

# GLASSBOX

Portfolio Optimization & Beta Hedging Tool

Introduction Guide | Version 1.0 | February 2026

## IMPORTANT DISCLAIMERS

- 1. Not Financial Advice:** Glassbox is an educational and analytical tool only. The recommendations and analysis provided are not financial advice. Always consult with a qualified financial advisor before making investment decisions.
- 2. Historical Data Limitations:** Analysis is based on historical price data. Past performance does not guarantee future results. Market conditions change rapidly, and historical correlations may break down.
- 3. Model Assumptions:** Our efficient frontier assumes normal distributions and stable correlations. Real markets exhibit fat tails, volatility clustering, and regime changes that models cannot predict.
- 4. Beta Calculation Risk:** Beta is calculated from historical data and may not reflect future market sensitivity. Market betas change during crises and tail events.
- 5. Hedging Costs Not Included:** Recommendations do not account for transaction costs, slippage, margin interest, or commissions. Actual costs may significantly impact returns.
- 6. Data Quality:** While we use Yahoo Finance data, errors in price data, corporate actions, or adjustments may occur. Verify critical data independently before trading.
- 7. Use at Your Own Risk:** Trading and investing carry substantial risk of loss. Use Glassbox's recommendations at your own discretion and risk tolerance.

# What is Glassbox?

Glassbox is a modern portfolio optimization and beta hedging tool designed for individual investors, financial advisors, and quantitative analysts. It helps you discover optimal asset allocations, understand market exposure, and implement hedging strategies.

## Three Core Features:

- 1. Efficient Frontier Analysis** — Visualize the risk-return tradeoff and identify optimal portfolios (GMV, Max Sharpe, Target).
- 2. Beta Calculation** — Understand your portfolio's sensitivity to S&P 500 market movements.
- 3. Hedging Recommendations** — Get specific sizing for market-neutral or target-beta positions using SPY or ES futures.

## Key Concepts

### Efficient Frontier

The efficient frontier is the set of optimal portfolios offering the highest expected return for a given risk level. Three key portfolios:

- **Global Minimum Variance (GMV):** Lowest possible volatility. Good for conservative investors.
- **Maximum Sharpe Ratio:** Best risk-adjusted returns. Optimal for most investors.
- **Target Portfolio:** Any custom allocation matching your specific risk/return target.

### Beta

Beta measures portfolio sensitivity to S&P 500 movements. Beta = 1.0 means portfolio moves with the market. Beta = 1.5 means 50% more volatile than the market.

### Hedging

Reduces market exposure by shorting SPY (ETF) or ES (futures). For example, a beta-1.5 portfolio requires shorting specific amounts of SPY to achieve market-neutral exposure (beta = 0).

# How to Use Glassbox

## Step 1: Select Assets

Enter your target stocks (e.g., AAPL, MSFT, NVDA). SGOV is automatically included as a risk-free asset. Specify quantities you own or plan to own.

## Step 2: Run Analysis

Click "Analyze" to fetch historical data (2 years by default) and calculate optimal portfolios. Analysis completes in 10-30 seconds.

## Step 3: Review Results

- Efficient Frontier Chart shows risk vs. return. Your current portfolio is marked on the chart.
- GMV Portfolio displays lowest-risk allocation and expected performance.
- Max Sharpe Portfolio shows best risk-adjusted returns and asset weights.

## Step 4: Consider Hedging

Review your portfolio beta and hedging recommendations. Short the recommended SPY shares or ES contracts to achieve zero market exposure or custom target beta.

## Step 5: Save & Track

Save analysis to compare multiple portfolio strategies over time.

# Known Limitations

- **Historical Data Only:** Correlations and volatility may change significantly.
- **No Transaction Costs:** Real trading involves commissions, spreads, and taxes.
- **Assumes Normal Distributions:** Real markets exhibit extreme events that models underestimate.
- **Rebalancing Not Modeled:** Maintaining optimal weights requires periodic rebalancing with costs.
- **No Fundamental Analysis:** Purely statistical. Does not assess company fundamentals or strategic risks.
- **Limited Time Horizon:** Structural market changes may invalidate recommendations.

## Ready to Get Started?

1. Visit [glassbox.io](https://glassbox.io) and click "Start Analysis"
2. Enter your target tickers and quantities
3. Review your efficient frontier and optimal allocations
4. Save your analysis for future reference

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