



FIN 2

MIDTERM ASSIGNMENT

Quintet - Investor 3

Date: December 6, 2024

Instructor: Nguyen Thi Hoang Anh



OUR TEAM



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AGENDA

- ▶ Investment Policy Statement (IPS) **01**

- ▶ Asset Allocation **02**

- ▶ Portfolio Construction **03**

- ▶ Final Aggregate Portfolio **04**

- ▶ Scenario Analysis **05**

- ▶ Portfolio Evaluation **06**

I. INVESTMENT POLICY STATEMENT (IPS)

01

Background

02

Investment Objective,
Strategy and Return
Objective

03

Risk Tolerance

04

Constraints



I. INVESTMENT POLICY STATEMENT (IPS)

1. Background

Background information

- ▶ **Name**
Carlos Ramirez
- ▶ **Age**
48
- ▶ **Career**
Business Owner with
annual income of \$165,198
- ▶ **Family**
Wife: Mary - same age, auditor
2 sons (aged 18 and 16)

I. INVESTMENT POLICY STATEMENT (IPS)

1. Background

Assets

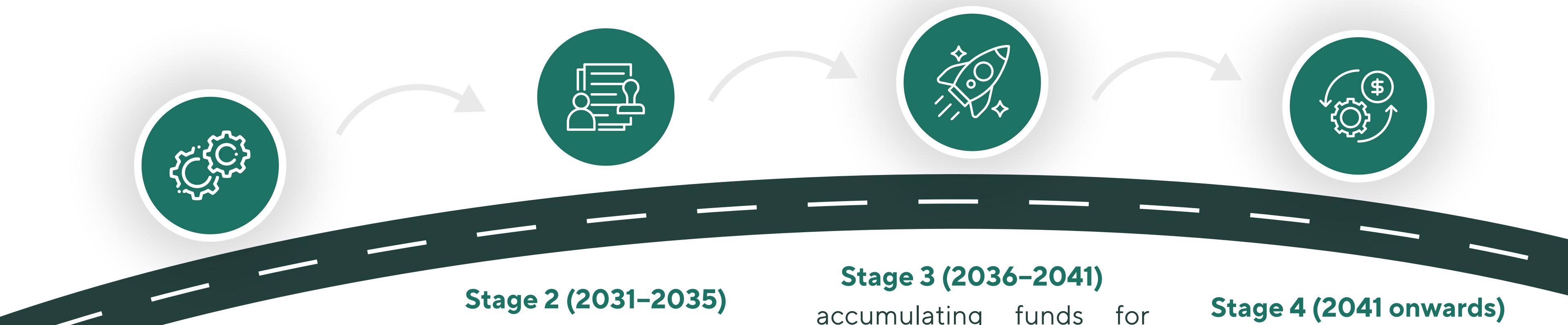
- ▶ **\$1.2 million**
mid-size logistics business equity
- ▶ **\$150,000**
personal savings
- ▶ **\$600,000**
diversified portfolio of REITs and index funds
- ▶ **\$350,000**
vacation property

Liabilities

- ▶ **\$200,000**
business loans
- ▶ **\$100,000**
mortgage on vacation property

I. INVESTMENT POLICY STATEMENT (IPS)

2. Investment Objective, Strategy and Return Objective



Stage 1 (2024–2030)
prioritize saving for
children's
college expenses
(26% expenses) and
mortgage payment

Stage 2 (2031–2035)
expand his logistics
business focusing on the
urban logistics market,
buying 10 new semi-
trucks at **\$100,000** each
over the period

Stage 3 (2036–2041)
accumulating funds for
retirement, ensure a
comfortable life post-
retirement, shifting
investment strategy to
conservative investments.

Stage 4 (2041 onwards)
selling the logistics
business for **\$5.7**
million, enjoy a
financially secure
post-retirement life

I. INVESTMENT POLICY STATEMENT (IPS)

2. Investment Objective, Strategy and Return Objective

2.2 Investment Strategy

We employ the **Goals-Based Asset Allocation (GBAA)** methodology to determine the **optimal distribution of portfolio assets**.

6 key objectives to shape their asset allocation strategy:

- ▶ **Retirement Security:**
90% over next 30 years
- ▶ **Mortgage Obligation:**
90% in 6 years
- ▶ **Educational Funding:**
80% within next 6 years
- ▶ **Business Expansion:**
70% in 12 years
- ▶ **Endowment Fund Creation:**
70% within 20 years
- ▶ **Charitable Donation:**
60% in 30 years

I. INVESTMENT POLICY STATEMENT (IPS)

2. Investment Objective, Strategy and Return Objective

2.3 Return Objective

Supplement financial goals of Carlo Ramirez in satisfying ongoing living expenses, children education fee, business expansion and provide funds upon the retirement of Carlo and his wife in 2041.

Required return: 1.17%

Expected inflation: 2.7%

Return Objective: 3.87%

I. INVESTMENT POLICY STATEMENT (IPS)

3. Risk Tolerance

3.1 Ability

Assets - diversified portfolio

- ▶ **\$1.2 million**
mid-size logistics business equity
- ▶ **\$150,000**
personal savings
- ▶ **\$600,000**
diversified portfolio of REITs and index funds
- ▶ **\$350,000**
vacation property

Liabilities

- ▶ **\$300,000**
in total

Net asset position

- ▶ **\$2,000,000**

=> AVERAGE ability
to take risks.

I. INVESTMENT POLICY STATEMENT (IPS)

3. Risk Tolerance

3.2 Willingness

- ▶ **Carlos and Mary are pragmatic investors**
*prioritize financial stability while pursuing growth in investment portfolio
clear understanding of the uncertainties associated with investment risk*
- ▶ **Their investment philosophy emphasizes a balance between growing assets and managing potential losses**
*expressed a firm aversion to losses exceeding 10% over any 12-month period
(Based on a risk assessment conducted on November 11, 2024)*

BELOW AVERAGE willingness to take risk

I. INVESTMENT POLICY STATEMENT (IPS)

4. CONSTRAINTS

4.1 Liquidity and Constraints

Goals	Constraints	
	Liquidity	Time Horizon
Fundamental Needs	extreme liquidity constraint	30 years until client's passing
Mortgage Obligation	high liquidity constraint	6 years
Educational Funding	median liquidity constraint	7 years (2024-2030)

I. INVESTMENT POLICY STATEMENT (IPS)

4. CONSTRAINTS

4.1 Liquidity and Constraints

Goals	Constraints	
	Liquidity	Time Horizon
Business Expansion	low liquidity constraint	5 years after their children's education
Endowment Fund	low liquidity constraint	20 years from now
Charitable Donation	low liquidity constraint	after client's passing

I. INVESTMENT POLICY STATEMENT (IPS)

4. Constraints

4.2 Tax

- ▶ **Carlos and Mary are subject to their country's tax regulations** implementing strategies that minimize tax liabilities while maximizing the wealth
- ▶ **They leverage tax-efficient investment strategies** such as utilizing tax-advantaged accounts and taking advantage of available deductions and credits

4.3 Legal

Carlos and Mary are committed to **adhering to all legal and regulatory standards applicable** to their financial planning.

I. INVESTMENT POLICY STATEMENT (IPS)

5. Unique Circumstances

► **Business Equity and Liquidity**

This asset is *illiquid*. They must *continually monitor business performance and market conditions* to ensure this asset aligns with their retirement and legacy goals.

► **Vacation Property**

This asset is *illiquid*. This asset is not included in their portfolio, as it serves more as a *personal asset for family enjoyment* than an income-generating investment.

I. INVESTMENT POLICY STATEMENT (IPS)

5. Unique Circumstances

► Estate Planning Considerations

Carlos and Mary wishes to *ensure their children's financial security through tax-efficient strategies*. They are also considering making charitable donations to support local causes, including a donation to their local library

► Investment preferences

Carlos and Mary wishes to maintain a *diversified portfolio that balances growth with risk management*. They expressed a *preference for lower-risk options*, and want limited exposure to high-volatility assets.

II. ASSET ALLOCATION

1. ASSET CLASSES SELECTION

a. Equity: S&P 500 (Expected Return: 10%)

Annualized returns of 16.6% over the past decade

Long-term returns can be broken down into:

Total return = (Sales growth / share count growth) * margin growth * P/E multiple growth + dividend yield

10 Years	EPS	DPS	Sales Per Share	Sales in Dollars	Share Count	Margin	P/E Multiple	Yield	Price	Total Return
12/31/2011	96.44	29.12	1,052.83	9,531.2	9,052.9	9.2%	13.0	2.3%	1,257.6	
12/31/2021	208.21	63.12	1,566.80	13,266.5	8,467.3	13.3%	22.9	1.3%	4,766.2	
Growth %	115.9%	116.8%	48.8%	39.2%	6.9%	45.1%	75.5%	-42.8%	279.0%	362.6%
Annual Avg	8.0%	8.0%	4.1%	3.4%	0.7%	3.8%	5.8%	2.3%	14.3%	16.6%
Return Attribution				3.5%	0.7%	3.9%	6.0%	2.4%		16.6%

II. ASSET ALLOCATION

1. ASSET CLASSES SELECTION

a. Equity: S&P 500 (Expected Return: 10%)

We project a **long-term expected return of 10%** for the **S&P 500**:

Time horizon	EPS	Sales per share	Sales in \$	Share count	Profit Margins	P/E Multiple	Div. Yield	Price	Total Return
9/30/2023	208.11	\$1,707.00	\$14,338.70	8400	12.20%	17.2	1.90%	3585.6	
9/30/2032	340.01	\$2,558.27	\$20,031.58	7830.18	13.30%	22.90%	1.30%	7786.34	
Total Growth	63.40%	49.90%	39.70%	-6.80%	9.00%	33.10%	-31.60%	117.20%	
Growth p.a	5%	4.10%	3.40%	-0.70%	0.90%	2.90%	-3.70%	8.10%	
Attribution	5%	4.10%	3.40%	0.70%	0.90%	2.90%	1.90%		10%

II. ASSET ALLOCATION

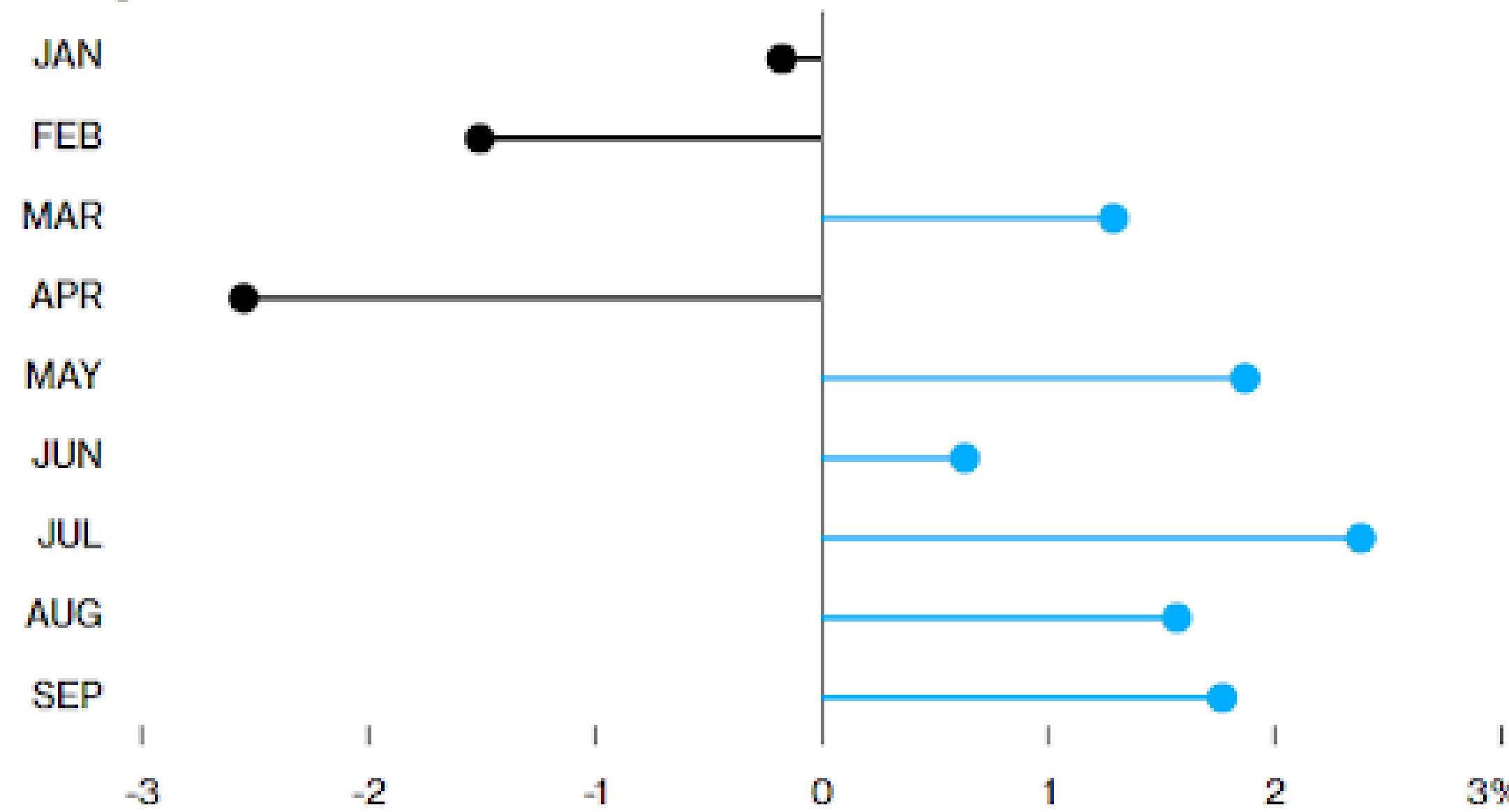
1. ASSET CLASSES SELECTION

b. US Investment Grade Bond (Expected Return: 5.8%)

US High-Grade Bonds Are On a Roll

Market's monthly winning streak is its longest since 2020

- Negative returns
- Positive returns

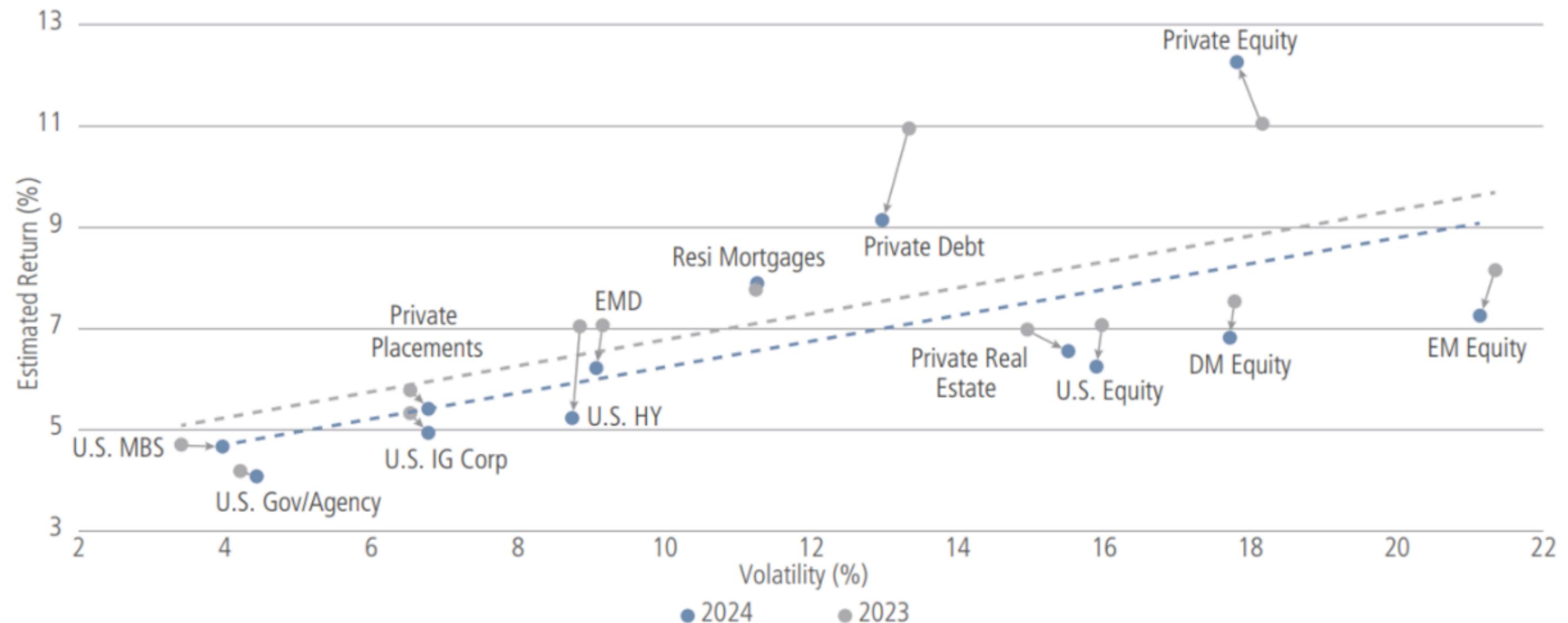


II. ASSET ALLOCATION

1. ASSET CLASSES SELECTION

c. US High-Yield Bond (Expected Return: 7.5%)

Estimated annualized return and volatility, five- to 10-year term



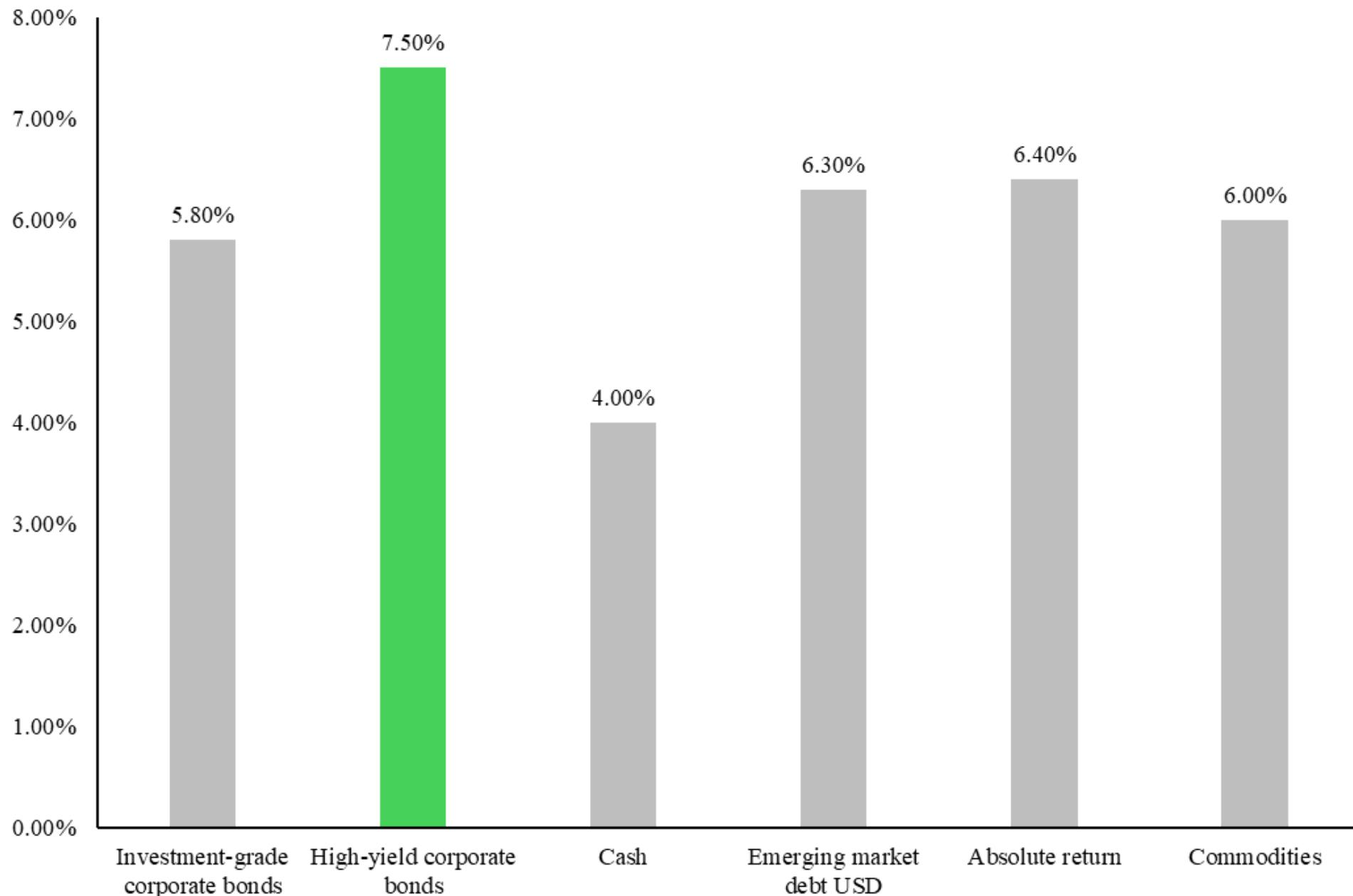
NB Capital Market Assumptions: 2024 versus 2023. source: Neuberger Berman, Bloomberg-Barclays, Cambridge Associates, FactSet; Analytics
are as of December 31, 2023

II. ASSET ALLOCATION

1. ASSET CLASSES SELECTION

c. US High-Yield Bond (Expected Return: 7.5%)

High-Yield Bonds are predicted to generate **7.5% returns over 5 years**



Forecasted five-year total average returns (%). source: Columbia Threadneedle Investments

II. ASSET ALLOCATION

1. ASSET CLASSES SELECTION

d. US REITs (Expected Return: 15%)

	FTSE Nareit All Equity REITs	S&P 500	S&P 500 Equal Weighted
20-year through 6/30/2024	7.87%	10.29%	10.06%
15-year through 6/30/2019 <i>(6/30/2004 - 6/30/2019)</i>	9.41%	8.75%	9.77%
5-year through 6/30/2024 <i>(6/30/2019 - 6/30/2024)</i>	3.40%	15.05%	10.94%

source: Morgan Stanley Investment Management, S&P, FTSE Nareit

II. ASSET ALLOCATION

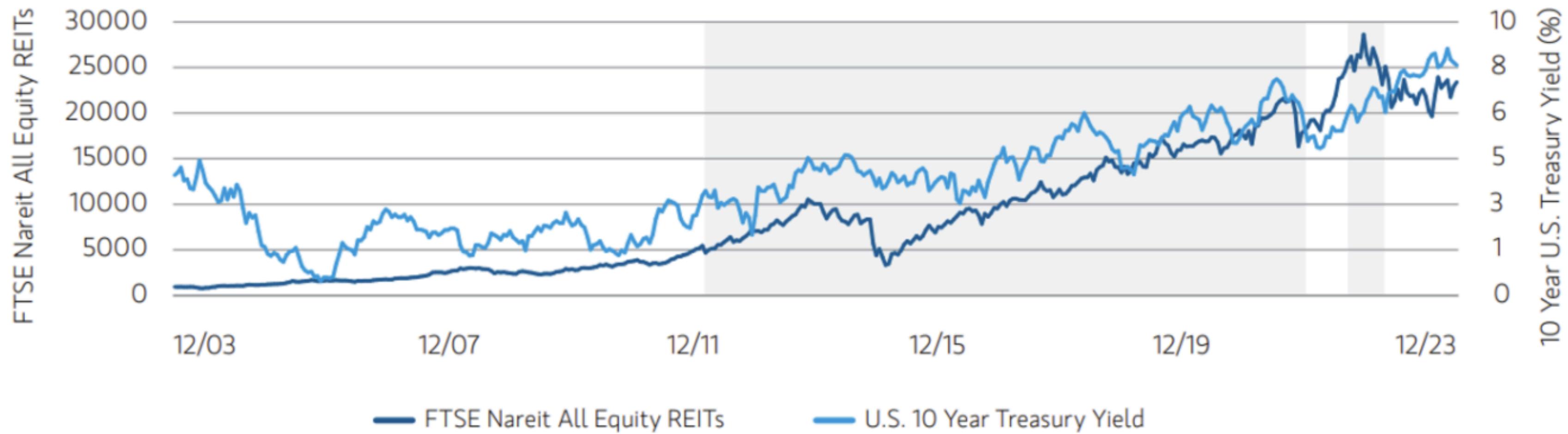
1. ASSET CLASSES SELECTION

d. US REITs (Expected Return: 15%)

DISPLAY 3

History Suggests that as Interest Rates Drop, REIT Values Will Increase

REITs vs. U.S. 10-year Treasury Yield



source: Bloomberg, FTSE Nareit.

II. ASSET ALLOCATION

2. CONSTRUCTION FOR THE CLIENTS

a. Constructing Optimized Modules

Employing Black-Litterman model to estimate the expected return
and...

	Expected		
	Return	Volatility	Liquidity
Cash	0.30%	0.29%	100%
Large-Cap S&P 500 Equity	6.67%	6.64%	80%
Investment-Grade US Bonds	4.10%	4.53%	70%
High-Yield US Bonds	5.16%	4.99%	65%
Real Estate Investment Trusts (REITs)	11.30%	14.25%	65%
...			
...			
...			
...			

II. ASSET ALLOCATION

2. CONSTRUCTION FOR THE CLIENTS

a. Constructing Optimized Modules

...DCC-Copula GARCH model to estimate covariance matrix.

	Large-Cap S&P 500 Equity	Investment-Grade US Bonds	High-Yield US Bonds	Real Estate Investment Trusts (REITs)	Cash
Large-Cap S&P 500 Equity	6.64%	2.31%	3.34%	6.62%	0.47%
Investment-Grade US Bonds	2.31%	4.53%	3.61%	4.54%	0.26%
High-Yield US Bonds	3.34%	3.61%	4.99%	4.91%	0.45%
Real Estate Investment Trusts (REIT)	6.62%	4.54%	4.91%	10.25%	0.54%
Cash	0.47%	0.26%	0.45%	0.54%	0.29%

II. ASSET ALLOCATION

2. CONSTRUCTION FOR THE CLIENTS

a. Constructing Optimized Modules

4 optimized asset allocation module that inline with different constraints:

	A	B	C	D
Portfolio Characteristics				
Expected return	4.10%	4.80%	5.40%	5.70%
Expected volatility	3.10%	3.60%	4.10%	4.30%
Portfolio Allocations				
Cash	31.75%	20%	10%	5%
Large-Cap S&P 500 Equity	19.31%	22.44%	25.26%	26.67%
Investment-Grade US Bonds	19.83%	23.08%	25.94%	27.36%
High-Yield US Bonds	20.88%	24.78%	27.94%	29.51%
Real Estate Investment Trusts (REITs)	8.23%	9.70%	10.87%	11.45%
Total	100%	100%	100%	100%
Constraints				
Minimum Cash	30%	20%	10%	5%
Minimum Liquidity	80%	70%	60%	50%
Maximum volatility	3.50%	4%	4.50%	5%

II. ASSET ALLOCATION

2. CONSTRUCTION FOR THE CLIENTS

b. Choosing suitable asset allocation module for client

“Highest Probability- and Horizon-Adjusted Return” Sub-Portfolio Module under Different Horizon and Probability Scenarios

	A	B	C	D
Portfolio Characteristics				
Expected return	4.10%	4.80%	5.40%	5.70%
Expected volatility	3.10%	3.60%	4.10%	4.30%
Annualized Minimum Expectation Returns				
Time Horizon (years)				
6				
Required Success				
90	2.50%	2.93%	3.29%	3.47%
80	3.05%	3.58%	4.02%	4.25%
70	3.46%	4.05%	4.56%	4.81%
60	3.80%	4.45%	5.01%	5.28%
12				
Required Success				
90	2.97%	3.48%	3.92%	4.13%
80	3.37%	3.94%	4.43%	4.68%
70	3.65%	4.28%	4.81%	5.08%
60	3.89%	4.56%	5.13%	5.41%
20				
Required Success				
90	3.23%	3.79%	4.26%	4.49%
80	3.54%	4.14%	4.66%	4.91%
70	3.76%	4.40%	4.95%	5.22%
60	3.94%	4.62%	5.19%	5.48%
30				
Required Success				
90	3.39%	3.98%	4.47%	4.72%
80	3.64%	4.27%	4.80%	5.06%
70	3.82%	4.48%	5.03%	5.31%
60	3.98%	4.66%	5.24%	5.52%

II. ASSET ALLOCATION

2. CONSTRUCTION FOR THE CLIENTS

b. Choosing suitable asset allocation module for client

After **choosing the appropriate asset allocation module for each goal**, here is the results:

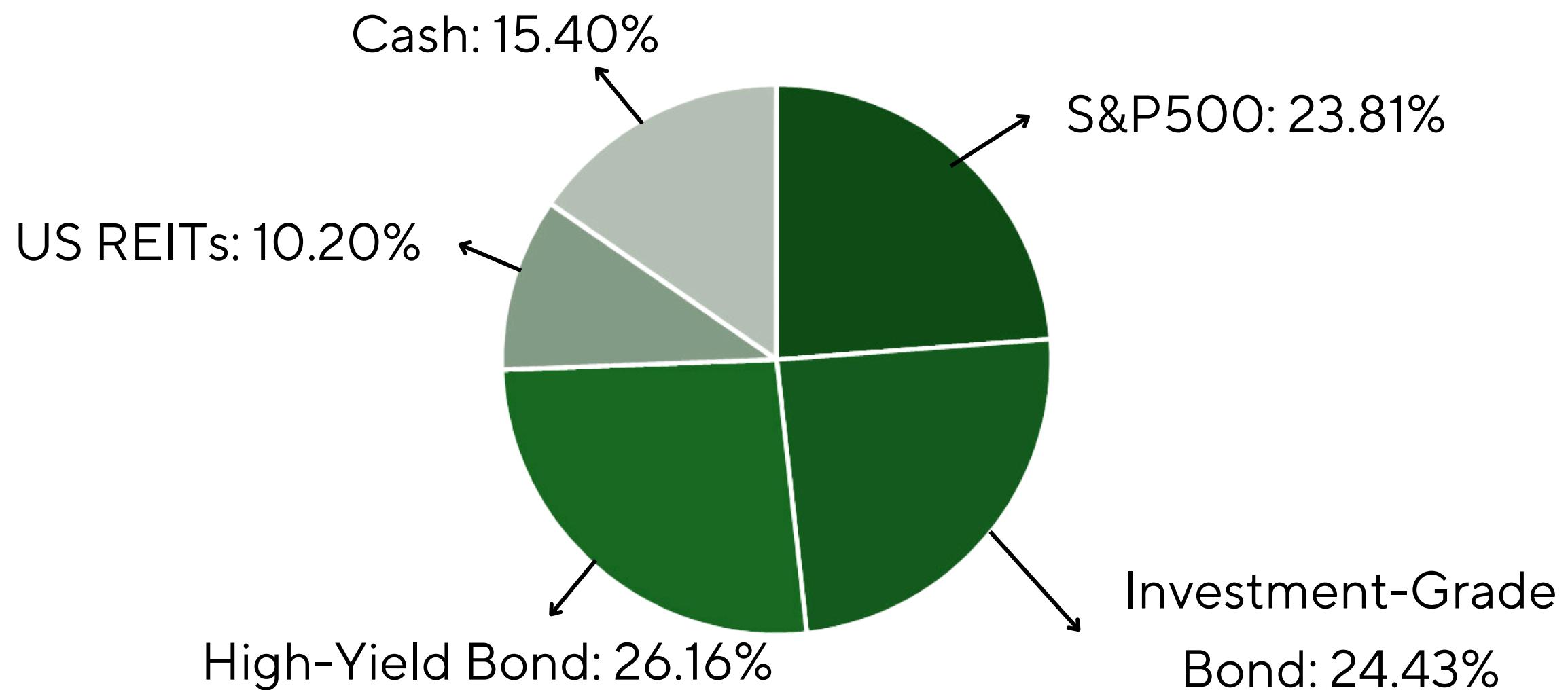
Goals	Required probability of success	Time Horizon	Liquidity Needs	Module	Discount Rate	Present Values	Proportion
Fundamental Needs (Living Expense)	90%	30	Extreme	A	3.39%	(1,987,145)	37.23%
Children's education	80%	6	Median	C	4.02%	(193,106)	3.62%
Mortgage payment	90%	6	High	B	2.93%	(106,760)	2.00%
Business Expansion	70%	12	Low	D	5.08%	(610,752)	11.44%
Endowment	70%	20	Low	D	5.22%	(2,061,043)	38.62%
Charity	60%	30	Low	D	5.52%	(378,139)	7.09%
Total						(5,336,946)	100.00%

II. ASSET ALLOCATION

2. CONSTRUCTION FOR THE CLIENTS

b. Choosing suitable asset allocation module for client

The **aggregate asset allocation portfolio** is very balance with weight is diversely allocate to each asset classes:



Annualized Expected Return

Annualized Standard Deviation

II. ASSET ALLOCATION

2. CONSTRUCTION FOR THE CLIENTS

b. Choosing suitable asset allocation module for client

Discount rate as the **portfolio expected return**, we get the the Present Values **economic assets:**

ECONOMIC BALANCE SHEET

Assets		Liabilities and Economic Net Worth
<i>Financial Assets</i>		<i>Financial Liabilities</i>
Personal savings, portfolio of REITs and index funds	750,000	PV of Mortgage Loans
Vacation Property	350,000	
<i>Extended Assets</i>		<i>Extended Liabilities</i>
PV of Carloz and Wife Income	4,785,672	Children' education expense
PV of expected business exit	2,215,253	Business Expansion
		Endowment Fund
		Charitable Donation
		PV of future living expense
		<i>Economic Net Worth</i>
		Economic net worth (economic assets less economic liabilities)
Total	8,100,925	2,763,980
		8,100,925

III. PORTFOLIO CONSTRUCTION

- ▶ **Active investment approach**
for US Equities, High-Yield Bonds, and REITs
to leverage their higher return potential and volatility
- ▶ **Passive strategy**
for US Investment Grade Bonds
aligns with their lower volatility and stable performance

III. PORTFOLIO CONSTRUCTION

1. EQUITY

- ▶ **Management style**
Active
- ▶ **Investment style**
Large-cap Blend
- ▶ **Inception date**
01 January 2024
- ▶ **Evaluation date**
25 November 2024
- ▶ **Benchmarks**
VTHR and SPLG

III. PORTFOLIO CONSTRUCTION

1. EQUITY

STOCK SELECTION

- **Technology:**
AAPL, MSFT, IBM
 - **Healthcare:**
JNJ, ELV
 - **Communications Service:**
META, GOOGL
 - **Consumer Cyclical:**
BKNG, BBY
 - **Entertainment:**
SPOT, NFLX
 - **Financials:**
GS, JPM, BRK-B

III. PORTFOLIO CONSTRUCTION

1. EQUITY

- ▶ Employ the **Black-Litterman model** to calculate the **implied expected return**.
(Historical data in the 10-year period from 1/1/2015 to 1/1/2024)
- ▶ **Adjust figures by taking into account the growth potential** of each stock
- ▶ Take the Black-Litterman implied expected return to **maximize Sharpe ratio** with the condition that **each stock weights at least 3%**

Our optimized portfolio:

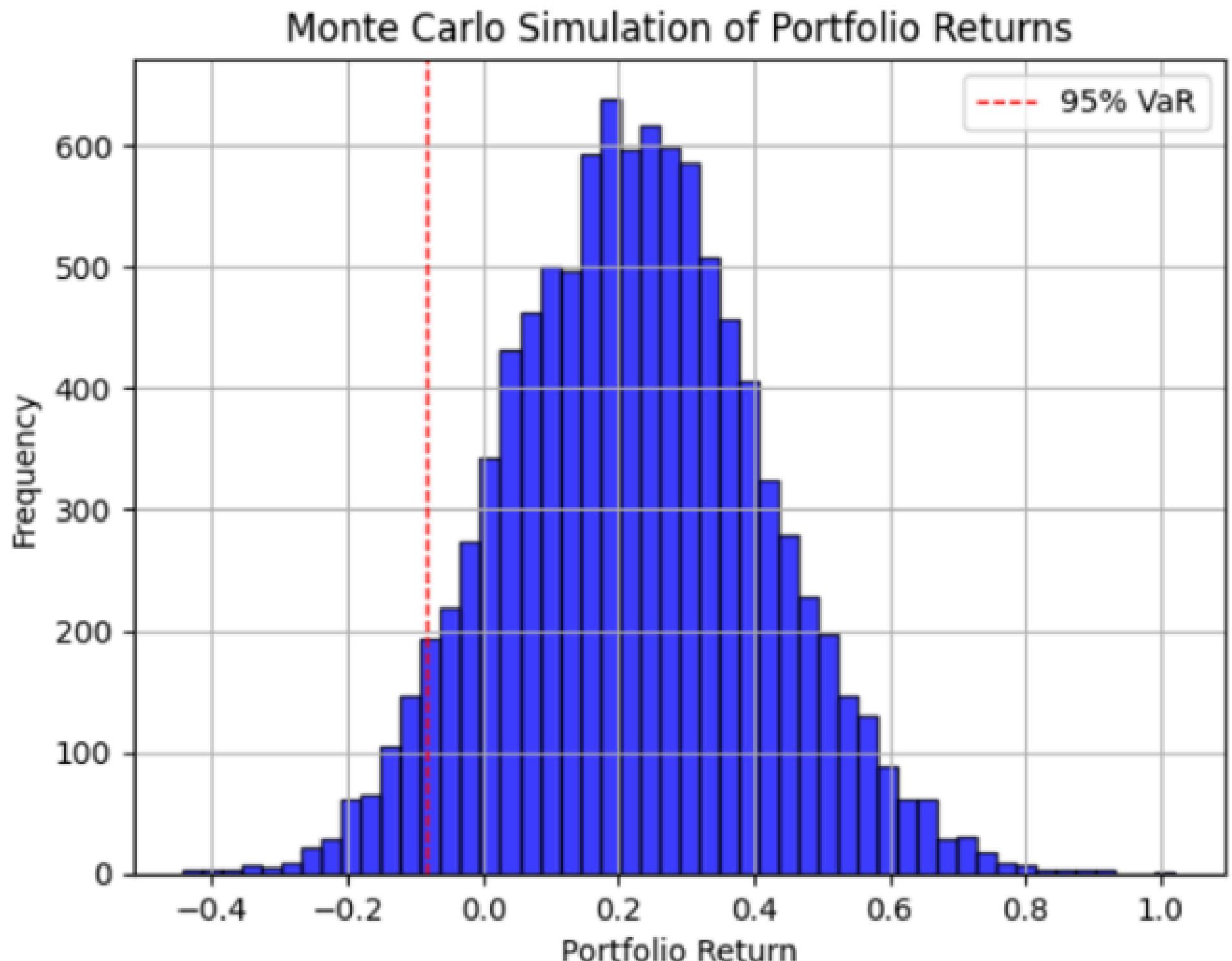
Stocks	AAPL	MSFT	IBM	META	GOOGL	BKNG	BBY
Weights	13.64%	8.97%	3.00%	8.97%	16.81%	3.45%	5.09%
Stocks	BRKb	JPM	GS	NFLX	SPOT	JNJ	ELV
Weights	9.04%	3.00%	3.00%	4.77%	3.00%	9.46%	3.00%
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮

III. PORTFOLIO CONSTRUCTION

1. EQUITY

Mean return	22.22%
Standard deviation	18.9%
95% VaR	-8.36%

Monte Carlo Simulation with Value-at-Risk analysis



III. PORTFOLIO CONSTRUCTION

2. REITS

Employ **active management** approach to achieve above-average growth and outperform benchmark

Benchmark: S&P United States REIT Index

- **Residential REITs:**
EQR, AVB
 - **Retail REITs:**
SPG, REG
 - **Office REITs:**
SLG, HIW
 - **Healthcare Facilities REITs:**
WELL, VTR

III. PORTFOLIO CONSTRUCTION

2. REITS

- ▶ Employ the **Black-Litterman model** to calculate the **implied expected return**.
(Historical data in the 10-year period from 1/1/2015 to 1/1/2024)
- ▶ **Adjust figures by taking into account the growth potential** of each stock
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Our optimized portfolio:

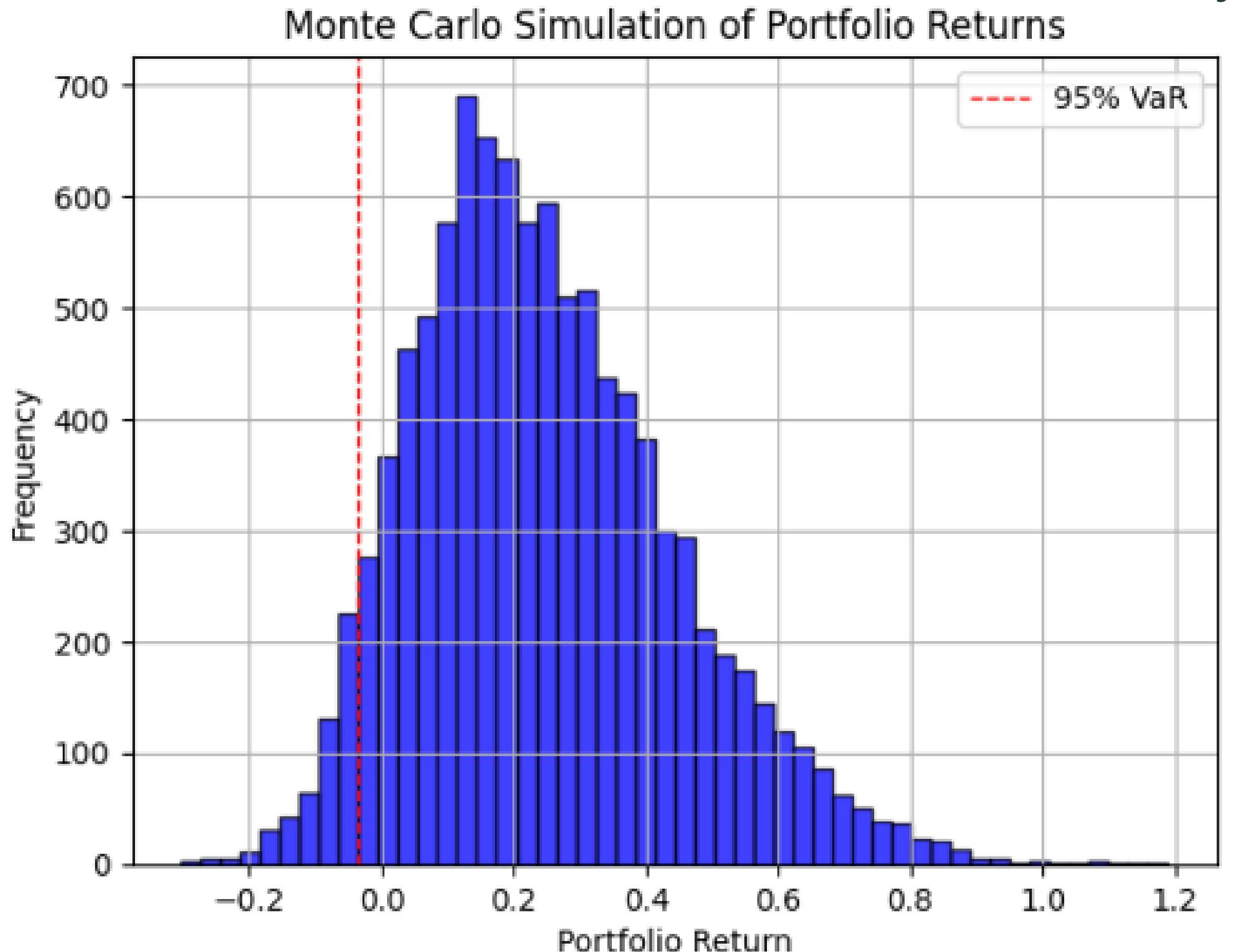
REITs	EQR	AVB	SLG	HIW
Weights	3.00%	17.02%	7.83%	3.00%
REITs	SPG	REG	WELL	VTR
Weights	3.00%	17.02%	42.13%	6.52%
...

III. PORTFOLIO CONSTRUCTION

2. REITS

Mean return	24.65%
Standard deviation	19.79%
95% VaR	-3.62%

Monte Carlo Simulation with Value-at-Risk analysis



III. PORTFOLIO CONSTRUCTION

3. HIGH-YIELD BOND

- ▶ **Benchmark:** PIMCO Active Bond Exchange-Traded Fund (BOND)
- ▶ Employ the **Black-Litterman model** to calculate the **implied expected return**.
(Historical data in the 10-year period from 1/1/2015 to 1/1/2024)
- ▶ **Adjust** figures by taking into account the growth potential of each stock
- ▶ Take the Black-Litterman implied expected return to **maximize Sharpe ratio** with the condition that **each stock weights at least 3%**

Our optimized portfolio:

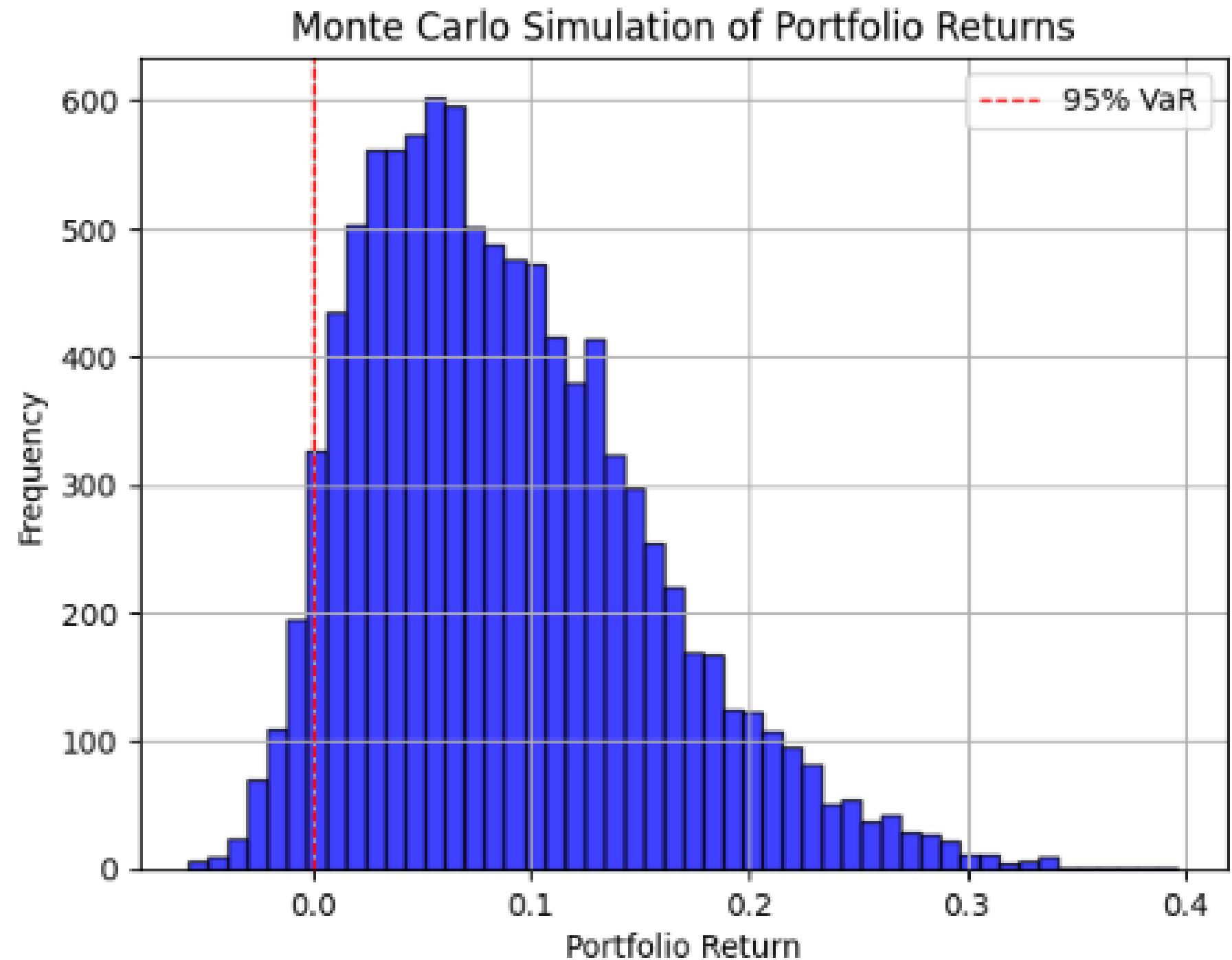
HYCorpBond ETFs	HYG	HMB
Weights	25.79%	74.21%

III. PORTFOLIO CONSTRUCTION

3. HIGH-YIELD BOND

Mean return	8.82%
Standard deviation	6.64%
95% VaR	-0.01%

Monte Carlo Simulation with Value-at-Risk analysis



III. PORTFOLIO CONSTRUCTION

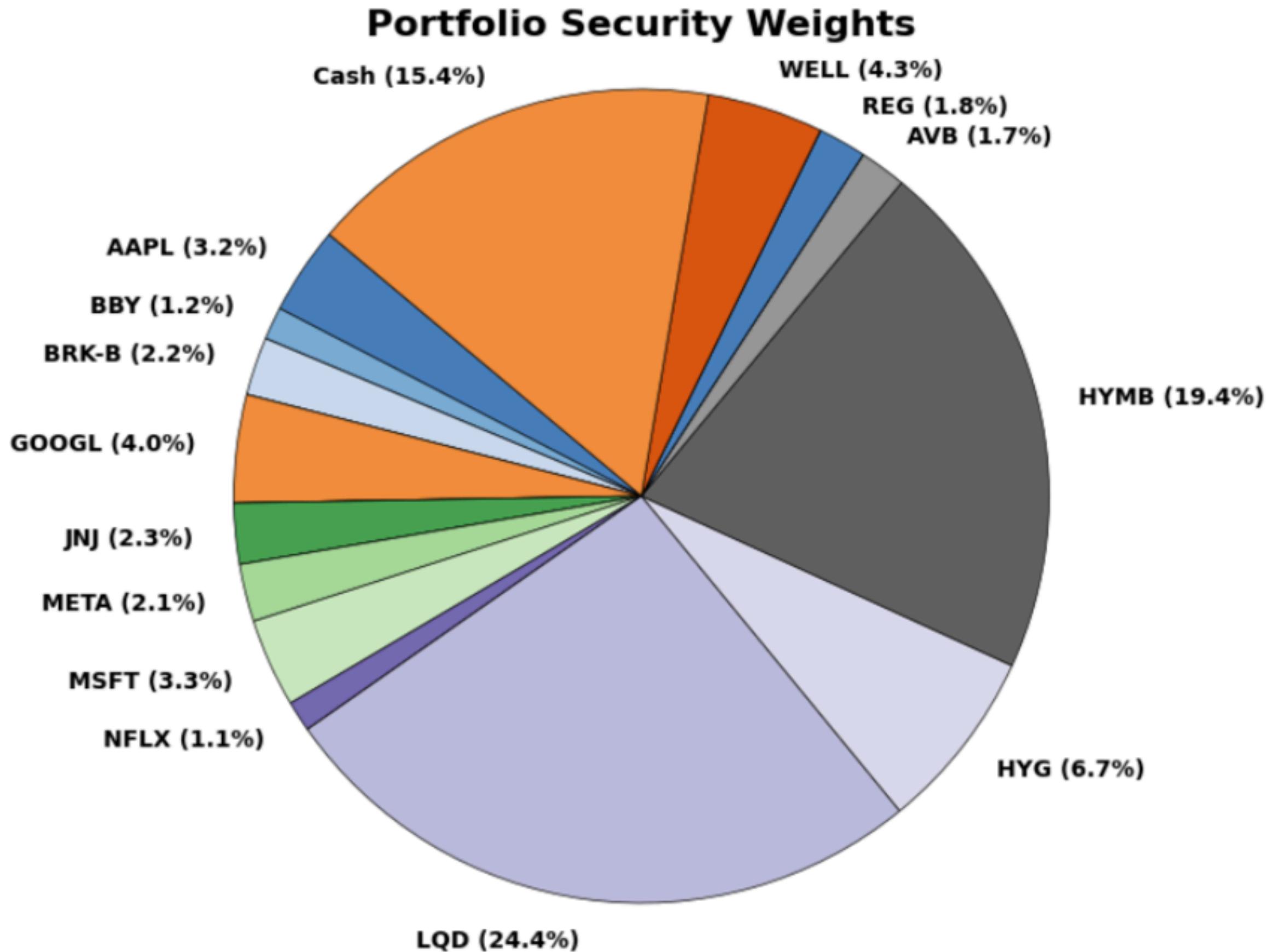
4. INVESTMENT-GRADE CORPORATE BOND

- ▶ **Stabilizing force** in portfolio, offering *diversification* and *downside protection*
 - ▶ **Passive management strategy** due to lower volatility and consistent performance
 - ▶ **Passively invest in** iShares iBoxx \$ Investment Grade Corporate Bond ETF (**LQD**)
-

IV. FINAL AGGREGATED PORTFOLIO

1. OUR PORTFOLIO

- ▶ **Diversified** across various asset classes
- ▶ **Balance between equities, fixed income, and cash** strive to **manage both growth and stability**
- ▶ **Equity exposure is the largest portion => a growth-focused strategy**
- ▶ **Healthy proportion in bonds => income stability**



IV. FINAL AGGREGATED PORTFOLIO

2. BENCHMARK PORTFOLIO

- ▶ Use the shrinkage estimates of the covariance matrix

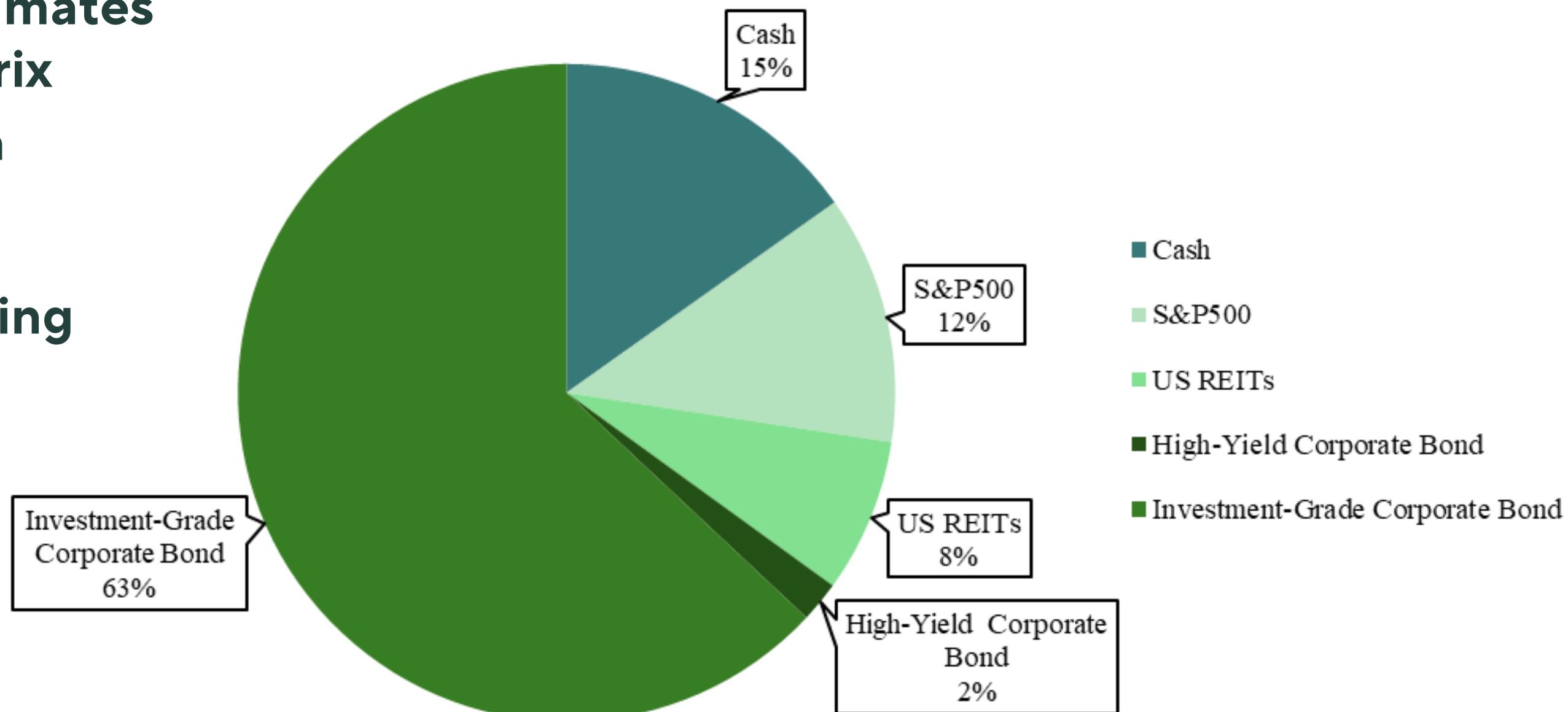
to form asset allocation sub-portfolios

- ▶ Choose passive investing to follow the index

for security selection

=> THE PORTFOLIO
FAVORS LOW RISK
AND STEADY INCOME.

Asset allocation portfolio using shrinkage estimates:

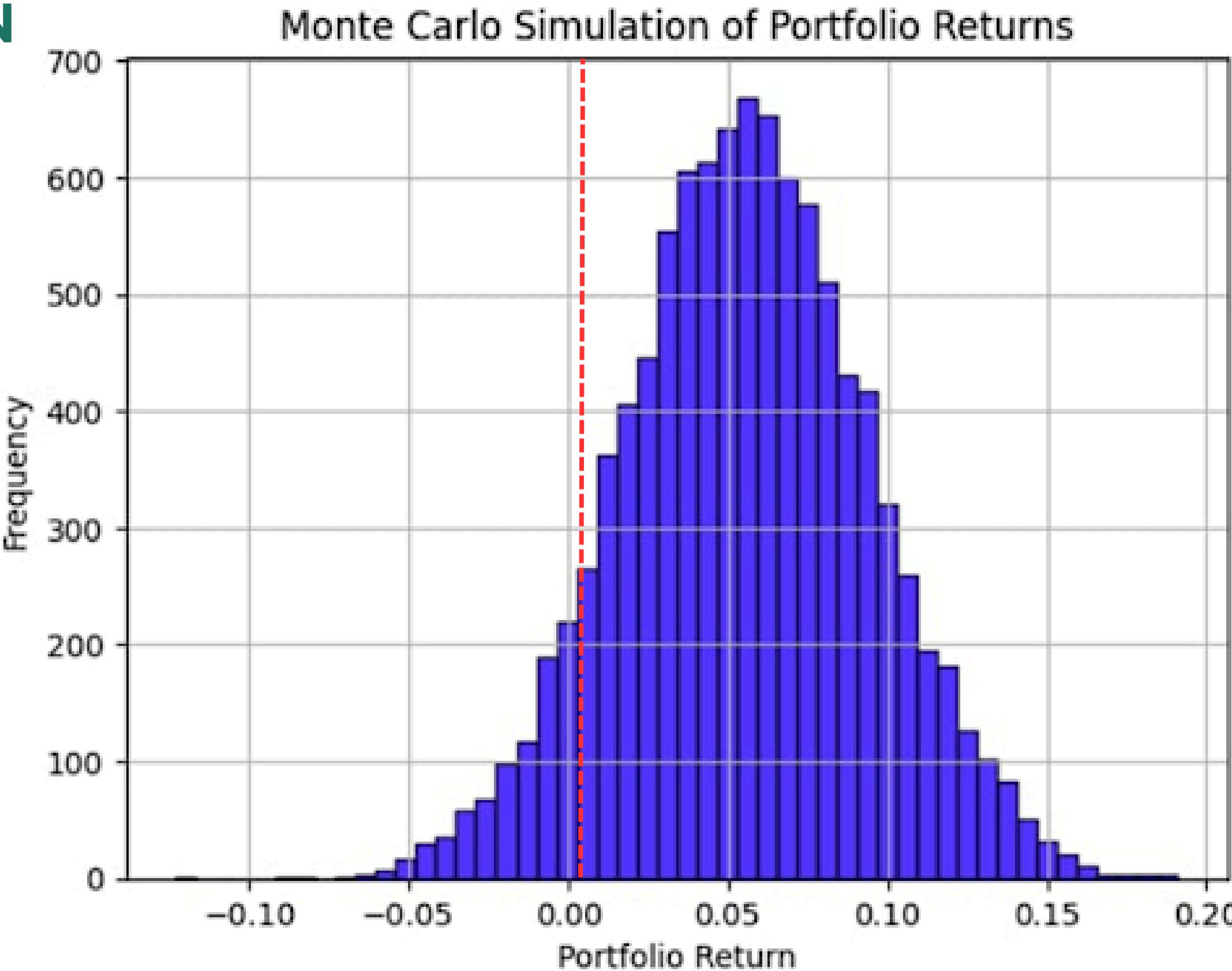


V. SCENARIO ANALYSIS

1. MONTE CARLO SIMULATION

- ▶ Expected annualized return of 5.52%
- ▶ Annualized standard deviation of 3.84%
- ▶ 90% Value at Risk (VaR) is above zero

=> ROBUSTNESS AND SAFETY FOR OUR CLIENT.



V. SCENARIO ANALYSIS

2. PUT OPTION HEDGE

- ▶ **Office REITs:** employees switching to hybrid and fully remote, office vacancy rate rose 16.9% over last year, 10% YoY since 2021. Predict **10% expected losses** in 2024
- ▶ **Entertainment:** disposable income stagnate since 2022 (\$21.9K Billion), expected to decline slightly in the first half of 2025 (\$21.6K Billion), predict **3% losses** in 2024

Protective Put to hedge incoming risks, while preserving potential for profits

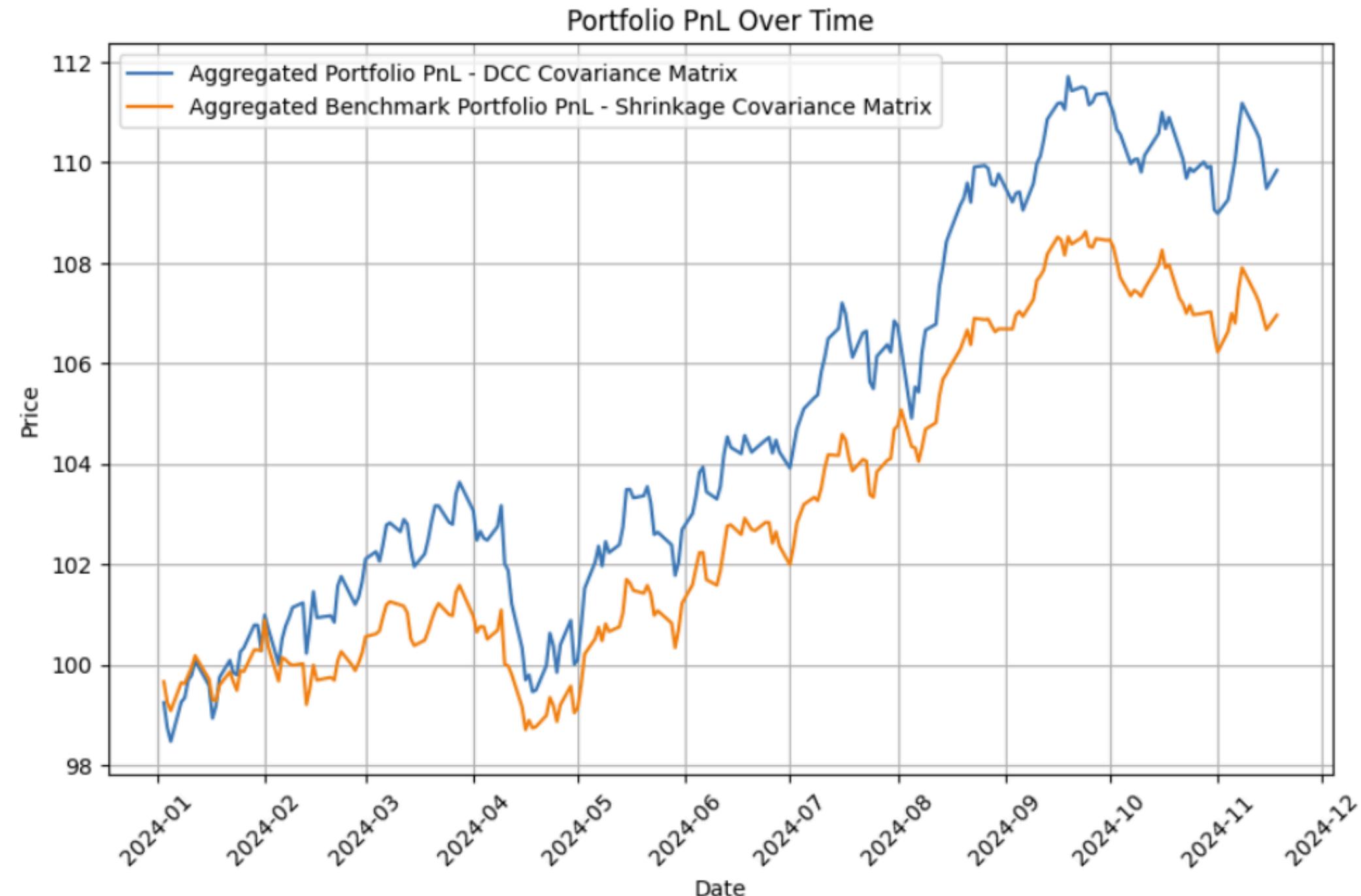
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VI. PERFORMANCE EVALUATION

1. ASSET ALLOCATION PERFORMANCE

Annualized return	9.68%
Annualized standard deviation	6.35%
Annualized Sharpe ratio	1.52
Max drawdown	3.88%

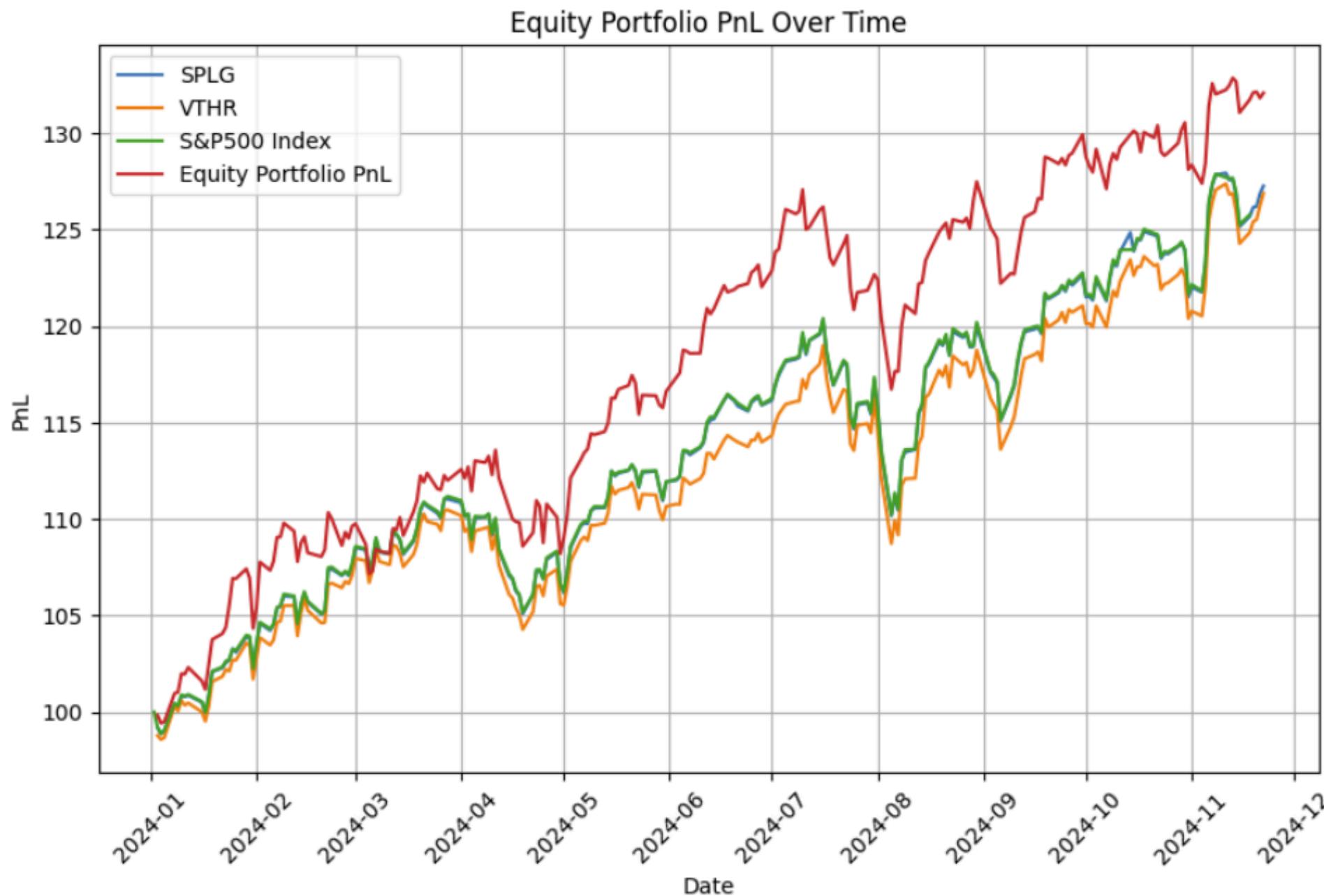
Our portfolio asset class performance in 2024:



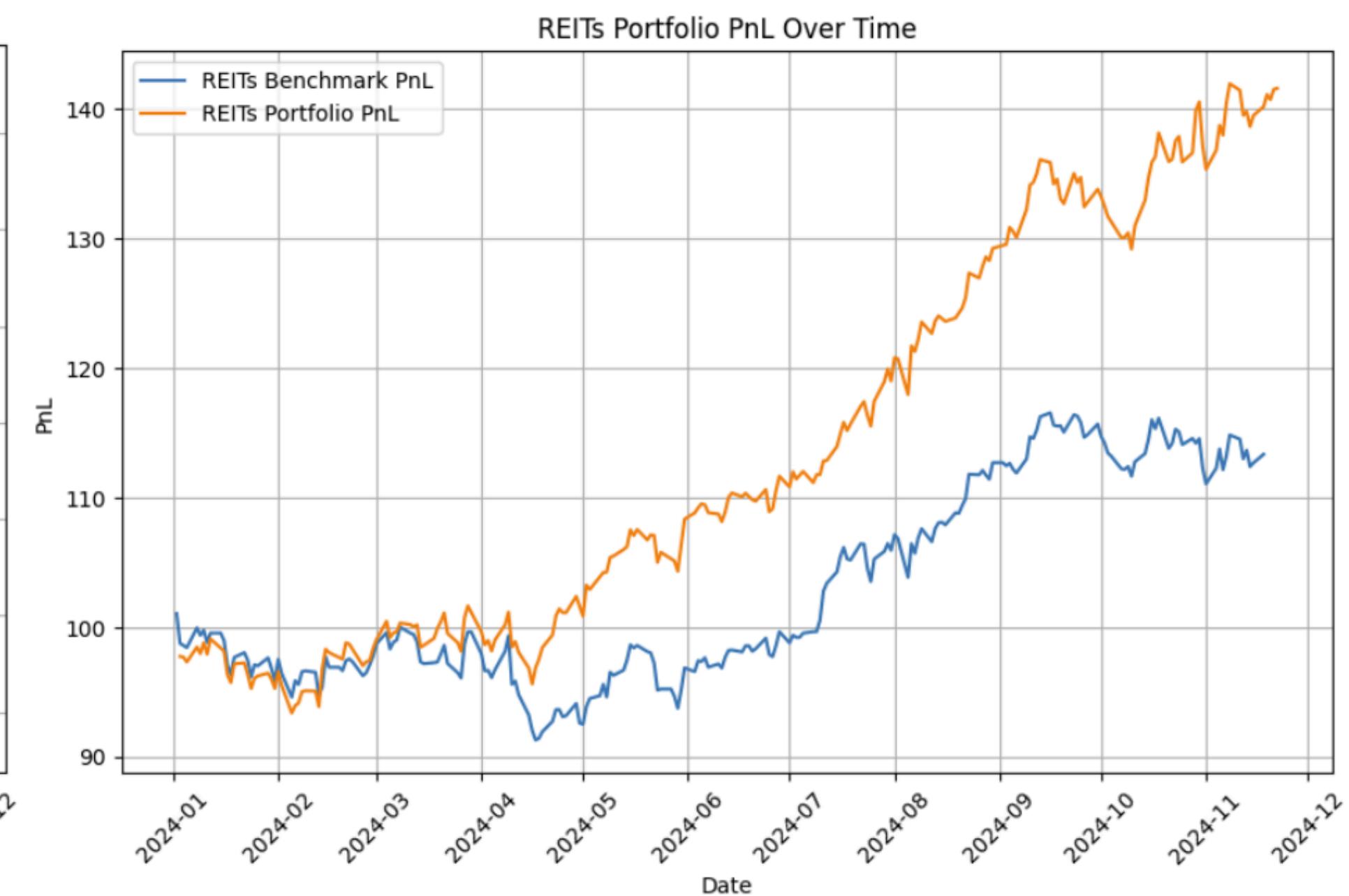
VI. PERFORMANCE EVALUATION

2. SECURITY SELECTION PERFORMANCE

Equity portfolio performance in 2024



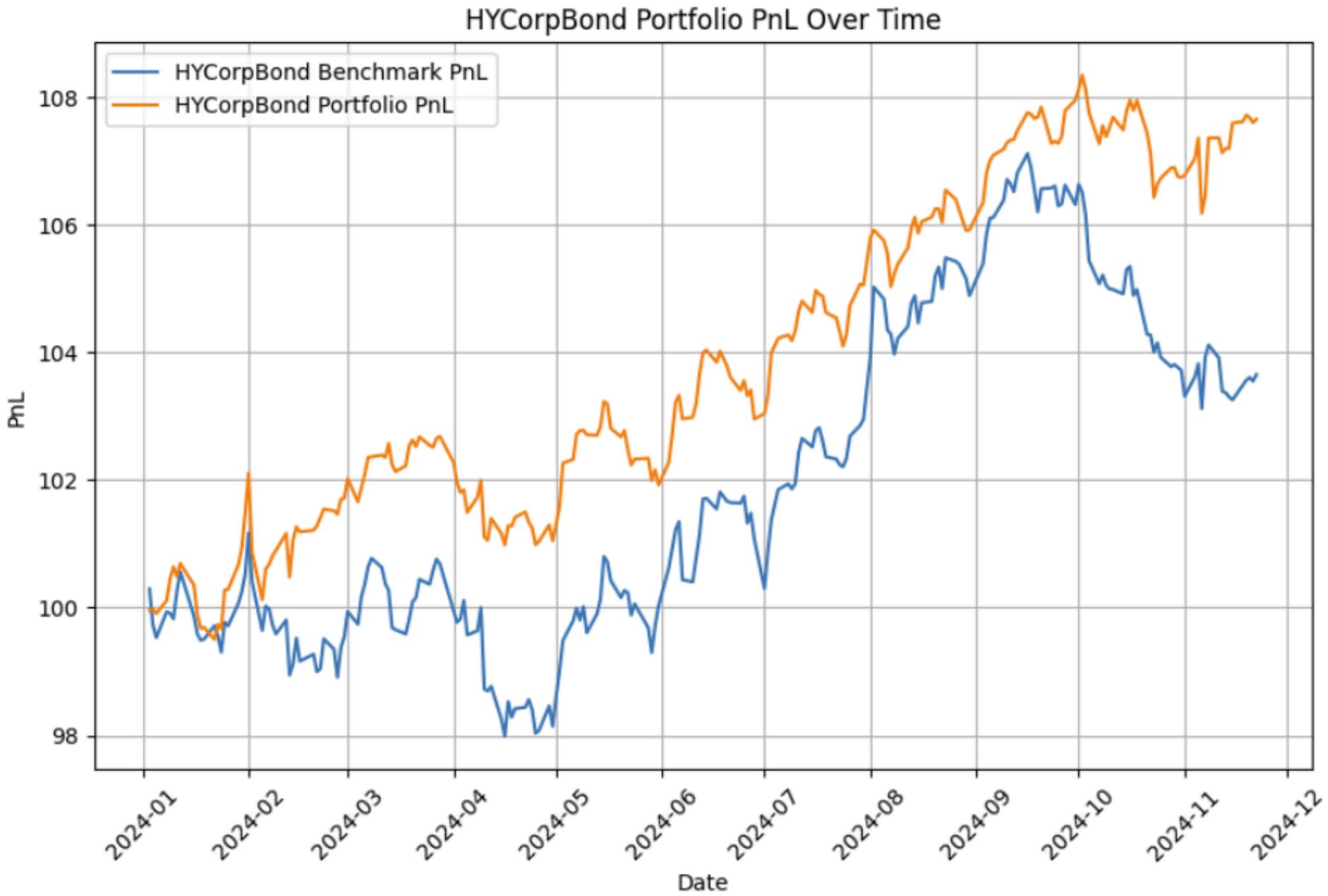
REITs portfolio performance in 2024



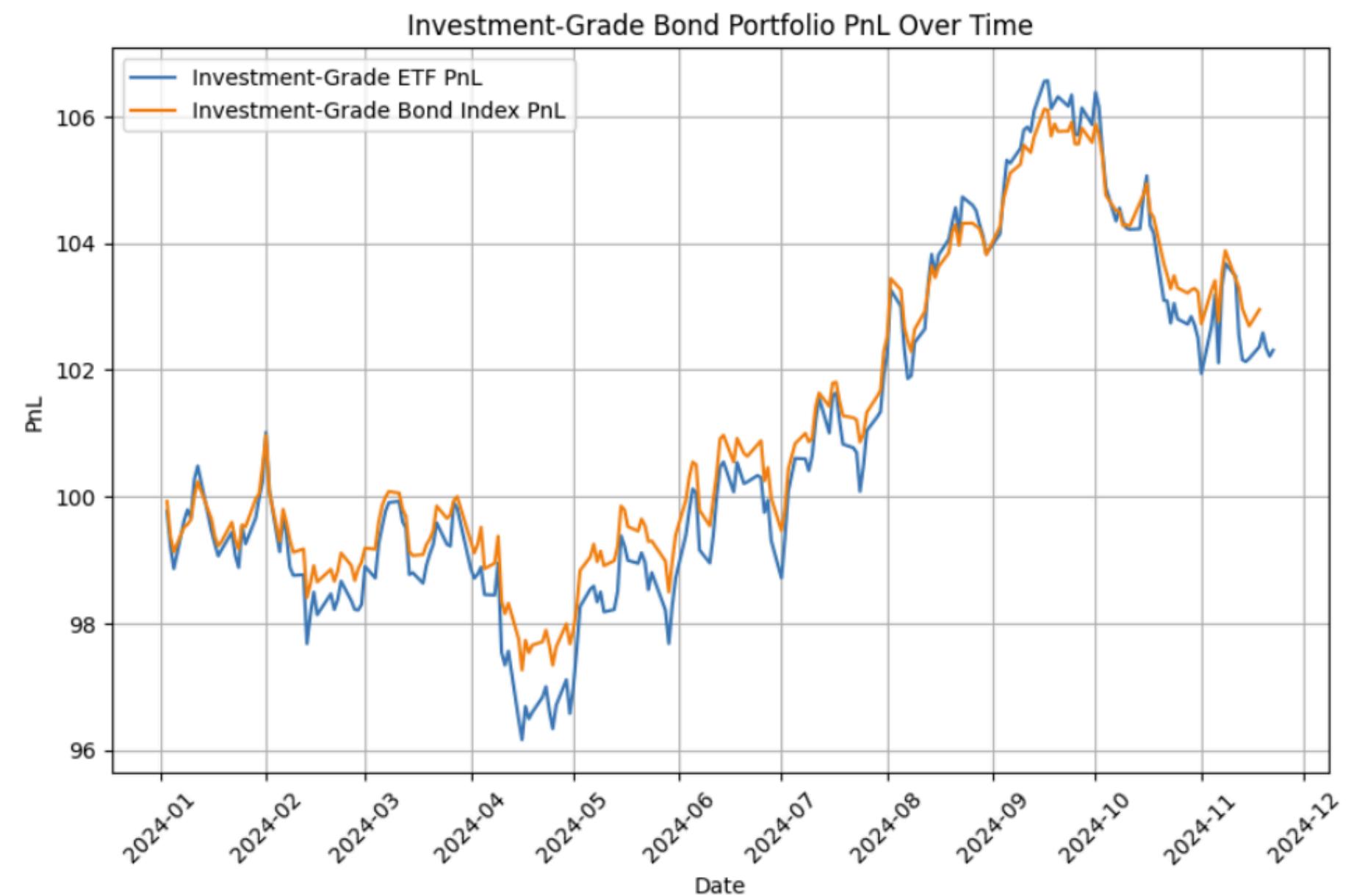
VI. PERFORMANCE EVALUATION

2. SECURITY SELECTION PERFORMANCE

High-Yield Corporate Bond ETF
portfolio performance in 2024



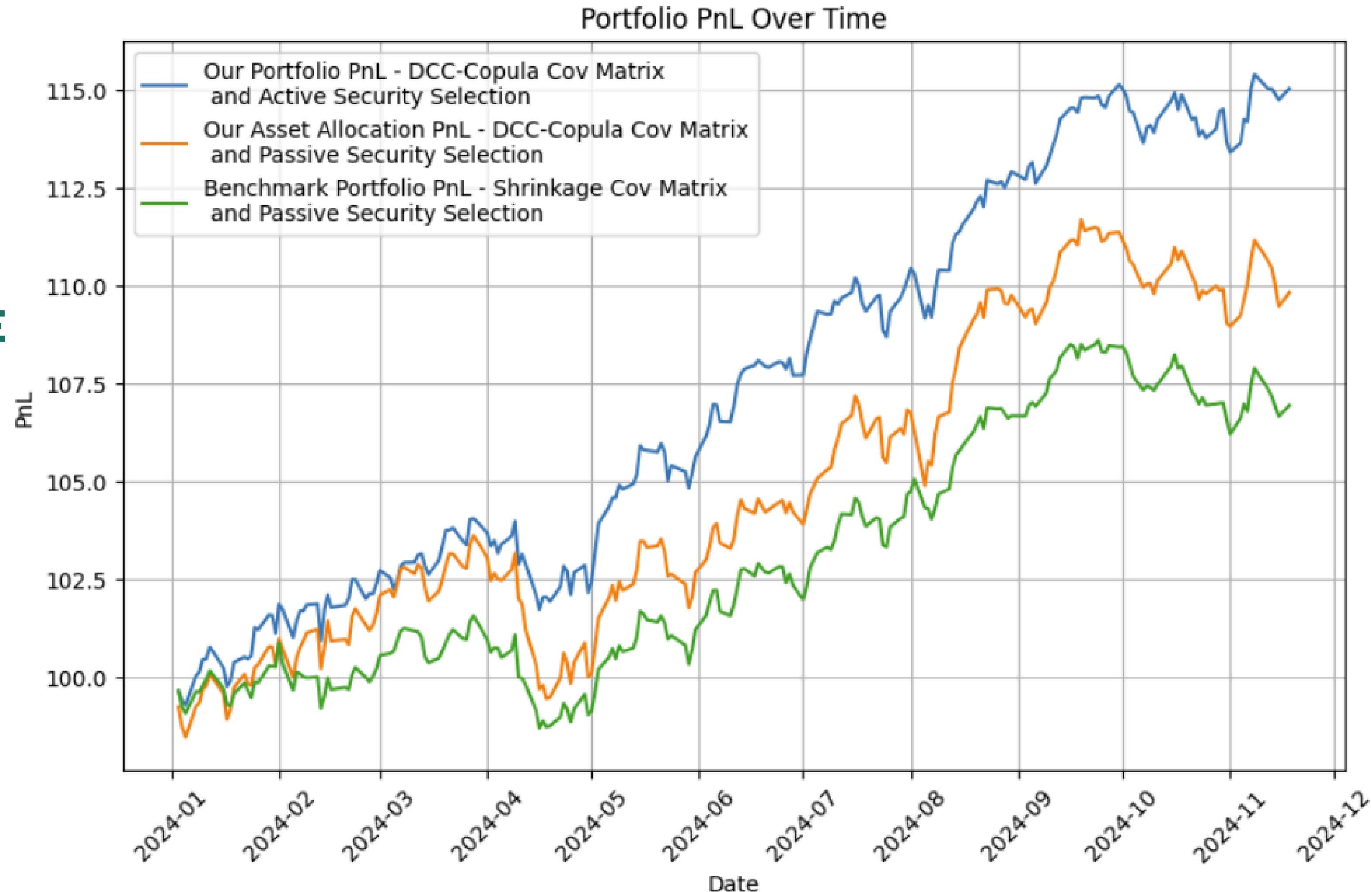
Investment-Grade Corporate Bond ETF
tracked the Index



VI. PERFORMANCE EVALUATION

3. FINAL AGGREGATED PORTFOLIO PERFORMANCE

Our portfolio substantially **outperformed** the benchmarks



VI. PERFORMANCE EVALUATION

3. FINAL AGGREGATED PORTFOLIO PERFORMANCE

Attribution Analysis

	Portfolio Weight	Benchmark Weight (Shrinkage Covariance Matrix)	Portfolio Return	Benchmark Return (Index Return)	Allocation	Selection	Interaction
Asset Classes							
Equities - S&P500	23.81%	12.23%	32.21%	25.77%	2.21%	0.79%	0.75%
Investment-Grade Bonds	24.43%	63.00%	2.54%	2.95%	1.44%	-0.26%	0.16%
High-yield Bonds	26.16%	2.02%	7.69%	3.35%	-0.81%	0.09%	1.05%
REITs	10.20%	7.57%	40.08%	12.19%	0.14%	2.11%	0.73%
Cash	15.40%	15.18%	4.58%	4.58%	0.00%	0.00%	0.00%
Total	100.00%	100.00%	15.09%	6.70%	2.99%	2.73%	2.69%

**THANK
YOU
FOR
LISTENING!**