Morningstar® Direct™ Asset Allocation

Asset Allocation is Morningstar Direct’s tool to model asset-class behavior, optimize on various risk and return metrics to identify optimal strategic asset-allocation policies, and forecast those policies’ future performance. This document is designed to provide an instructive product overview to help you get started with the Asset-Allocation tool in Morningstar Direct.

Description

Asset Allocation traditionally relies on two components: Log-normal distributions to build assumptions of asset-class risk and return, and mean-variance optimization to identify efficient asset mixes that provide the greatest expected return for a given amount of expected risk – the series of portfolios known as the efficient frontier.

When developing asset-class assumptions, Morningstar Direct users have access to three distribution models: traditional log-normal distribution, an enhanced version of log-normal known as the Johnson model, and the historical-data-based bootstrap method. Log-Normal distribution, which is traditionally used for asset-class modeling, underestimates the chance of extreme events and it is considered thin-tailed. The Johnson distribution model has the ability to capture those extreme events by accounting for skewness and kurtosis, and it is considered fat-tailed. You can also bootstrap historical data, applying these distribution models, to create asset class assumptions. (For the sake of simplicity, this document will focus on the Log-Normal model.)

Once asset-allocation assumptions are established, users can run optimization to build efficient frontiers with various return and risk measures. Select from Arithmetic Mean or Geometric Mean for return measures and Standard Deviation, CVaR (Conditional Value at Risk), 1st Lower Partial Moment below a given Target/Arithmetic Mean, or Downside Deviation below a given Target/Arithmetic Mean for your choice of risk measures.

After identifying optimal asset mixes, users can forecast the future performance of those asset mixes using Wealth and Return Percentiles, Wealth and Return Histograms, Target Wealth and Returns, and Probability of Loss. Users can apply inflation adjustment, cash flows, and rebalancing to forecasting for a more specific prediction of future returns and risk.

Outline

- How to Access the Asset Allocation Tool
- Developing Asset-Class Assumptions
- Optimizing Inputs and Identifying Efficient Asset Mixes
- Forecasting Future Performance
- Window Customization
Morningstar® Direct™ Asset Allocation

How to Access the Asset Allocation Tool

To begin, you can launch the Asset Allocation tool in one of three ways:

1. Visit the Morningstar Direct Cloud homepage at https://direct.morningstar.com, then in the “Portfolio” section, click “Allocation”.

2. Type http://assetallocation.morningstar.com directly into your web browser (Google Chrome works best).

3. Open the Morningstar Direct desktop application, and then in the left navigation menu, click “Asset Allocation”.

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Developing Asset-Class Assumptions

1. This section will explain how to build a set of asset-class inputs and analyze asset-class assumptions. First, we will need to create an asset-class set. Click the “Asset-Class Setup” button at the top of the page:

2. This will open the Asset Class Setup window. You can click “New Set” to create your own set of asset classes, or choose one of the sample sets provided with Morningstar Direct. To add an asset class to the set, click the “Add” button.
3. Each asset class requires a proxy security (typically a market index) for modeling purposes. Users can enter their own custom risk and return assumptions in the Asset-Allocation tool, but a proxy is required even if it is not ultimately used. Search for a proxy security by clicking the magnifying-glass icon.

4. Once you’ve added all of your asset classes, click OK to save the set, and the model will close. Your set is saved for future use.
5. Next, create an input file to store your asset classes, distribution calculations and other data information, and to get started in the main part of the Asset Allocation tool. From the Asset Allocation home screen, click on “New Input”.

6. You will be asked to select an asset-class set from the dropdown. The set that you just created should be available for selection. You can also add and remove asset classes for use in your model at this stage. In addition, you can choose a distribution model from this screen. For now, we will use Log-Normal (the default) for demonstration purposes. Once complete, click OK.
7. You will be taken to Input Settings dialog. This screen allows you to change the frequency of data input, the way that returns are calculated within the simulation (either additive or compounded), the number of simulations, random seeding for an extra layer of randomization, and the ability to designate an asset class as a model for inflation in forecasting. For now, we will stick with the defaults. Click OK.
8. You will be taken to the main Asset-Allocation workspace in a new window.

The workspace is organized as pages that contain components. Each component displays a particular set of information regarding the simulation. By default, the workspaces in Morningstar Direct Asset Allocation are divided into Input, Optimizer and Forecasting sections, which also matches the organization of this document. Each workspace is customizable, and users can add, remove and resize components to fit their working preferences. To add a component, simply drag it from the bottom of the screen into the workspace.

We are currently focused on the inputs step. The Input workspace is organized to show us information about our asset-class assumptions:

- Under Input Summary, we see the calculated annual Arithmetic Mean and Standard Deviation for each asset class over the course of its available time-series data.
- The Correlation component likewise shows us how each asset class correlates with the others over their commonly available time period.
- Asset Class Statistics shows the results calculated from the simulation. (The user inputs are the starting point for each simulation, but when the same figures are calculated from the simulation and not from actual historical performance, the return and risk metrics can differ slightly.)
Users can also change the data and methodologies used to calculate risk and return metrics. These can be changed from the Estimates button in the top ribbon under Inputs. The Estimates model lets you change the calculation inputs for return, risk and correlation.

The different radio buttons in the Arithmetic Mean tab represent the different methods Morningstar Direct offers for calculating expected return of an asset class, such as Black-Litterman, CAPM and Building Block. (For more information on these advanced methodologies, feel free to reach out to your client solutions consultant). The default calculation for risk and return is to use the most frequent historical time-series data provided by the proxy index as far back as data is available. For instance, arithmetic mean and standard deviation for an asset class using the S&P 500 TR USD as a proxy index would use monthly returns starting in 1970 through the most recent month.
Different securities have different start and end dates, but you can also select the start and end dates for historical calculation from the appropriate tab in Estimates:

The same date changes can be applied for standard deviation and correlation:
The correlation tab also allows users to enter their own correlation matrix. Simply click on a table cell to edit, or copy and paste from Excel by clicking the top-left cell (1.00000) and pasting your Excel data into the correlation table.

Morningstar Direct can also run asset-allocation simulations using users’ own estimates for forward-looking risk and return. The Input Summary tab lets users enter their own arithmetic-mean and standard-deviation estimates for one or more asset classes. Similar to the correlation table, you can also copy and paste data from Excel directly into the estimates cells.
9. Your inputs are now in the system. Before we move on to optimization, you can save your work. Each workspace in Morningstar Direct Asset Allocation makes use of two types of files:

- An **Input file** contains capital-market assumptions (estimates), constraints around asset-class allocation, and calculation methodologies.

- A **Case file** contains asset mixes, the efficient frontier, and any forecasting settings created by the user.

NOTE: A case file requires an input file, but an input file can be used by more than one case file. Changes made to an input file in one case file will show up in another case file that is using those inputs. Therefore, be mindful when saving changes to input files.
Optimizing Inputs and Identifying Efficient Asset Mixes

1. Having established our capital-market assumptions and correlations, the system can build an efficient frontier. The frontier is drawn based on the 2,000 (or user-entered number) simulations that used the inputs specified by the user. Each frontier is a series of 100 different asset mixes that provide the greatest expected return (Y-axis) for a specified level of risk (X-axis).

2. We can select asset mixes from the frontier by one of several methods. The first is to mouse over a point on the frontier which will give you the option to “Add Asset Mix” for evaluation:
3. You can also use the Search function to find asset mixes that fit particular criteria. To access this, click the Asset Mixes button in the top ribbon:

4. You will be taken to the Asset Mixes dialog. From this screen, click “Search”.

![Asset Mixes dialog](image-url)
5. You will be taken to the Asset Mix Search dialog. From there, you can search for one or more asset mixes according to risk and return statistics:

![Asset Mix Search Dialog]

6. Once complete, you’ll now be able to see the mixes as squares on the efficient frontier, as well as the risk/return statistics for each asset mix and the composition – both shown below.

![Asset Mix Statistics][Simulated]  

![Composition](image)
Let’s say, though, that after viewing some of the portfolios along the efficient frontier, there’s an undesirably high allocation to one or more asset classes. This is when constraints can be employed – you can set minimum and maximum allocations, group asset classes and set limits on the group, or create relative formulas that relate the allocation of asset classes to each other. To set constraints, click on the Constraints button in the top ribbon:

You will be taken to the Constraint Settings dialog where you can apply individual constraints, group constraints, or relative constraints. Once complete, click OK.
9. Your efficient frontier will automatically update.

10. Keep in mind, just like every component in Morningstar Direct Asset Allocation, users can export the data to an Excel spreadsheet. Simply click the “Export” button and all 100 efficient portfolios will be exported as an .xls file. The export function is available in all components. Let’s proceed and now move on to forecasting future returns.
Forecasting Future Performance

1. Asset allocation in general is designed to plan for future portfolio performance, and Morningstar Direct Asset Allocation likewise offers forecasting functionality to help users determine the potential outcomes for their selected asset mixes. To get started in forecasting, click the Forecasting tab to open the default forecasting workspace:

   Like the other two default workspaces, Forecasting is built around a set of components that display relevant data and/or charts. Forecasting is organized according to the user’s selected asset mixes – each asset mix’s forecast shows the weighted averages of its constituent asset mixes over the 2,000 simulations that run from the user’s inputs. Users can choose percentiles for display, which provides a sense of the possible performance outcomes from best to worst.

2. The Forecasting workspace is customizable like the rest of the tool. An important menu item that controls most forecasting settings is the Forecasting button in the top ribbon:
3. Clicking this will open the Forecasting settings menu. There are a number of in the Basic tab that let users customize the way their forecasting components will display:

- **Initial Assets** represents the initial monetary amount used for forecasting. This is useful to forecast future returns on potential allocations for an existing portfolio. The default is $1 USD, so all forecasting results are based off of percentage returns to that amount. This figure can be changed in both amount and display currency.

- **Forecasting Frequency** refers to the intervals within which returns are forecast. If the figure is set to monthly, then one month will be the minimum forecasting unit; if set to annually, then one year will be the minimum unit. Regardless of unit, the system limits users to 100 forecasting periods, so monthly forecasting will display a maximum of 100 months; annual forecasting will display a maximum of 100 years; etc.

- **Return Display Frequency** is the interval at which returns are shown. This can be different from Forecasting Frequency.

- **Rebalancing** refers to both how and how regularly portfolios are rebalanced – allocations can be set to rebalance to their original mix, or values can change and the allocation can change with them.
4. The Display tab can be used to determine which percentiles, wealth targets and other figures are displayed within Forecasting components.

- **Percentiles** show a line item for each percentile of simulated results. The default is to show results at the 5th, 50th and 95th percentiles, but this can be changed to anything from 1 to 99. Percentiles will be displayed using different colored lines. Either add a new percentile by typing into the input field and clicking “Add”, or remove an existing one by clicking on it and selecting “Remove”.

- **Project Year** represents the span for which to display results in components. By default, components will show results out to the 20th year of forecasting, but if users only care about results 10 years out, they can click “20” and remove it. Keep in mind that the maximum Project Year is impacted by the Forecasting Frequency – if forecasting is set to monthly, the display will only show the equivalent of 100 months out, or 8 years.

- **Target Returns** are annualized return values for use as goals. Forecasting components will show the probability of achieving each annualized Target Return at each Project Year; by default, the system shows the likelihood of achieving an annualized 0, 8 and 15 percent return at 5, 10 and 20 years, respectively.

- **Target Value** represents the monetary value accumulated over time from the Initial Assets figure on the “Basic” tab. If the Initial Assets value changes, these values should also be considered, as the default values are based on the default Initial Asset of $1 USD. Forecasting components will display the likelihood of achieving a goal amount of 8, 4 and 2 by default, so if the Initial Asset is changed from $1, these values should also be changed accordingly.
5. The Cash Flows tab allows users to account for the impact on inflows and outflows to the forecasted portfolio. Cash flows can be positive or negative, and they can be a monetary amount of a percentage of the portfolio at some point in time. To add a new cash flow to the model, click “Add”, then select from the available prompts to specify the type of cash flow to consider.

For outflows, be sure to enter a negative number in the input field.
Asset-Allocation Reports

1. Morningstar Direct Asset Allocation integrates easily with Morningstar Direct Presentation Studio. Components used in the Asset Allocation tool are also available in Presentation Studio and can be customized to display using different fonts, colors, layouts and more. To run a Presentation Studio report directly from Morningstar Direct Asset Allocation, click the Run Reports icon in the top ribbon:

2. This will open the Run Report dialog. From here, select a pre-created Presentation Studio template. You can use either Morningstar Direct default asset-allocation templates, or create your own in Presentation Studio. Select the asset mixes from your case that you would like to include in the report, choose a file name, and then click “Run Report”.

![Run Report dialog image]
3. A watch-face icon will appear on top of the Run Report button while the report is being processed. When the icon changes to a green checkmark, the report is ready in PDF format.

4. As you can see below, here is an example of a PDF.