

# Axioma Portfolio Optimizer

## The most flexible portfolio-construction tool on the market

Axioma Portfolio Optimizer supports a wide range of investment management approaches, from quantitative to fundamental. With virtually limitless objectives and an equally unlimited range of constraints, Axioma Portfolio Optimizer delivers maximum flexibility to model even the most complex strategies.

Plus, Axioma Portfolio Optimizer incorporates a key unique feature: our patented Axioma Alpha Alignment methodology prevents the risk underestimation common to optimizers, while effectively managing uncertainty with Axioma's Robust Optimization technology. And with its open platform, clients have the freedom to choose any combination of Axioma Robust Risk Models and/or third-party and internal risk models for their portfolio construction process.

**Flexible is better...**

# Axioma Portfolio Optimizer

## For index-tracking portfolios...

- Take advantage of flexible options for risk control.
  - Minimize the tracking error of your portfolio in the objective or place a hard limit on tracking error using a risk constraint.
  - Use more than one risk model to incorporate several perspectives on risk.
  - Include risk elements that use more than one benchmark or model portfolio.
- Incorporate all the transaction-related costs that impact performance. The transaction cost types available in the optimizer can be used in any combination to accurately reflect overall costs.
  - Capture market impact using non-linear market-impact models (quadratic, 3/2, and 5/3 powers) or a piecewise-linear approximation.
  - Use the fully integrated Goldman Sachs Shortfall Model.
  - Include commissions and brokerage fees using linear costs.
- Place explicit limits on trading activity.
  - Limit overall portfolio turnover or limit turnover of a set of assets.
  - Place asset-specific limits on trading; for example, limit trade size to a fraction of average daily volume.
- Control portfolio beta using Axioma-provided historical betas, predicted betas computed relative to any benchmark you choose, or betas you supply.
- Limit the number of names held or traded.

## For actively managed portfolios...

In addition to the risk and transaction cost controls available for passive portfolio management, the modeling library contains many options designed to get the most from your alpha signal.

- Augment your risk control using the Alpha Factor. The Alpha Factor compensates for components of your alpha signal that are not included in the risk model, providing more accurate predicted risk estimates.
- Limit risk contributions at the factor or asset level.
- Use Robust Optimization to explicitly incorporate uncertainty in your alpha estimates.
- Incorporate additional tilts in your objective. Tilts can be implemented on any factor, including risk factors, factors from one of Axioma's factor libraries, or user-supplied factors.
- Prevent small positions and small trades with threshold constraints.

## For long/short portfolios...

Manage your long/short portfolio, create a hedging basket, or create an overlay using Axioma's extensive set of options for long/short optimization.

- Control the long, short, and net exposure to any factor, including user-defined factors.
- Fix the portfolio leverage or let the optimizer select the best leverage value within a range you specify.
- Limit the ratio of long to short holdings in the total portfolio or over any subset of assets.
- Capture trading costs unique to long/short portfolios.
  - Include asset-specific borrowing costs to capture differences in the short rebate resulting from holding a short position.
  - Include asset-specific short sell costs to capture costs associated with taking a short position.
- Limit short selling at the asset, group, or portfolio level.
- Prevent short positions in "hard to borrow" assets.
- Limit the number of assets held on the long and short side separately.

## For global portfolios...

Global portfolios present many challenges for optimizers. Asset universes are larger, there are often multiple assets in the universe from a given issuer, global risk models contain many more factors, and risk and exposure need to be managed over more dimensions.

- Incorporate risk from the currency perspective of your choice.
- Control exposures to countries and currencies, in addition to sectors, industries, and styles.
- Accurately incorporate active specific risk for portfolios that hold multiple lines from the same issuer using Axioma's Issuer Specific Covariance.
- Track a benchmark holding foreign ordinaries by holding depository receipts.
- Control holdings by issuer.
  - Include "issuer bet" constraints that aggregate asset holdings by issuer.
- Control trading by issuer:
  - Limit the total buys and sells by issuer.
  - Prevent simultaneous buying and selling of assets from the same issuer.
- Capture ticket charges for buys, sells or all transactions. Ticket charges can vary by country, exchange or on an asset-by-asset basis.
- Set round lot values by country, exchange or individual asset.

# The Superior Features of Axioma Portfolio Deliver Superior Performance

## Modeling flexibility provided by powerful optimization algorithms...

Axioma Portfolio uses Second Order Cone Programming (SOCP), a state-of-the-art approach capable of solving complex optimization problems exactly and efficiently. With Axioma Portfolio, you can move beyond simple mean-variance optimization scenarios to construct models that accurately capture all the complexities of your investment process.

## An open platform...

The Axioma Portfolio platform is completely open. Use content from Axioma, a third party or your own research team to power your construction process.

## Incorporate ETFs, futures and other composite instruments...

- Utilize integrated content from Axioma or create your own custom asset compositions.
- Take advantage of full look-through to accurately control portfolio risks.
- Control total exposure at the asset or factor level resulting from holding a combination of individual stocks and ETFs or futures.

## Diagnose infeasibilities quickly and easily with the Constraint Hierarchy...

Axioma Portfolio's Constraint Hierarchy provides a comprehensive approach to dealing with infeasibilities. Simply provide a priority for each constraint and when a conflict between constraints occurs, the Optimizer will provide a solution that is as close as possible to satisfying all the constraints. If a constraint is violated, the constraint with the lowest possible priority is always chosen.

## Use Constraint Attribution to understand the costs of your constraints...

Axioma's Constraint Attribution provides a dashboard view of the impact of individual constraints, objectives or groups of constraints on the objective function value (usually portfolio return) in your strategy. This tells you which elements of your strategy have an overall impact and which do not. It also provides a relative measure of the potential for improving the objective by relaxing different constraints.

## Explore strategy trade-offs with the Frontier...

Frontier optimization explores the impact of varying either a constraint limit or an objective term weight. Used in conjunction with Constraint Attribution, it enables the user to validate the impact of relaxing constraints in the strategy. Objective frontiers can be used to create a classical mean variance frontier or to explore trade-offs, such as return vs. transaction costs or risk vs. tax liability. The Frontier automates the execution of a series of rebalancings covering a range of strategy settings. It provides a consolidated view of the results for each rebalancing enabling the user to select the optimum trade-off.

## Evaluate small changes to the optimized portfolio with the Buy/Sell Editor...

The Buy/Sell Editor enables the user to evaluate the impact of changes to the portfolio holdings or optimized trade list. These changes can be created manually or by an automated process external to the Optimizer. The Buy/Sell Editor provides an easy-to-use interface for specifying these changes and evaluating their impact on the characteristics of the resulting portfolio. All portfolio analytics are accessible for portfolios created using the Buy/Sell Editor.

## Flexible backtesting...

Add the Axioma Backtester module and utilize all the model building flexibility in the Optimizer for time series simulations. Like the Optimizer, the Backtester is an open platform enabling you to use content from any source you choose in your backtest analysis.

## Automate your portfolio construction processes...

The execution of large batches of portfolio rebalancings can be automated and scheduled to take place at your convenience. Portfolios can share a common strategy, or each portfolio can have a unique set of optimization settings.

Further customization and automation can be accomplished using one of Axioma Portfolio's API interfaces. In addition to the GUI, there are APIs in C++, Java, MATLAB, and R. There is also an XML-based interface that enables easy integration with existing systems via a command-line interface.

## Minimum system requirements...

Axioma Portfolio runs on Windows 200x, XP, or Windows 7. A Pentium 4 or better processor is recommended. For best performance, 4GB or more of RAM is recommended.

For more information about Axioma  
please contact [sales@axioma.com](mailto:sales@axioma.com)  
or call us.

United States and Canada: +1 212-991-4500  
Europe: +44 (0)20 7856 2424  
Asia: +852-8203-2790



**Flexible is better.®**

**Axioma, Inc.** is the leading provider of innovative risk-management and portfolio-construction solutions to financial institutions worldwide. With an emphasis on innovation, outstanding service and open-platform technology, Axioma gives its clients more choice, greater flexibility and increased performance. Founded in 1998, Axioma is headquartered in New York, with offices in Atlanta, Geneva, Hong Kong, London, San Francisco and Singapore.