

- ✓ Axioma Portfolio Optimizer™
- ✓ Axioma Portfolio Analytics™
- ✓ Axioma Risk Models™
- ✓ **Axioma Risk Model Machine™**

# AXIOMA RISK MODEL MACHINE™

## Customize risk models to align with your investment process

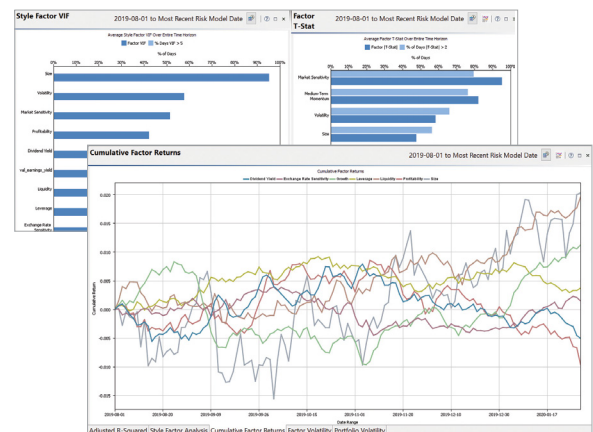
**AXIOMA RISK MODEL MACHINE** is a breakthrough tool that allows you to build custom risk models easily.

Because the models are tailored to your own investment process, custom risk models help you achieve enhanced results. By aligning the factors in the risk model with the factors used in the returns model, unintended risk exposures are avoided.

Managers are also better able to provide improved transparency into their investment process by showing where and how they add value to the mandate while researchers can gain valuable insights into the performance of the individual components of their particular investment process.




Custom risk models built with the Axioma Risk Model Machine (RMM) are used extensively by both fundamental and quantitative firms, from some of the industry's largest institutions to sophisticated boutiques. RMM is flexible, powerful and easy-to-use tool that provides users with a competitive edge in risk forecasting, portfolio construction, client reporting and alpha research for a broad range of investment processes.

Axioma Risk Model Machine's features include onscreen analytics for testing your custom risk models.



Qontigo's suite of portfolio construction tools help portfolio managers quickly and accurately implement their investment strategies.

## What is the Axioma Risk Model Machine?

 <p><b>CUSTOM SOLUTIONS</b></p>	<ul style="list-style-type: none"> <li>RMM brings together Axioma software, Axioma Equity Factor Risk Models and Axioma Factor Libraries into a unique and powerful tool that enables you to build customized risk models tailored to your investment process</li> </ul>
 <p><b>INNOVATIVE METHODOLOGIES</b></p>	<ul style="list-style-type: none"> <li>RMM incorporates innovative methodologies and techniques used in our time-tested risk model production system</li> <li>The Qontigo Research Team has extensive experience developing innovative industry-leading methodologies for constructing risk models</li> </ul>
 <p><b>TAILORED RISK MODELS</b></p>	<ul style="list-style-type: none"> <li>RMM gives you the ability to combine our experience with your own proprietary expertise, all within a fully validated and proven approach to model construction</li> <li>Customized risk models can be used directly with Axioma software or with your own in-house analytical framework</li> </ul>

# Custom Risk Models with RMM

An off-the-shelf risk model is by definition a compromise. Off-the-shelf models must perform well across a broad range of portfolios resulting from diverse construction processes. In contrast, a custom risk model built with RMM and tailored specifically to your process will improve risk-adjusted performance, prevent unintended risk-taking, enhance your internal and external reporting, and refine your alpha research process.

## What are the key benefits?

### 1 Improve the accuracy of portfolio risk forecasts

Unlike custom risk models, off-the-shelf models do not “see” the risk resulting from exposures to alpha factors that are not part of the risk model. A standard model may also use an industry classification different from your own, and may estimate risk for a much broader universe than the one in which you are interested. Custom risk models enable you to understand the factor exposures in your portfolio, catch your industry bets and focus on risk behavior specific to your investable universe.

### Construct more efficient portfolios

- 2 A custom risk model allows you to allocate risk to factors you believe will outperform and avoid taking risk where you do not have a view, to incorporate your own industry classification to fully align your construction and alpha-building processes, and to focus your risk budgeting process on the universe of assets you care about.

### 3 Communicate your investment approach more effectively

A custom risk model allows you to better understand what is driving your portfolio returns. Risk and performance analyses created using a custom risk model identify all the “bets”—exposures in the portfolio—you are taking, and calculate returns for all those exposures.

### 4 Gain insight into the performance of your alpha signals

With a custom risk model, you can validate alpha factor performance using regression-based returns incorporating all the risk factors—then view the historical patterns of these “pure” factor returns and understand their long-term and short-term risk-adjusted return profile.

## Why use RMM to build custom models?

### 1 Avoid wasting time and resources cleaning data

Use our high-quality risk models and factor library content as the starting point for creating your own risk models.

### 2 Test and refine your risk models before you deploy

In addition to high quality content and advanced model-building algorithms, RMM provides comprehensive diagnostic reports and interactive analytics views to assess the quality of your custom risk model.

### 3 Benefit from state-of-the-art processes

Leverage the proven algorithms created by the Qontigo Research Team to build Axioma Factor Risk Models.

### 4 Let it flow

With a custom risk model, you can validate alpha factor performance using regression-based returns incorporating all the risk factors—and use custom risk models in both production and research workflows. You can easily access custom risk models from all of Axioma’s portfolio management software modules.

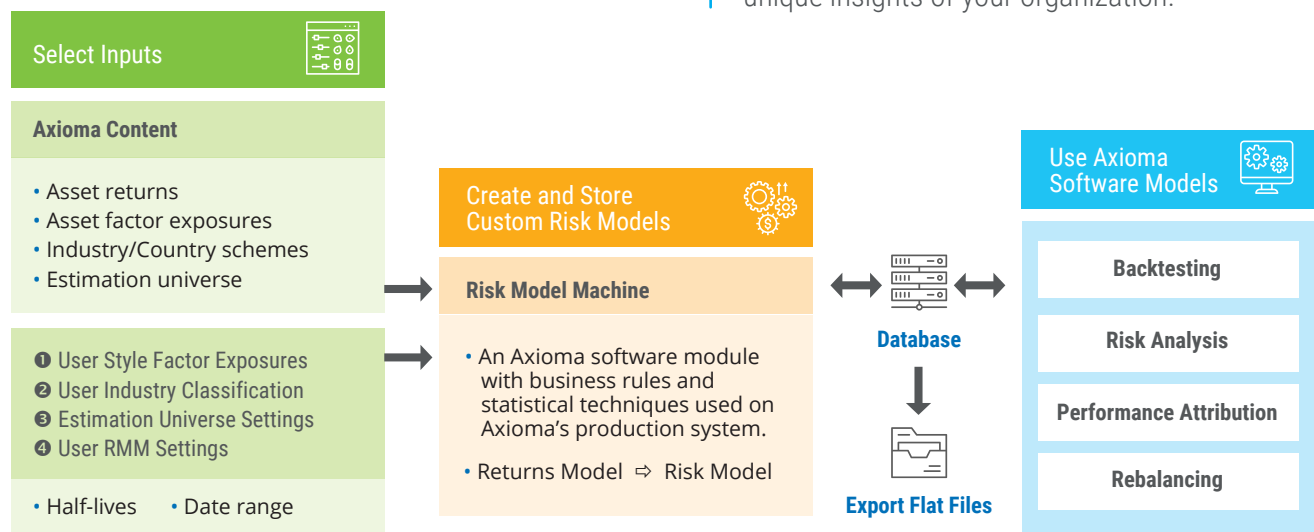
Custom risk models enable you to build better portfolios and to gauge more accurately the performance and risks of your investment approach. Period.

## How does RMM work?

- > The locally deployed RMM software builds new risk models from the ground up by combining Axioma risk model content with your data. You select an Axioma Factor Risk Model to customize, leveraging our expertise in creating, managing and delivering content — before selecting parameters to customize with RMM.
- > For statistical models, RMM uses Asymptotic Principal Components factor analysis to estimate asset factor exposures and factor returns where users select the number of systematic factors

- > For fundamental models, RMM runs daily cross-sectional returns regressions over a specified time period to estimate factor returns, then builds a custom risk model each day using these new factor returns, new specific risk estimates, and the pre-specified asset factor exposures

Axioma Risk Model Machine gives you the power to build risk models tailored for your firm by combining our research and exhaustively tested model engine with the unique insights of your organization.



### How can I access the Axioma Risk Model Machine?

The Risk Model Machine is deployed on your PCs. You have full control over the environment that runs RMM and do not need to send sensitive data off-site when using it.

### Where can I use custom risk models built with RMM?

Custom risk models generated with the Risk Model Machine are fully compatible with Axioma Portfolio Optimizer, Axioma Portfolio Backtester, and Axioma Portfolio Analytics. The models can also be exported to a common file format for use with third-party software.

### Can I automate production of custom risk models built with RMM?







After identifying a custom risk model that meets your objectives, you can use a “catch up” capability to easily update it with the latest inputs. These model updates can be scheduled for a more streamlined workflow.

### What analytics are available for testing my custom risk model?

With a custom risk model, you can validate alpha factor performance using regression-based returns incorporating all the risk factors — and then view the historical patterns of these “pure” factor returns and understand their long-term and short-term risk-adjusted return profile

- > Measure the explanatory power of your model through time series views of its adjusted R2
- > Assess the significance of individual factors by viewing their T-statistics
- > Detect co-linearity between factors using the Variance Inflation Factor
- > Compare your model's risk predictions with realized risk levels for both factors and portfolios
- > View time series plots of factor returns and factor volatilities
- > Compare your model with our standard models

## What aspects of the Axioma Equity Factor Risk Models are customizable?

	<b>ESTIMATION UNIVERSE</b>	<ul style="list-style-type: none"> <li>• Limit the estimation universe to a single sector or a subset of the sectors</li> <li>• Limit the estimation universe with a market cap cutoff to create a small cap model</li> <li>• Limit the estimation universe to any set of assets you choose: for example, a benchmark, your investable universe or an ESG universe</li> </ul>
	<b>COVERAGE UNIVERSE</b>	<ul style="list-style-type: none"> <li>• Limit the coverage universe to any set of assets you choose, such as a benchmark, your investable universe or an ESG universe</li> </ul>
	<b>INDUSTRIES</b>	<ul style="list-style-type: none"> <li>• Use Axioma's GICS-based industry classification or provide your own</li> </ul>
	<b>STYLE FACTORS</b>	<ul style="list-style-type: none"> <li>• Select any combination of "style" factors when customizing a fundamental model. These may include traditional style metrics as well as macroeconomic or ESG factors</li> <li>• Use factors from the Axioma Risk Models, factors from an Axioma-provided factor library, factors from a third-party provider, or proprietary factors you provide</li> </ul>
	<b>MODEL RESPONSIVENESS</b>	<ul style="list-style-type: none"> <li>• Control the model responsiveness and align it with your investment horizon by setting the model half-lives for factor correlations, factor volatilities and specific risks</li> </ul>
	<b>LINKED MODELS</b>	<ul style="list-style-type: none"> <li>• Custom risk models can be linked together over time, which allows the number of style factors, industries or countries in the model to be increased or reduced. For example, you can include or exclude style factors to reflect different market regimes, add or remove emerging market countries and change industry classification schemes.</li> </ul>

### Customization Options

#### FUNDAMENTAL RISK MODELS

Style factors	<ul style="list-style-type: none"> <li>• Add your own style factors</li> <li>• Remove or customize Axioma style factors</li> </ul>
Industry classification	<ul style="list-style-type: none"> <li>• Replace the Axioma industry classification with your own</li> </ul>
Estimation universe	<ul style="list-style-type: none"> <li>• Limit by sector membership</li> <li>• Limit by market cap cutoff</li> <li>• Limit to any set of assets</li> </ul>
Half-life parameters	<ul style="list-style-type: none"> <li>• Control the model responsiveness</li> </ul>

#### STATISTICAL RISK MODELS

Style factors	<ul style="list-style-type: none"> <li>• Specify the number of systematic factors to estimate</li> </ul>
Industry classification	<ul style="list-style-type: none"> <li>• Limit to any set of assets</li> </ul>
Estimation universe	<ul style="list-style-type: none"> <li>• Control the model responsiveness</li> </ul>

To learn more about Qontigo, please contact us, or visit [qontigo.com](https://qontigo.com)



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