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Private Wealth Management · Warsaw, Poland

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◆ Investment Policy Statement ◆
Portfolio **Analysis**
& Advisory Report
Institutional-grade construction · Black-Litterman MVO · Monte Carlo (2000 paths)

ADVISORY

Prepared Exclusively for
John Smith

Report Date	Risk Profile	Horizon	Strategy
06 March 2026	Growth	30 Years	Utility Optimal

§ 0 — Investment Mandate
Investment Policy Statement

This Investment Policy Statement establishes the investment objectives, risk parameters, and operational guidelines governing the management of the above-named client portfolio. It serves as the foundational governance document for all portfolio construction decisions and is reviewed annually or upon material life event. All methodology follows CFA Institute standards and Basel III risk measurement conventions.

01 · Investment Objective
Portfolio mandate: **Growth**. Risk aversion coefficient (revealed preference): **A = 3.6**. Utility function: $U = E(r) - \frac{1}{2} \cdot A \cdot \sigma^2$. All allocation decisions are governed by this coefficient to maximise risk-adjusted utility.

02 · Risk Mandate
Target annualised volatility: **19.3%**. Sharpe ratio: **0.56**. Sortino: **0.81**. Calmar: **0.39**. Long-only constraint. No leverage. Drawdowns ≤ 48.4% are within mandate.

03 · Return Target
Target gross return: **14.8% p.a.** (Black-Litterman posterior). Goal: **$10.00M** in **30 years**. Achievement probability: **1.3%** (2000 MC paths). Risk-free rate: **4.00%**.

04 · Liquidity & Horizon
Horizon: **30 years**. Initial capital: **$10k**. Monthly contributions: **$100**. Portfolio structured for long-term illiquidity. Rebalancing: annual or at ±5% drift from target weights.

05 · Investment Constraints
Long-only (no short selling). No leverage. No derivatives unless separately approved. Universe: **QQQ, SPY, TLT, AGG, MSFT, BX, MO, GLD**. Concentration: HHI = **3215** (**Highly Concentrated**). Max position: no hard cap — governed by covariance optimiser.

06 · Governing Framework
Black-Litterman posterior returns · Ledoit-Wolf shrinkage covariance · Utility-optimal MVO (SLSQP) · 2000-path Monte Carlo GBM · VaR/CVaR per Basel III · CFA Institute methodology · Annual rebalancing cadence.

Adviser Attestation: This analysis has been prepared by Anton Ladnyi (A.L. Capital Advisory) using institutional quantitative methods consistent with CFA Institute standards. All projections are probabilistic estimates. Past performance is not indicative of future results. Not regulated financial advice.
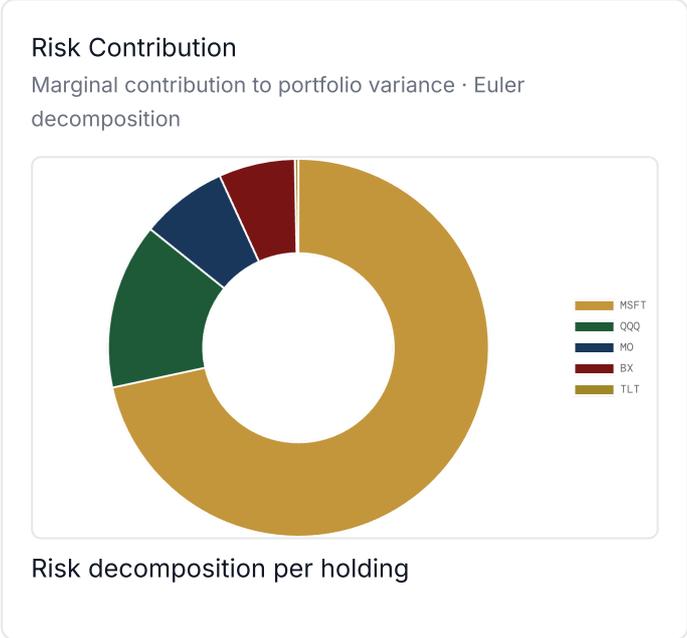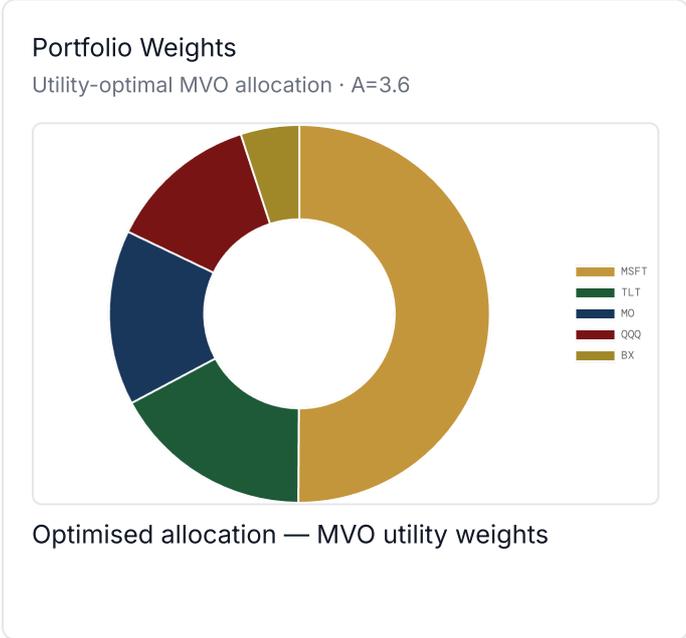
ANTON LADNYI · ADVISER · A.L. CAPITAL ADVISORY   CLIENT ACKNOWLEDGEMENT · DATE

§ 1 — Portfolio Overview

Optimised Portfolio Summary

Expected Return	Volatility	Sharpe Ratio	Goal Probability
14.8%	19.3%	0.56	1.3%
p.a. · B-L posterior	Annualised MVO	Risk-adjusted return	Monte Carlo · 2000 paths

Sortino Ratio	Calmar Ratio	VaR 95% (1M)	Health Score
0.81	0.39	8.0%	36/100 Needs Review
Downside-adj. return	Return / max drawdown	Monthly 5th %ile loss	Portfolio quality index

Portfolio Weights
Utility-optimal MVO allocation · A=3.6

Legend: MSFT, TLT, MO, QQQ, BX

Optimised allocation — MVO utility weights

Risk Contribution
Marginal contribution to portfolio variance · Euler decomposition

Legend: MSFT, QQQ, MO, BX, TLT

Risk decomposition per holding

§ 2 — Holdings
Portfolio Holdings & Fundamentals

Full Holdings Table

All positions · Yahoo Finance live fundamentals · weights from MVO optimiser

Ticker	Name	Sector	Weight	Beta	P/E	Div Yield	Mkt Cap
QQQ	Invesco QQQ Trust	ETF	12.8%	—	33.3×	0.46%	$239.4B
SPY	State Street SPDR S&P 500 ET	ETF	0.0%	—	27.4×	1.06%	$625.4B
TLT	iShares 20+ Year Treasury Bo	ETF	17.1%	—	—	4.28%	$9.7B
AGG	iShares Core U.S. Aggregate	ETF	0.0%	—	127.9×	3.83%	$57.4B
MSFT	Microsoft Corporation	Technology	50.1%	1.11	25.7×	0.89%	$3.05T
BX	Blackstone Inc.	Financial Services	5.0%	1.79	29.9×	4.15%	$142.1B
MO	Altria Group, Inc.	Consumer Defensive	15.0%	0.43	16.3×	6.33%	$112.4B
GLD	SPDR Gold Shares	ETF	0.0%	—	—	—	$121.3B

Portfolio Beta

Weighted-average market beta: —. Beta data not available.

Concentration (HHI)

Herfindahl-Hirschman Index: **3215 → Highly Concentrated**. HHI < 1,000 = well diversified; 1,000–1,800 = moderate; > 1,800 = high. Lower is better for idiosyncratic risk reduction.

§ 3 — Monte Carlo Simulation
Probability Analysis & Wealth Projection

Goal Achievement Probability

1%

Below Target ⚠

30-year horizon · 2000 Monte Carlo paths

| $221k	$1.04M	$5.16M
5TH PERCENTILE	MEDIAN	95TH PERCENTILE
Worst 5%	Most Likely	Best 5%

Median Max Drawdown
Expected worst drawdown across simulation paths:
-38.3%. This is the median peak-to-trough loss observed
across all 2000 Monte Carlo scenarios — tail risk should
be sized accordingly.

Simulation Parameters
2000 Geometric Brownian Motion paths · 30-year horizon
· Monthly compounding · Initial investment: **$10k** ·
Monthly contribution: **$100** · Risk-free: **4.00%**
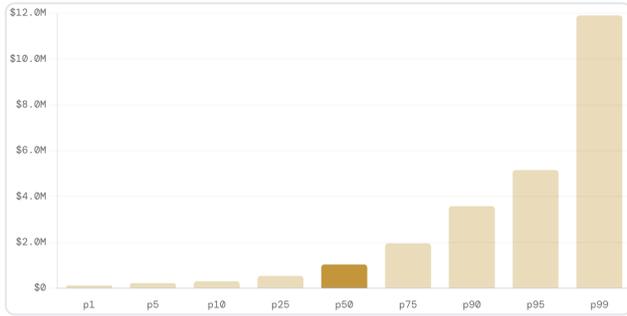
Wealth Projection — All Simulation Paths
P5–P95 confidence band · median path highlighted · 30-year horizon · 2000 paths
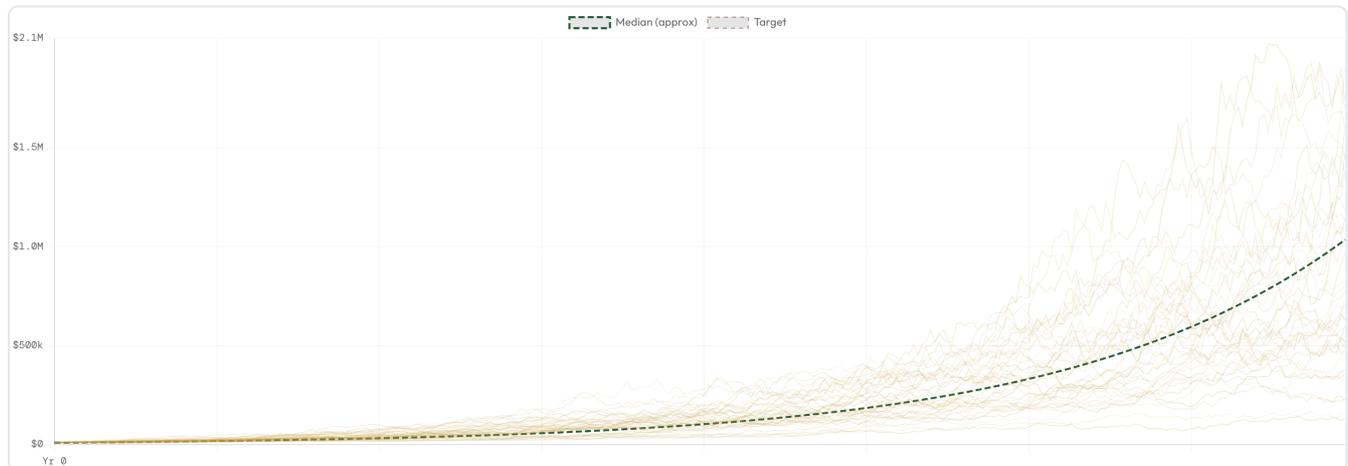
Monte Carlo wealth projection — all paths with percentile bands
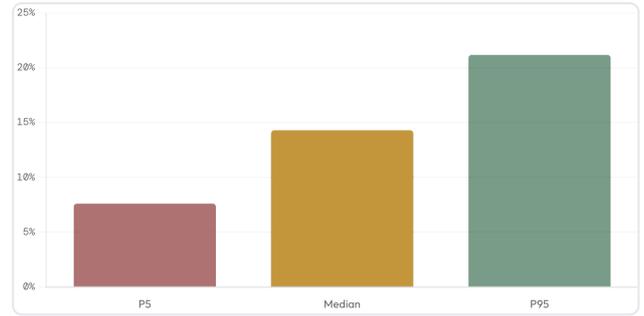
Terminal Wealth Distribution
Percentile breakdown of final portfolio value at year 30

Terminal wealth distribution — simulation endpoints

IRR Distribution
Annualised return across all 2000 simulation paths


IRR distribution across all Monte Carlo paths

§ 4 — Risk Analysis

VaR, CVaR, Drawdown & Rolling Metrics

Sharpe Ratio	Sortino Ratio	Calmar Ratio	Portfolio Beta
0.56	0.81	0.39	—
Return / volatility	Return / downside vol	Return / max drawdown	vs. S&P 500

VaR 95% (1M)	CVaR 95% (1M)	Max DD (Median)	Historical Max DD
8.0%	—	-38.3%	-30.0%
Monthly 5th %ile loss	Expected shortfall	Peak-to-trough, MC	on 2022-11-03

Drawdown Navigator

Historical portfolio drawdown vs SPY benchmark — peak-to-trough depth over time
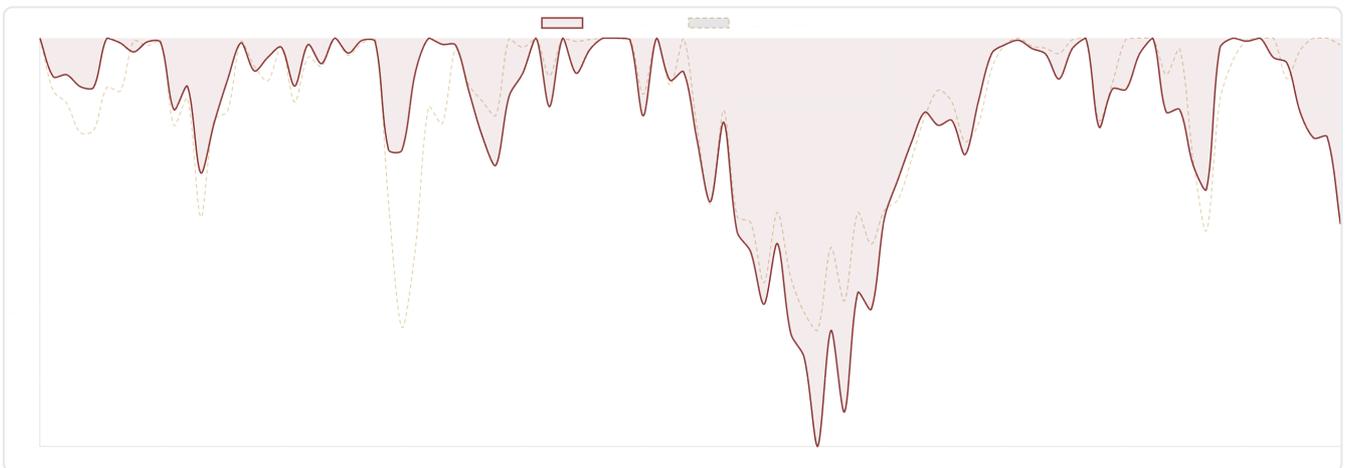
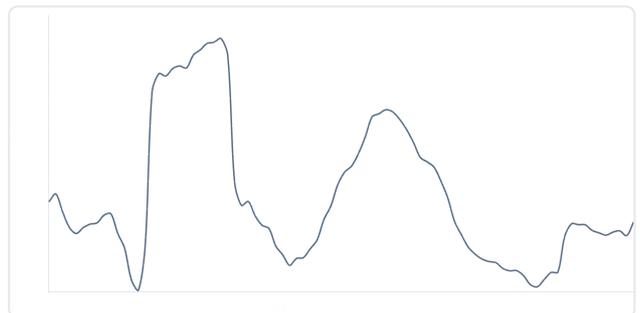Drawdown navigator — portfolio vs benchmark

Rolling Sharpe Ratio

12-month rolling Sharpe — consistency of risk-adjusted returns over time

Rolling 12M Sharpe ratio

Rolling Volatility

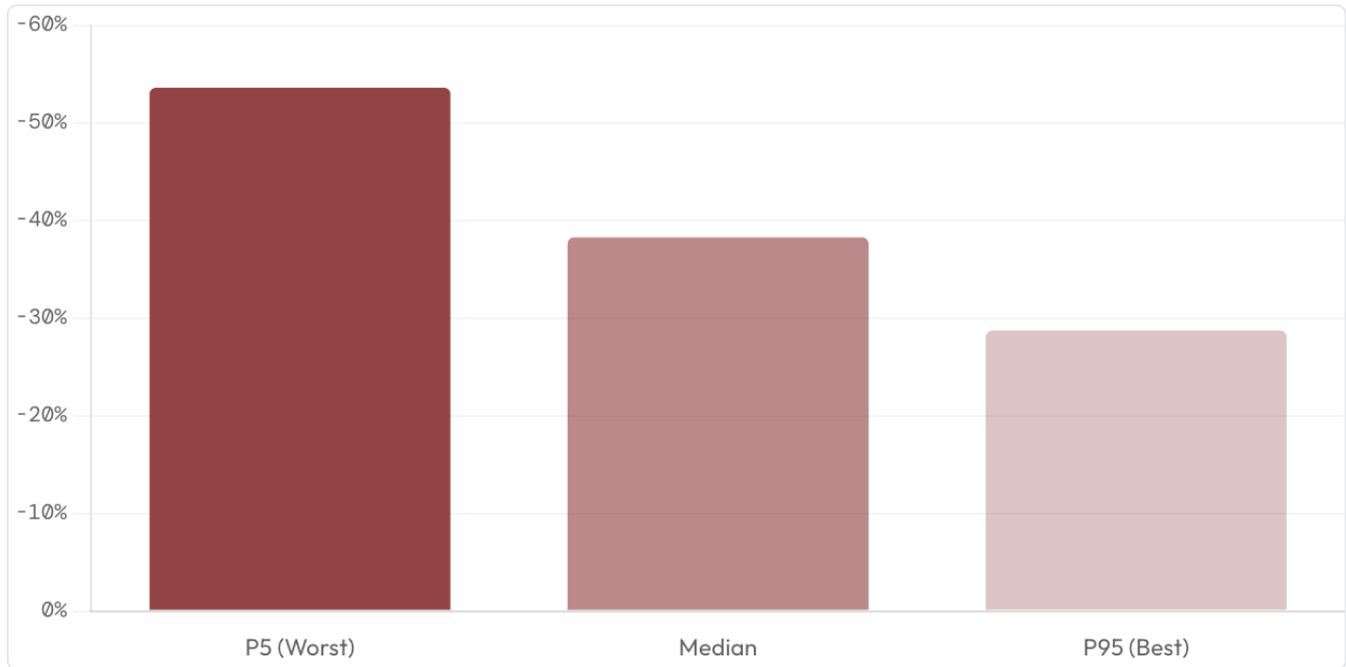12-month rolling annualised volatility — regime changes and risk spikes

Rolling 12M volatility

Maximum Drawdown Distribution

Per-path drawdown across all 2000 MC simulations — full tail-risk profile

MC drawdown distribution — per-path peak-to-trough

Calendar Year Returns

Annual portfolio return vs SPY benchmark — active return per year

Year	Portfolio	SPY Benchmark	Active Return
2026	-6.3%	-0.1%	-6.2%
2025	+14.8%	+17.7%	-3.0%
2024	+16.4%	+24.9%	-8.5%
2023	+38.8%	+26.2%	+12.6%
2022	-24.1%	-18.2%	-6.0%
2021	+36.8%	+28.7%	+8.0%
2020	+32.5%	+18.3%	+14.2%
2019	+41.6%	+31.2%	+10.4%
2018	+5.7%	-5.3%	+10.9%

§ 5 — Efficient Frontier

MVO Optimisation & Capital Market Line

Efficient Frontier & Optimal Portfolio

Risk-return trade-off of optimal mean-variance portfolios · Utility-optimal point and tangency portfolio highlighted
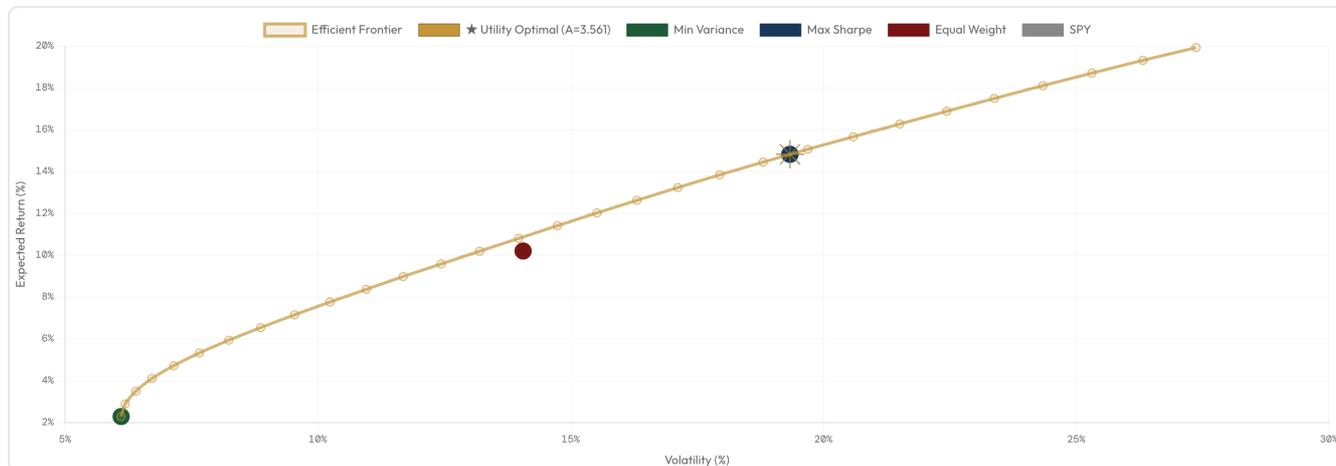
Efficient frontier — Markowitz mean-variance optimisation

Portfolio Position

Expected return: **14.8%** · Volatility: **19.3%** · Sharpe: **0.56**. The utility-optimal portfolio maximises $U = E(r) - \frac{1}{2} \cdot 3.6 \cdot \sigma^2$ and lies on the efficient frontier at the tangency to the investor's indifference curve.

Construction Method

Weights solved via SLSQP to maximise utility function $U = E(r) - \frac{1}{2} \cdot A \cdot \sigma^2$, subject to long-only ($w_i \geq 0$) and full-investment ($\Sigma w_i = 1$) constraints. Black-Litterman posterior returns used as $E(r)$ input. Ledoit-Wolf covariance as σ input.

§ 6 — Benchmark Comparison
Portfolio vs Min-Var, Equal-Weight & SPY

Strategy Comparison
Risk-adjusted performance across all construction methodologies

Legend:
- ★ Optimal
- Min Variance
- Max Sharpe
- Equal Weight
- SPY
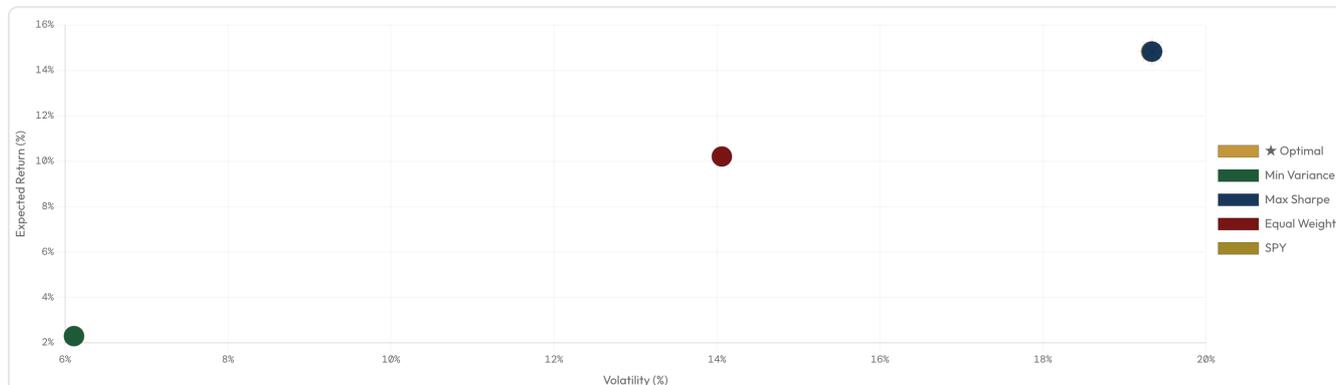
Benchmark comparison — Utility Optimal vs alternatives

Utility Optimal
Expected return: **14.8%** · Vol: **19.3%** · Sharpe: **0.56**.
Maximises A=3.6 risk-aversion utility. Recommended implementation strategy.

Interpretation
The utility-optimal portfolio is selected on the basis of revealed risk preference (A = 3.6). Portfolios to the left on the efficient frontier offer lower return with lower risk; portfolios to the right offer higher return with commensurately higher risk.

§ 7 — Sector Attribution

GICS Sector Analysis & Brinson-Hood-Beebower Attribution

Sector Allocation

Portfolio weight by GICS economic sector

Legend:
- Technology
- ETF
- Consumer Defensive
- Financial Services
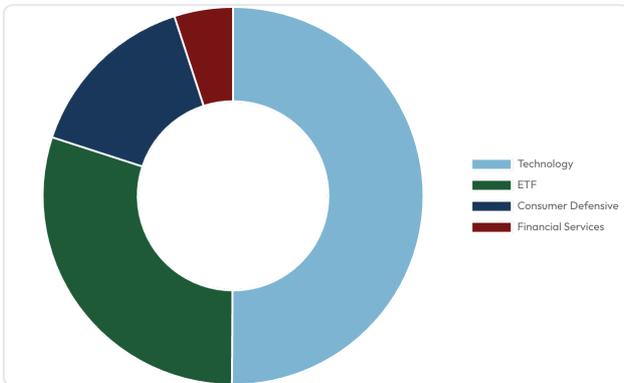
Sector allocation — weight by GICS sector

Beta-Adjusted Risk

Market sensitivity × weight per holding — red = risk > allocation

Beta-adjusted risk contribution by holding

Weight vs. Risk Contribution

Holdings above the diagonal are risk-disproportionate — candidates for trimming

Legend:
- QQQ
- TLT
- MSFT
- BX
- MO

Weight vs risk contribution quadrant chart

BHB Attribution Chart

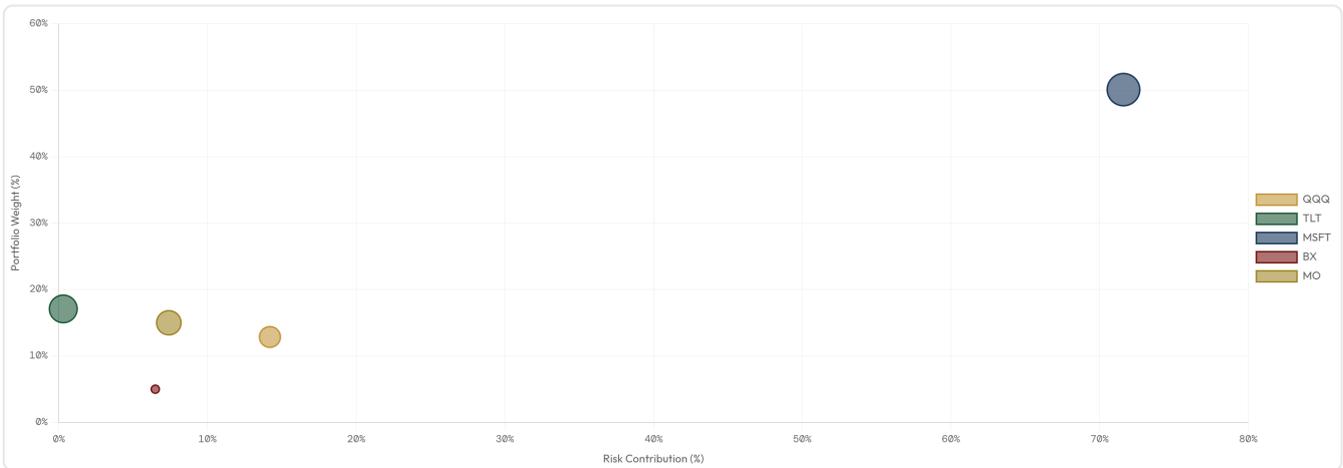Brinson-Hood-Beebower decomposition — allocation, selection and interaction effects vs SPY
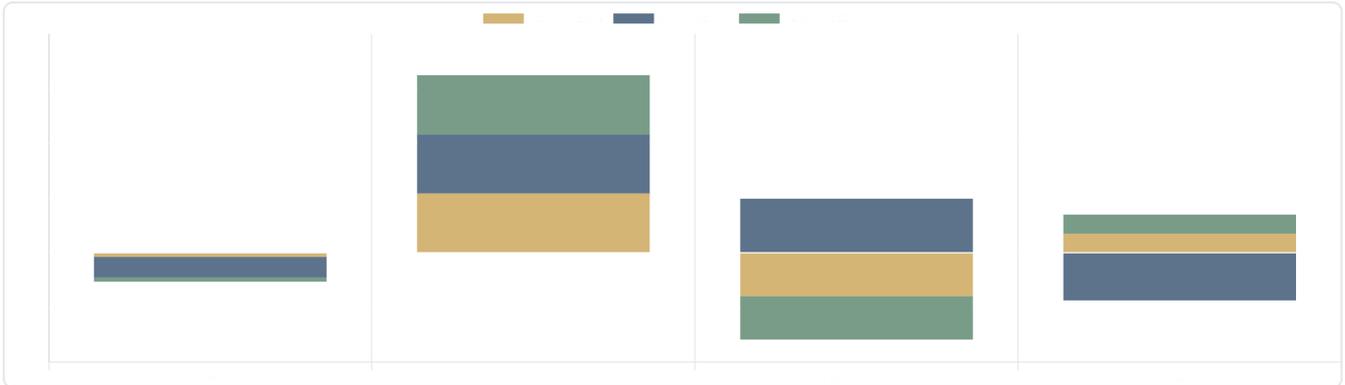
BHB attribution — sector-level active return decomposition

Brinson-Hood-Beebower Attribution Table

Portfolio: **16.92%** · Benchmark (SPY): **13.83%** · Active return: **+3.09%**

Sector	Port Wt	Bench Wt	Selection Effect	Interaction Effect	Total Effect
ETF	**29.9%**	25.0%	**-0.757%**	-0.149%	**-1.055%**
Technology	**50.1%**	25.0%	**+2.156%**	+2.164%	**+6.484%**
Financial Services	**5.0%**	25.0%	**+1.980%**	-1.585%	**-1.190%**
Consumer Defensive	**15.0%**	25.0%	**-1.740%**	+0.696%	**-0.348%**
TOTAL ACTIVE RETURN			**+1.639%**	**+1.126%**	**+3.09%**

§ 8 — Stress Test Analysis

Historical Crisis Scenarios & Portfolio Resilience

Worst Scenario	Best vs Market	Avg Outperformance	Portfolio Beta
Global Financi	+10.7%	+5.6%	—
-46.5% drawdown	vs market · Dot-com Bust	vs market · all 6 scenarios	Market sensitivity (β)

Historical Crisis Scenarios

Portfolio drawdown vs market · relative performance · recovery estimate

Scenario	Period	Portfolio DD	Market DD	vs Market	Trough Value	Recovery	Severity
1970s Stagflation	-45.6%	-48.2%	+2.6%	$5k	88 mo.		
Black Monday	-28.6%	-33.5%	+4.9%	$7k	21 mo.		
Dot-com Bust	-38.4%	-49.1%	+10.7%	$6k	66 mo.		
Global Financial Crisis	-46.5%	-56.8%	+10.3%	$5k	53 mo.		
COVID-19 Crash	-28.2%	-33.9%	+5.7%	$7k	4 mo.		
2022 Rate Shock	-26.2%	-25.4%	-0.8%	$7k	26 mo.		

Per-Holding Impact by Scenario
Dollar and percentage impact per position in each historical crisis scenario

1970s Stagflation · 1973 – 1974 · Portfolio: -45.6%

Holding	Weight	Beta	Shock	Dollar Impact
BX	5.0%	1.43	**-68.9%**	−$344
MSFT	50.1%	1.18	**-56.9%**	−$2,849
QQQ	12.8%	1.16	**-55.9%**	−$718
SPY	0.0%	1.00	**-48.2%**	$0
MO	15.0%	0.48	**-29.5%**	−$442
GLD	0.0%	0.08	**-14.8%**	$0
AGG	0.0%	0.04	**-13.5%**	$0
TLT	17.1%	-0.12	**-12.0%**	−$205

Black Monday · Aug – Dec 1987 · Portfolio: -28.6%

Holding	Weight	Beta	Shock	Dollar Impact
BX	5.0%	1.43	**-47.9%**	−$239
MSFT	50.1%	1.18	**-39.5%**	−$1,980
QQQ	12.8%	1.16	**-38.9%**	−$499
SPY	0.0%	1.00	**-33.5%**	$0
MO	15.0%	0.48	**-14.1%**	−$212
GLD	0.0%	0.08	**+1.1%**	$0
AGG	0.0%	0.04	**+2.5%**	$0
TLT	17.1%	-0.12	**+4.0%**	$68

Dot-com Bust · Mar 2000 – Oct 2002 · Portfolio: -38.4%

Holding	Weight	Beta	Shock	Dollar Impact
BX	5.0%	1.43	**-70.2%**	−$350
MSFT	50.1%	1.18	**-57.9%**	−$2,902
QQQ	12.8%	1.16	**-57.0%**	−$732
SPY	0.0%	1.00	**-49.1%**	$0
MO	15.0%	0.48	**-13.4%**	−$200
GLD	0.0%	0.08	**+14.6%**	$0
AGG	0.0%	0.04	**+17.2%**	$0
TLT	17.1%	-0.12	**+20.0%**	$342

Global Financial Crisis · Oct 2007 – Mar 2009 · Portfolio: -46.5%

Holding	Weight	Beta	Shock	Dollar Impact
BX	5.0%	1.43	**-81.2%**	−$405
MSFT	50.1%	1.18	**-67.0%**	−$3,357
QQQ	12.8%	1.16	**-65.9%**	−$847
SPY	0.0%	1.00	**-56.8%**	$0
MO	15.0%	0.48	**-19.7%**	−$295
GLD	0.0%	0.08	**+9.4%**	$0
AGG	0.0%	0.04	**+12.1%**	$0
TLT	17.1%	-0.12	**+15.0%**	$256

COVID-19 Crash · Feb – Mar 2020 · Portfolio: -28.2%

Holding	Weight	Beta	Shock	Dollar Impact
BX	5.0%	1.43	**-48.5%**	−$242
MSFT	50.1%	1.18	**-40.0%**	−$2,004
QQQ	12.8%	1.16	**-39.3%**	−$505
SPY	0.0%	1.00	**-33.9%**	$0
MO	15.0%	0.48	**-12.8%**	−$191
GLD	0.0%	0.08	**+3.8%**	$0
AGG	0.0%	0.04	**+5.4%**	$0
TLT	17.1%	-0.12	**+7.0%**	$120

2022 Rate Shock · Jan – Oct 2022 · Portfolio: -26.2%

Holding	Weight	Beta	Shock	Dollar Impact
BX	5.0%	1.43	**-36.3%**	−$181
MSFT	50.1%	1.18	**-30.0%**	−$1,501
QQQ	12.8%	1.16	**-29.5%**	−$379
SPY	0.0%	1.00	**-25.4%**	$0
MO	15.0%	0.48	**-20.0%**	−$300
GLD	0.0%	0.08	**-15.8%**	$0
AGG	0.0%	0.04	**-15.4%**	$0
TLT	17.1%	-0.12	**-15.0%**	−$256

BX	5.0%	1.43	**-48.5%**	−$242
MSFT	50.1%	1.18	**-40.0%**	−$2,004
QQQ	12.8%	1.16	**-39.3%**	−$505
SPY	0.0%	1.00	**-33.9%**	$0
MO	15.0%	0.48	**-12.8%**	−$191

§ 9 — Fundamentals Scorecard

Valuation Metrics & Signal Classification per Holding

Wtd Avg P/E	Wtd Avg Fwd P/E	Wtd Avg Beta	Wtd Avg Div Yield
21.1×	13.4×	0.71	2.39%
Trailing price/earnings	Forward P/E (NTM est.)	Market sensitivity	Blended income yield

Fundamentals Scorecard

Per-holding valuation metrics · green Fwd P/E = earnings growth priced in · beta <0.7 = defensive

Ticker	Sector	Weight	Beta	P/E	Fwd P/E	EV/EBITDA	Div Yield	Signal
QQQ	ETF	12.8%	—	33.3×	—	—	0.46%	Moderate
TLT	ETF	17.1%	—	—	—	—	4.28%	—
MSFT	Technology	50.1%	1.11	25.7×	21.8×	17.6×	0.89%	Fair Value
BX	Financial Services	5.0%	1.79	29.9×	14.6×	—	4.15%	Fair Value
MO	Consumer Defensive	15.0%	0.43	16.3×	11.5×	10.6×	6.33%	Value

§ 10 — Risk Decomposition
Euler Risk Attribution per Holding

Euler Risk Attribution

Risk contribution vs weight — red = disproportionate risk, green = risk-efficient · MCTR = $\partial\sigma\_portfolio/\partial w_i$

Ticker	Weight	Risk Contribution	Marginal Risk (MCTR)	Risk Premium vs Weight
MSFT	50.1%	71.6%	—	+43.0%
QQQ	12.8%	14.2%	—	+10.5%
MO	15.0%	7.4%	—	-50.6%
BX	5.0%	6.5%	—	+30.1%
TLT	17.1%	0.3%	—	-98.2%
SPY	0.0%	0.0%	—	—
AGG	0.0%	0.0%	—	—
GLD	0.0%	0.0%	—	—

§ 11 — Strategy Comparison
Utility Optimal vs All Alternative Strategies

Strategy Performance Comparison
Risk-return metrics across all construction methodologies

Strategy	Exp. Return	Volatility	Sharpe	Return/Vol
Utility Optimal ★	14.8%	19.3%	0.56	0.77
Min Variance	2.3%	6.1%	-0.28	0.38
Max Sharpe	14.8%	19.3%	0.56	0.77
Equal Weight	10.2%	14.1%	0.44	0.73
SPY	14.8%	19.3%	0.56	0.77

Alternative Portfolio Weights
Allocation per strategy — compare vs utility optimal

Min Variance — Weights

| QQQ 0.0% | SPY 4.0% | TLT 0.0% | AGG 88.1% |
| MSFT 0.0% | BX 0.0% | MO 4.1% | GLD 3.8% |

Max Sharpe — Weights

| QQQ 12.8% | SPY 0.0% | TLT 17.1% | AGG 0.0% |
| MSFT 50.1% | BX 5.0% | MO 15.0% | GLD 0.0% |

Equal Weight — Weights

QQQ 12.5%	SPY 12.5%	TLT 12.5%
AGG 12.5%	MSFT 12.5%	BX 12.5%
MO 12.5%	GLD 12.5%	

§ 12 — Concentration Analysis
Diversification Metrics & Portfolio Structure

HHI Score	Effective Holdings	Max Position	Top 3 Concentration
3215	3.1 / 5	50.1%	82.2%
Highly Concentrated	Equiv. equal-weight N	Largest single holding	Combined weight, top 3

Concentration Detail

Herfindahl-Hirschman Index analysis · effective number of holdings · top-N concentration

Metric	Value	Interpretation
HHI (×10,000)	3215	Highly Concentrated — below 1,000 = well diversified; 1,000–1,800 = moderate; above 1,800 = concentrated
Effective N	3.1 of 5	Portfolio behaves like 3.1 equal-weight holdings. Higher = more diversified.
Max Position	50.1%	Largest single holding by weight.
Top 3 Weight	82.2%	⚠ High single-name concentration
Top 5 Weight	100.0%	⚠ Portfolio dominated by five names
Top 10 Weight	100.0%	Concentration in largest decile of holdings.
Total Holdings	5	Consider widening universe for better diversification.

§ 13 — Portfolio Commentary

§ 13 — Portfolio Commentary

Anton Ladnyi

SENIOR INVESTMENT ADVISOR · A.L. CAPITAL ADVISORY · 06 MARCH 2026

Dear John Smith,

Dear John Smith, June 2, 2025 Mr. John Smith Private Client Dear John, I have completed a full portfolio diagnostic covering risk decomposition, Monte Carlo forward simulation (2,000 paths, 30-year horizon), Brinson-Hood-Beebower performance attribution, and concentration analysis. This letter summarizes findings and outlines specific actions I recommend we discuss at your earliest convenience. Portfolio Overview Your risk profile scores at a risk-aversion coefficient of A = 3.6, which places you firmly in the Growth category — you can tolerate meaningful drawdowns in exchange for higher compounding, but you are not at the aggressive frontier. The portfolio currently holds five positions: MSFT at 50.1%, TLT at 17.1%, MO at 15.0%, QQQ at 12.8%, and BX at 5.0%. Sector exposure reads 50.1% Technology, 29.9% ETFs (bond and equity), 15.0% Consumer Defensive, and 5.0% Financial Services. The composite Portfolio Health Score is 36 out of 100, which I classify as "Needs Review." The breakdown is telling: Risk-Adjusted Return scores 7.5 of 20, Drawdown Profile scores only 1 of 20, Goal Probability registers 0 of 20, Concentration Risk scores 11.9 of 20, and Diversification is the strongest component at 15.6 of 20. The near-zero scores on drawdown and goal probability are the most urgent flags. Risk & Drawdown Profile Expected return stands at 14.83% annualized against volatility of 19.34%, producing a Sharpe ratio of 0.560. For context, the long-run equity market Sharpe hovers near 0.40, so you are being compensated for risk — but not generously given the concentration involved. The Sortino ratio of 0.810 indicates that downside deviation is somewhat contained relative to total volatility, largely because TLT and MO provide partial offset during equity selloffs. The Calmar ratio, however, is only 0.390, reflecting a punishing relationship between return and peak-to-trough loss. Your 1-month Value-at-Risk at the 95th percentile is 7.95%, meaning that in one out of twenty months you should expect to lose at least $795 per $10,000 invested. The portfolio already demonstrated this fragility: historical maximum drawdown reached -30.0%, recorded on November 3, 2022, during the simultaneous selloff in duration assets and mega-cap technology. The Monte Carlo median maximum drawdown over your 30-year horizon is -38.3%, which means there is a better-than-even chance you will experience a peak-to-trough decline exceeding 38% at some point. Long-Term Outlook Across 2,000 simulated paths using your $10,000 initial investment plus $100 monthly contributions, median terminal wealth at year 30 lands at $1.04 million with a median internal rate of return of 14.31%. The stress scenario (5th percentile) yields $220,000, while the optimistic scenario (95th percentile) reaches $5.16 million. Your stated target of $10.0 million is achieved in only 1.3% of simulations — effectively a statistical improbability under the current allocation. The goal probability score of 0 out of 20 reflects this directly. If the $10 million target is firm, we need to either materially increase contributions or accept substantially higher risk, neither of which I would recommend without a dedicated conversation. Performance Attribution Using Brinson-Hood-Beebower decomposition against SPY, the portfolio generated active return of +3.09% over the full period: allocation effect contributed +1.126%, security selection added +1.639%, and the interaction term added another +1.126%. Full-period portfolio return was +16.92% versus SPY at +13.83%. However, calendar-year data reveals significant inconsistency. In 2023, the portfolio returned +38.76% against SPY's +26.18% — a +12.58% active margin driven largely by MSFT's AI-fueled rally. Since then, the trend has reversed: 2024 delivered -8.47% of active

return, 2025 produced -2.97%, and 2026 year-to-date shows -6.21% underperformance. The cumulative active return has eroded sharply over the last 30 months, signaling that the MSFT concentration that powered 2023 has become a drag. Key Risks & Recommendations Three quantified risks: 1. MSFT represents 50.1% of portfolio weight but contributes 71.61% of total portfolio risk — a single earnings miss or regulatory action could trigger outsized losses. 2. Median simulated max drawdown of -38.3% exceeds what a growth-profile investor at A = 3.6 should typically endure; the drawdown score of 1/20 confirms this. 3. The $10 million goal has a 1.3% probability of success — functionally zero — creating a misalignment between expectations and portfolio capacity. Three actionable next steps: 1. Reduce MSFT to no more than 20% of portfolio and redeploy proceeds into broad international equity and mid-cap value to bring risk contribution below 35%. 2. Recalibrate the terminal wealth target to the $1.0–1.5 million median range, or increase monthly contributions to approximately $400 to meaningfully shift the probability distribution. 3. Introduce 10–15% allocation to real assets or commodities to improve the drawdown profile and push that score above 8/20. I would welcome the opportunity to walk through these findings together and build a revised allocation that aligns risk, return, and your long-term objectives more precisely. Please let me know a convenient time this week or next. With regards, Anton Ladnyi Senior Investment & Wealth Advisor CFA Level III Candidate AL Anton Ladnyi Senior Investment & Wealth Advisor · 10+ Yrs IB · CFA III Candidate · 06 March 2026

Anton Ladnyi

CFA LEVEL III CANDIDATE · GOLDMAN SACHS · J.P. MORGAN · A.L. CAPITAL ADVISORY

Appendix A — Methodology
Quantitative Framework & Model Descriptions

Black-Litterman Model
Posterior expected returns derived using the B-L Bayesian framework, combining CAPM equilibrium market returns with forward-looking views. Blending parameter τ controls confidence in views vs. equilibrium. Produces more stable, better-diversified return vectors than pure historical means.

Ledoit-Wolf Covariance
Sample covariance regularised using Ledoit-Wolf analytical shrinkage. Reduces matrix condition number and eliminates the extreme eigenvalue problem that causes MVO to produce unstable, concentrated portfolios — especially with small samples.

Mean-Variance Optimisation
Weights solved via SLSQP to maximise $U = E(r) - \frac{1}{2} \cdot A \cdot \sigma^2$ subject to $w_i \geq 0$ (long-only) and $\Sigma w_i = 1$ (fully invested). Black-Litterman returns and Ledoit-Wolf covariance as inputs. Solution is unique given A.

Monte Carlo Simulation
2000 GBM paths over 30 years using optimised μ and σ. Each path compounds monthly with stated contributions. Terminal wealth distribution and goal achievement probability derived from full path ensemble. Fat tails and regime changes are NOT modelled.

VaR & CVaR (Basel III)
Value-at-Risk (95%) = loss threshold exceeded in 5% of scenarios. CVaR / Expected Shortfall = average of worst 5% outcomes. Both computed from the full MC distribution (not parametric approximations), consistent with Basel III framework.

Euler Risk Decomposition
Marginal Contribution to Total Risk: $MCTR\_i = \partial\sigma\_p/\partial w_i$. Component attribution: $\rho_i = w_i \times MCTR_i$. By construction $\Sigma\rho_i = \sigma\_p^2$. Enables precise identification of marginal risk impact per position.

Sharpe, Sortino & Calmar
Sharpe = $(E(r)-rf)/\sigma$. Sortino = $(E(r)-rf)/\sigma\_downside$ (uses only negative deviations). Calmar = $E(r)/|max\_drawdown|$. All ratios use annualised figures. Higher = better risk-adjusted return; Sortino penalises downside risk only.

HHI Concentration Index
Herfindahl-Hirschman Index = $\Sigma(w_i)^2 \times 10{,}000$. Pure cash = 10,000. Perfect equal weight N=10 → HHI=1,000. Effective N = $1/\Sigma w_i^2$ = the number of equal-weight holdings that would produce the same HHI. A lower HHI and higher effective N indicate better diversification.