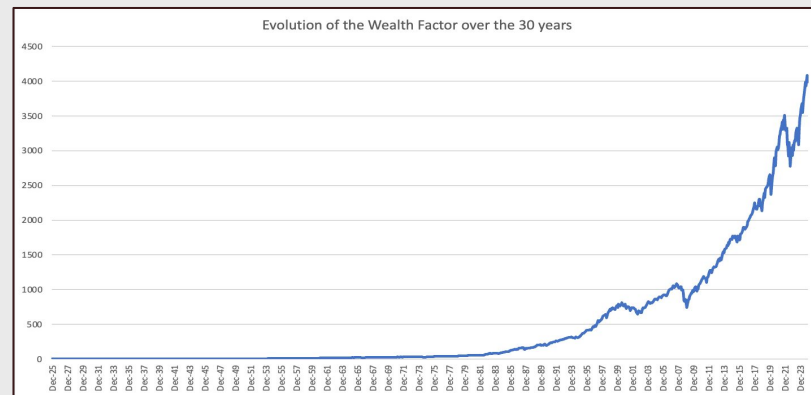
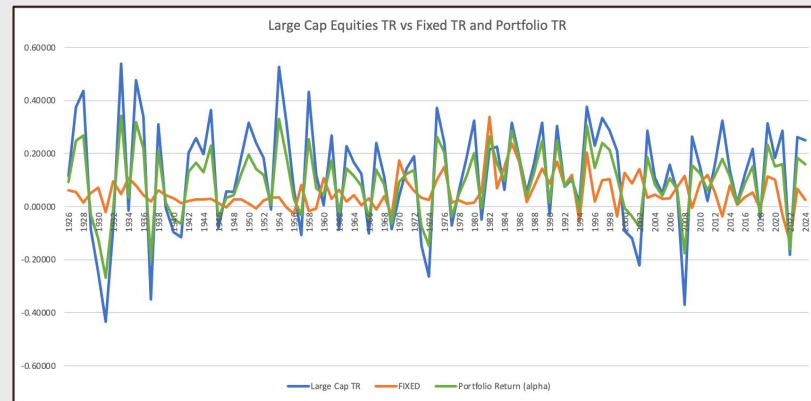


# Managing a Legacy Portfolio

We are tasked with the goal of recommending a 30-year investment allocation that preserves the purchasing power of the trust while continuing to support its annual 3% spending mandate.

- The trust has followed a 60/40 approach
  - 60% in US large cap equities
  - 40% in a blended fixed income securities
    - 65% in intermediate-term US treasury bonds
    - 35% in long term corporate bonds
- Exhibited more volatility in recent years
- Annual inflation of 2.5%

Number of Years Portfolio return was higher than 5.5%	Percentage of Years that exceeded the 5.5% hurdle
64	0.646464646





# 60/40 Historical Data

The 60/40 approach has its pros and cons.

## Pros:

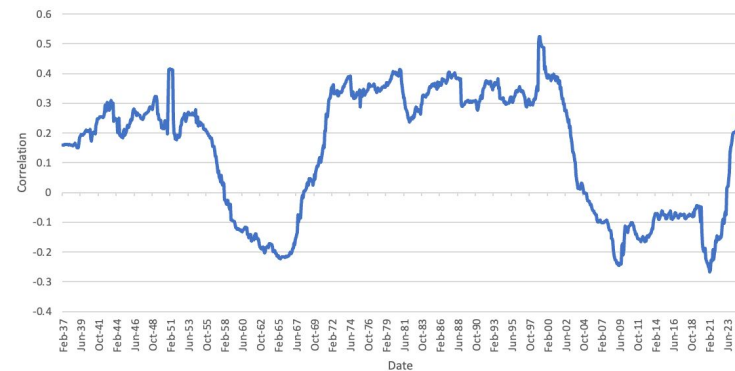
- Lower volatility, particularly during periods of negative correlation.
- Moderate risk - works well for a fund seeking both growth and capital preservation.

## Cons:

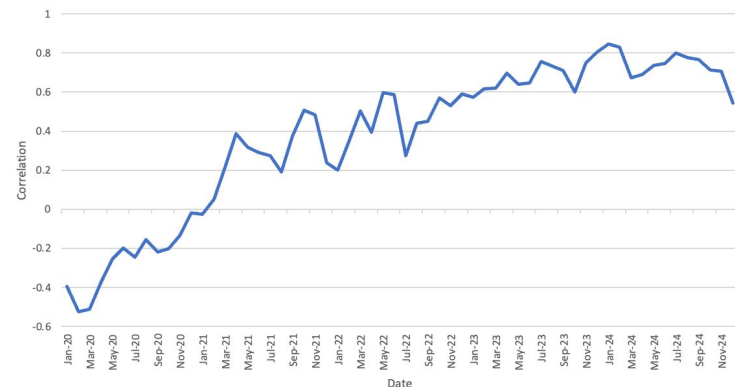
- Interest rate sensitivity - bond durations decline when interest rates rise.
- Inflation risk.
- Exposure to corporate credit risk.
- Less effective in low-yield environments.

High correlation between fixed income and equities in 2022 was a key factor in the fund's poor performance, however such rapid increases are rare.

Rolling 10-Year Correlation Between FIXED & US Large Cap Equities

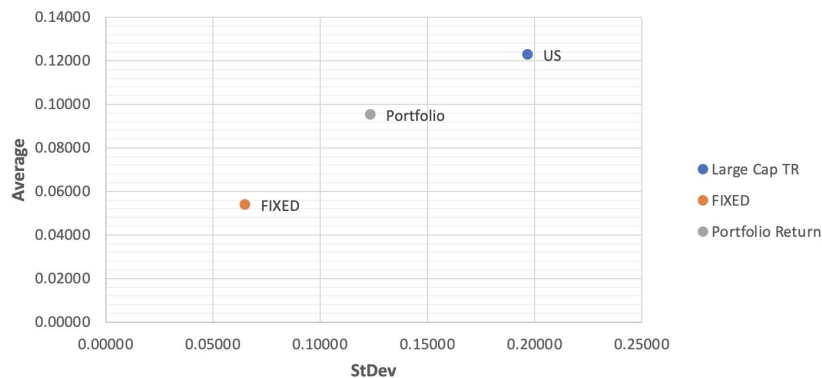


Last Five Years Rolling 12-mo Correlation Between FIXED & US Large Cap Equities



# 60/40 Historical Data

Historical TR Average and StDev for Asset Classes and Portfolio  
(annual)



- Positive Correlation between average returns and volatility
- 60/40 strategy balances the volatility risk from equities and stability from fixed income
- Reduces our risk without sacrificing all return

## 60/40 Benchmark Values

Probability of losing PP	Volatility	Average total returns	Median Real Return
18.1%	10.7%	0.07797	0.0177

Correlation	US Large Cap Equities	Fixed Income	60/40 Portfolio
US Large Cap Equities	1	0.098534	0.97736
Fixed Income	0.098534	1	0.30516
Portfolio	0.97736	0.30516	1

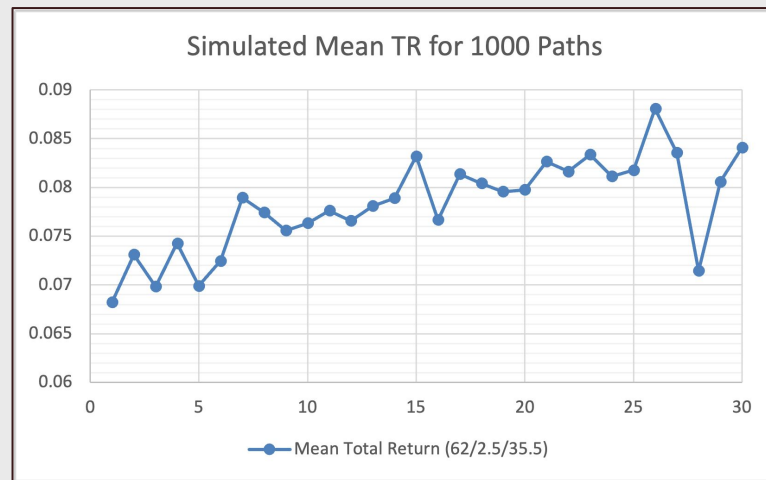
- Correlation between equities and fixed income nearly zero
- Diversification benefit
- Preserving purchasing power while limiting volatility

# → 62/2.5/35.5 Allocation

Probability of Loss of Purchasing Power	17.8%
E[% Loss PP   Loss PP]	-26.43%
Real Balance $\geq 100$ (Real Returns $\geq 0\%$ )	822
Real Balance Range	[25.54, 911.96]
Average Real Return	1.73%
Median Real Return	1.77%
Volatility	10.88%

## 62% US Large Cap Equities, 2.5% Money Market, 35.5% Fixed Income Fund

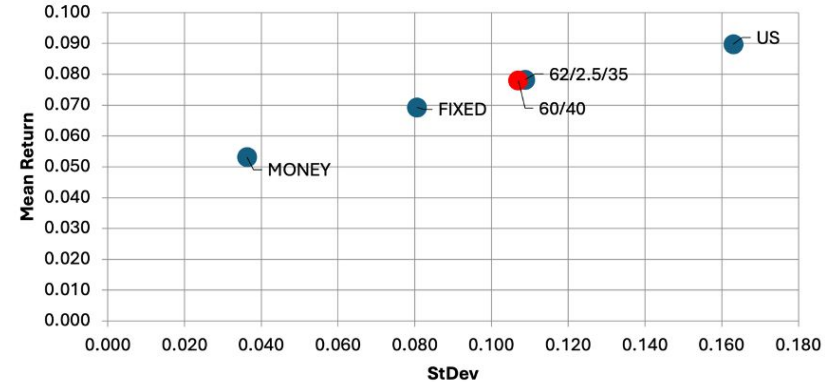
- Trade-off for lower probability loss of purchasing power for  $\sim 0.1\%$  increase in volatility
- Slight worsening in our conditional expectation approximately 1%
- Increasing the weight in equity, results in capital growth of the fund.
- A little less in fixed income securities results in less steady income.
- Higher mean and median balance.
- 822 paths out of 1000 show positive real geometric return.



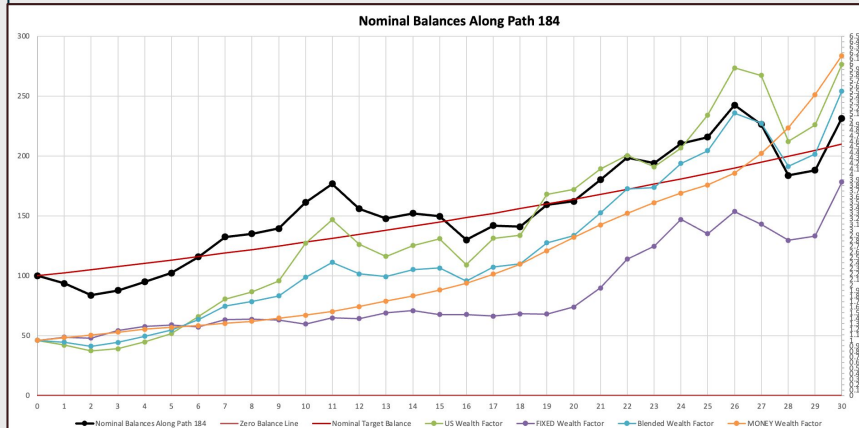
# 62/2.5/35.5 Allocation

- Slightly higher volatility but higher returns
- Preserves purchasing power
  - In fact, reduces the probability of losing purchasing power compared to the 60/40.
- 25th percentile and 75th percentile are generating positive returns.
- Paths tend to be above the nominal target balance.

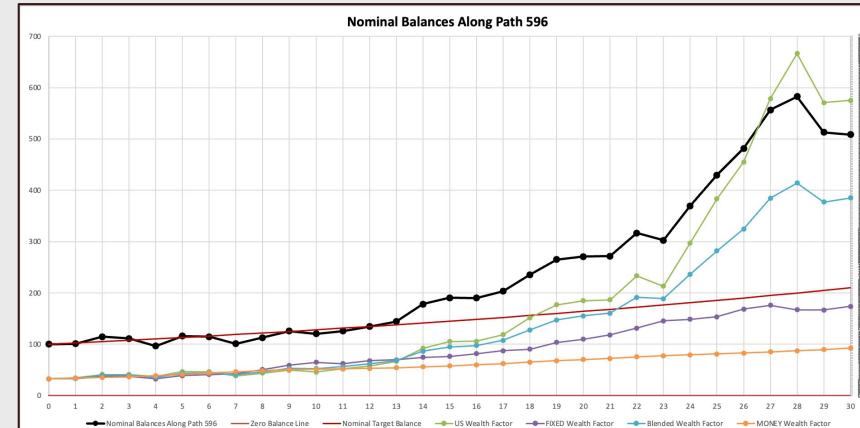
## Total Return Last 5 Years



25<sup>th</sup> percentile was path 184



75<sup>th</sup> percentile was path 596



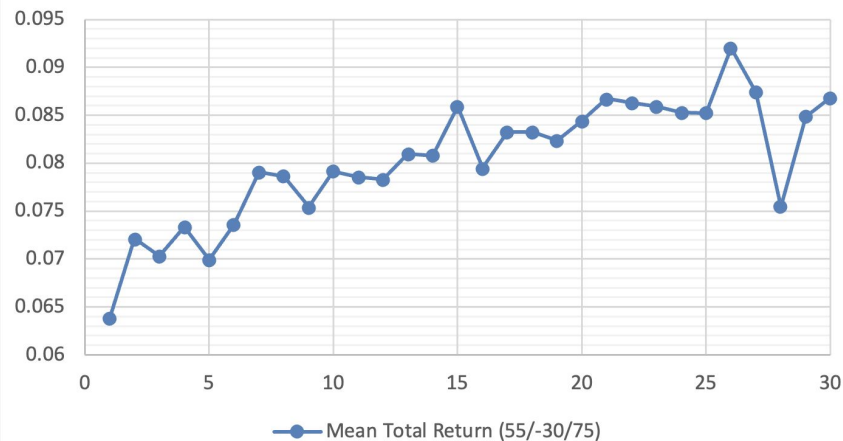
# → 55/-30/75 Allocation

Probability of Loss of Purchasing Power	15.8%
E[% Loss PP   Loss PP]	-25.79%
Real Balance $\geq 100$ (Real Returns $\geq 0\%$ )	842
Real Balance Range	[27.45, 1140.93]
Average Real Return	1.90%
Median Real Return	1.89%
Volatility	11.27%

## 55% US Large Cap Equities, -30% Money Market, 75% Fixed Income Fund

- Main difference is that we now must borrow money
- Putting a significant amount of weight into Fixed Income
- Trade-off for lower probability loss of purchasing power for  $\sim 0.6\%$  increase in volatility
- Slight worsening in our conditional expectation compared to current allocation by  $< 1\%$
- Higher average and median return

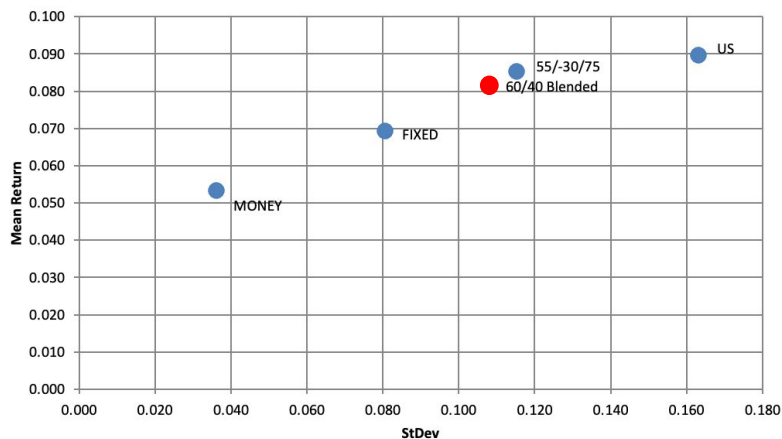
Simulated Mean TR for 1000 Paths



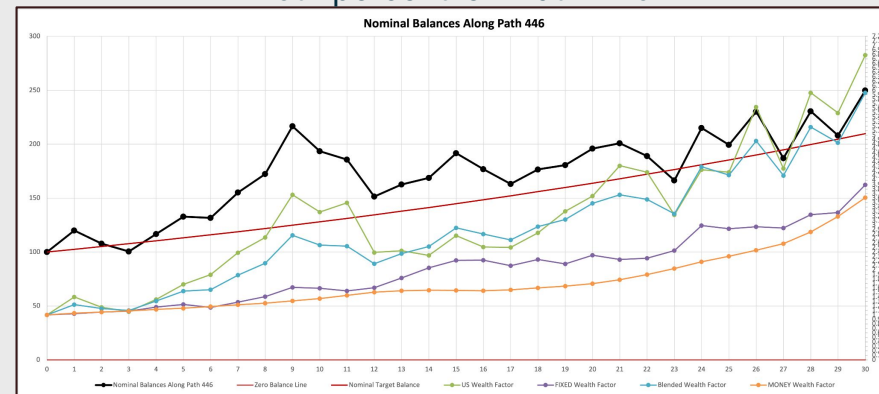
# 55/-30/75 Allocation

- Higher volatility associated with higher return
- Net 130% in equities and fixed income
- 75% in fixed income provides steady returns
- Trading higher short-term volatility for better long-term returns and loss protection

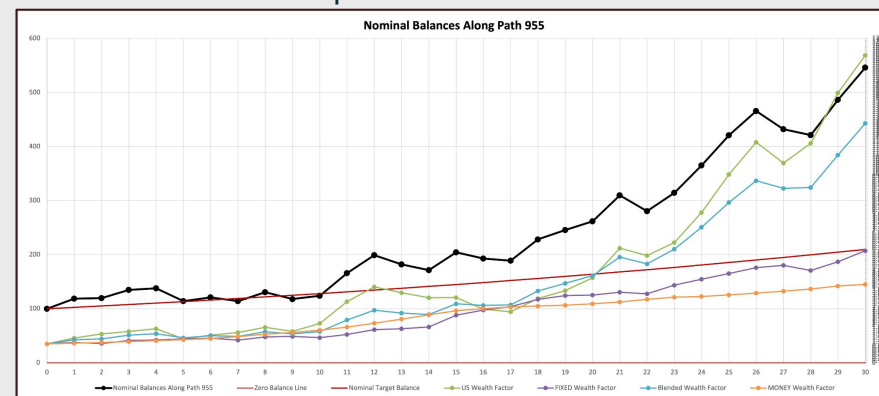
## Total Return Last 5 Years



## 25th percentile - Path 446



## 75th percentile - Path 955

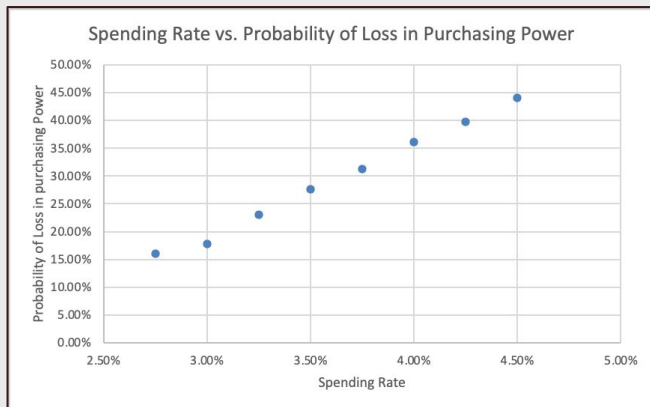




# Spending Rate

As stated previously, the fund has a target spending rate of 3% of its balance at the beginning of each year.

Our analysis suggests that an increase to this rate would likely work in opposition to the fund's primary objective of preserving purchasing power over the next 30 years.



## 3% Spending

Probability of Loss of Purchasing Power	17.8%
E[% Loss PP   Loss PP]	-26.43%
Real Balance $\geq 100$ (Real Returns $\geq 0\%$ )	822
Real Balance Range	[25.54, 911.96]
Average Real Return	1.73%
Median Real Return	1.77%

## 3.5% Spending

Probability of Loss of Purchasing Power	27.6%
E[% Loss PP   Loss PP]	-26.30%
Real Balance $\geq 100$ (Real Returns $\geq 0\%$ )	724
Real Balance Range	[21.89, 795.17]
Average Real Return	1.24%
Median Real Return	1.28%

Legacy Portfolio

→ 30-Year Investment Allocations

Recommended Strategy

62/2.5/35.5

Large Cap / Money Market / Fixed  
Purchasing Power Risk: 17.8%

Alternate Strategy

55/-30/75

Large Cap / Money Market / Fixed  
Purchasing Power Risk: 15.8%

- 3% Spending Rate
- 2.5% Annual Inflation
  
- Minimal Increase of  
E[% Loss PP | Loss PP]

Information is based on simulated data  
from AIRG Economic Scenario Generator

Comparison with Historical 60/0/40 Investment Strategy

Increase  
Median Return

Comparable  
Volatility



Decrease  
**0.3% or 2.3%**  
Purchasing Power Risk

# Thank You!

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Open for questions