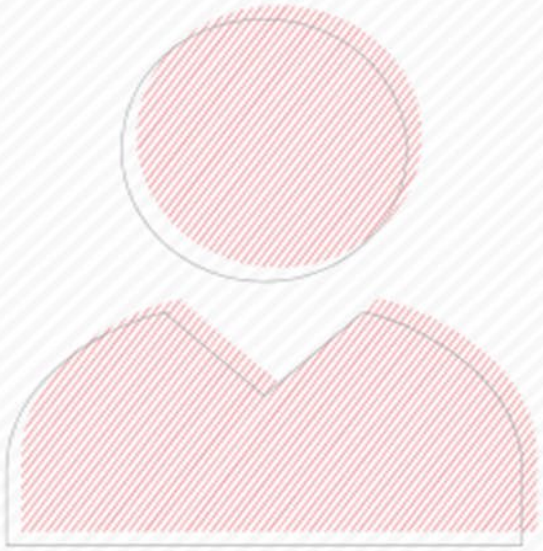
Workshop Training Guide

Morningstar Direct

Risk Decomposition



MORNINGSTAR Direct

Contents

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Risk Decomposition

Overview

The Asset Allocation module in Morningstar Direct™ allows users to determine how much of a portfolio to invest in cash, equity, fixed income, alternatives, and other asset classes. To keep users from having to repeat this process for every model portfolio or investment, the Asset Allocation module allows users to create a series of asset mixes to be reused in a variety of cases.

Additionally, the Asset Allocation module allows users to decompose risk to determine which asset classes contribute the most to risk. By identifying those, you will be able to make changes to your asset mix to improve return and reduce risk.

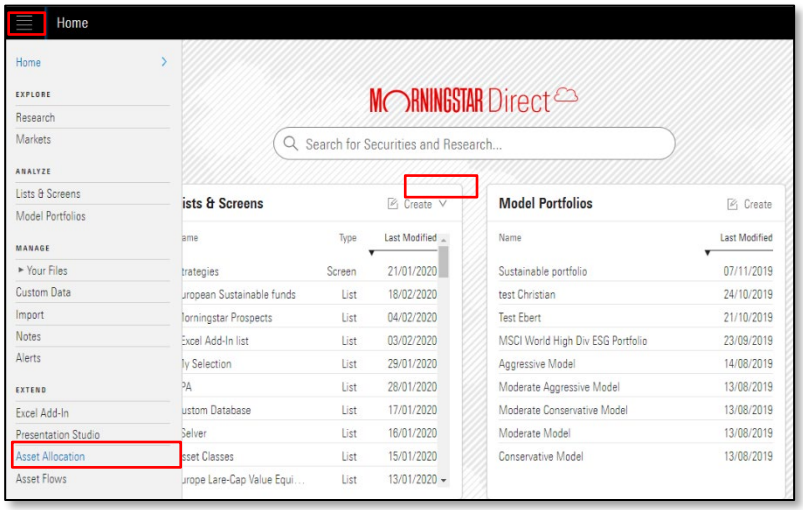
If you have never used Asset Allocation before, we encourage you to watch this video and follow this exercise guide.

Exercise 1: Accessing the Asset Allocation module

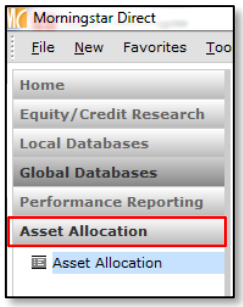
To begin, you can launch the **Asset Allocation** tool in one of three ways:

- Visit the Morningstar the web-based Direct homepage at https://direct.morningstar.com, then click the menu bar in the top-left corner and click Asset Allocation on the menu.

  ☞ **Note:** You will need to enter your Morningstar Direct credentials.



- Type http://assetallocation.morningstar.com directly into your web browser (Google Chrome works best).
- Open the Morningstar Direct desktop application, and then in the left navigation panel, click **Asset Allocation**.

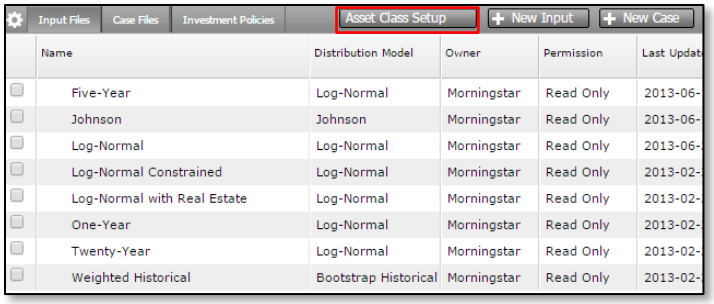


Exercise 2: Setting up Asset Classes

Before creating our case study, we first need to input our asset class assumptions.

To create your asset class set, do the following:

1. Click **Asset Class Setup** at the top of the page. The **Asset Class Setup** dialogue box opens.



Click **Asset Class Setup**

2. Click **New Set > Create**. The **Asset Class Set Name** window appears.
3. Type "Asset Classes" and click OK.
4. Click **Add**. The **Add Asset Class** window opens.
5. Enter the asset class name and select the corresponding indices as shown in the table below.

Asset Class Name	Index Name	SecId
Global Corporate Bond	Morningstar Gbl Bd Infra GR EUR	F00000U3UB
Emerging Europe	Morningstar EM Europe GR EUR	F00000T5XE
Moderate Allocation	Cat 50%Barclays US Agg TR&50%FTSE Wld TR	XIUSA04GT8
UK Equity Mid/Small Cap	FTSE AllSh TR GBP	XIUSA04CGI
High Yield Fixed Income	ICE BofA Gbl HY Constnd TR HEUR	FOUSA06W37
Asia Equity	MSCI AC Asia Pacific NR USD	XIUSA04EW7
Europe Equity Large Cap	MSCI Europe Large NR EUR	F00000UX0N
Global Equity Large Cap	MSCI World High Dividend Yield NR USD	FOUSA06OZ9

☞ **Note:** If you had saved the indices as an Investment List, you could retrieve them using the Investment List drop-down menu.

Once done, the indices display in the **Asset Class Setup** dialogue box.

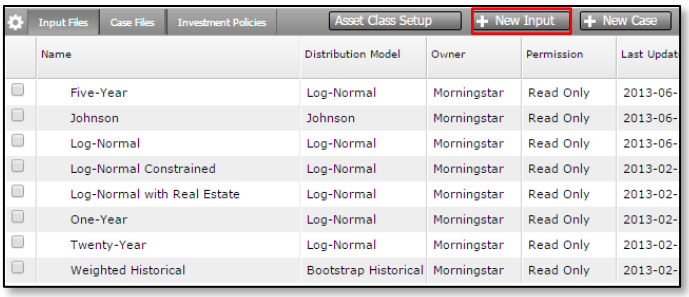
6. Click **OK**. The **Asset Class Setup** dialogue box closes.

Exercise 3: Creating an Input file

Input files are used to store your asset classes, distribution calculations and other data information, and to get started in the main part of the **Asset Allocation** tool.

To get started, do the following:

1. From the **Asset Allocation Home** screen, click **New Input**. The **Asset Class Selection** dialogue box opens.

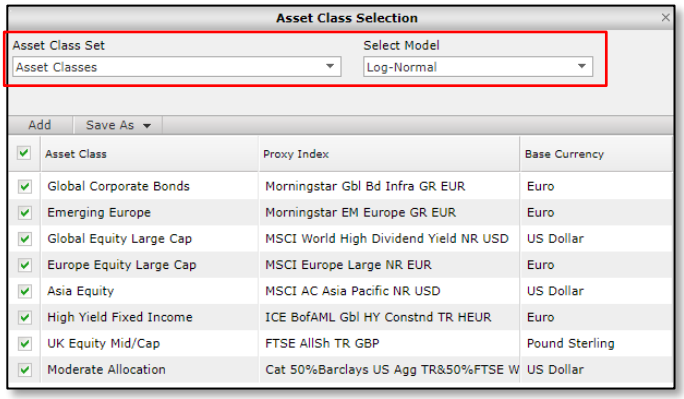


Click **New Input** to get started

2. Using the **Asset Class Set** drop-down menu, select your saved set of indices.

   ☞ **Note:** You still have the possibility to add or delete asset classes from this dialogue box using the **Add/Delete** buttons.

3. Using the **Select Model** drop-down menu, select the **Log Normal** model.



Select your **Asset Class Set** and **Model**

4. Click **OK**. The **Input Settings** dialogue box opens.

We will use the default input settings and the Historical model (under the Set-Up tab).

5. Click **OK**. The Asset Allocation window opens.

   ☞ **Note:** To find out more about the various models and baseline settings, refer to the onboarding asset allocation guide.

Exercise 4: Setting the Time Horizon for your Analysis

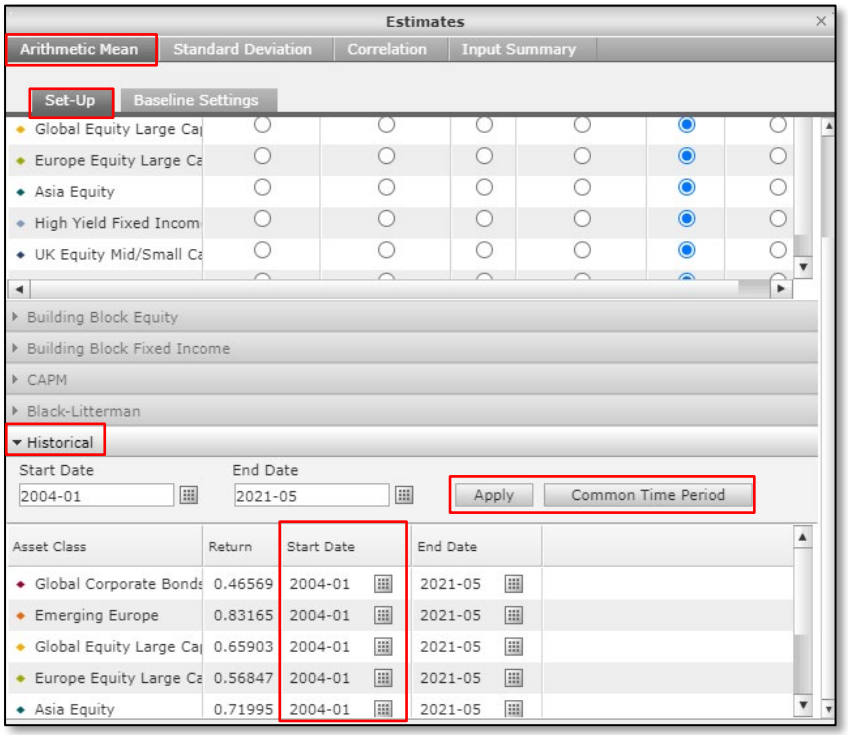
We work first with the **Input Workspace** tab. We will first define a common time horizon.

1. Click the **Estimates** button from the **Input** toolbar.
2. From the **Arithmetic** tab, under the **Set-Up** sub-tab, expand the **Historical** section.

Each asset class start date is listed below, and the **Input Summary** component (top-right of your Input page) is using these time periods to calculate each asset class's arithmetic mean. We want to run an analysis on a common time period. Do the following:

3. Under the **Historical** section, click the **Common Time Period** button.
4. Click **Apply**.

☞ **Note:** The Start Date for each asset class updates to display the common start date.



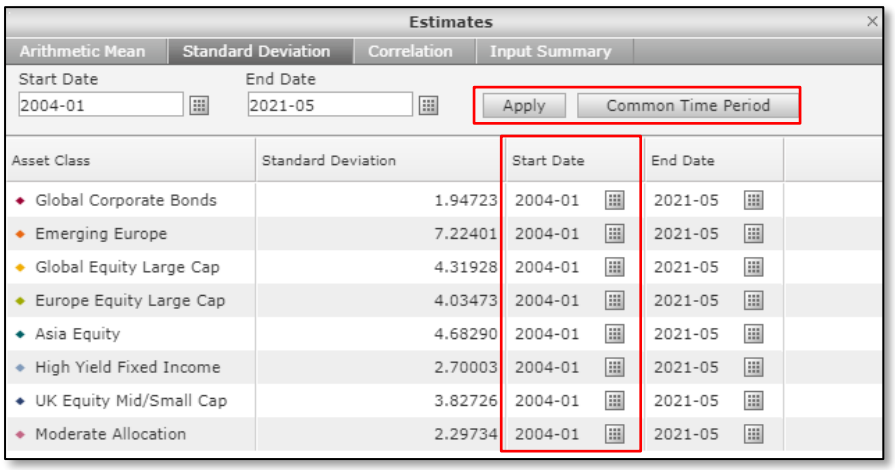
Click **Common Time Period** and then click **Apply**

You have now applied a common time period to evaluate each asset class's arithmetic mean.

We can now apply the same to the Standard Deviation.

1. From the **Estimates** window, click the **Standard Deviation** tab.
2. Click **Common Time Period** and then click **Apply**.

☞ **Note:** The Start Date for each asset class updates to display the common start date.



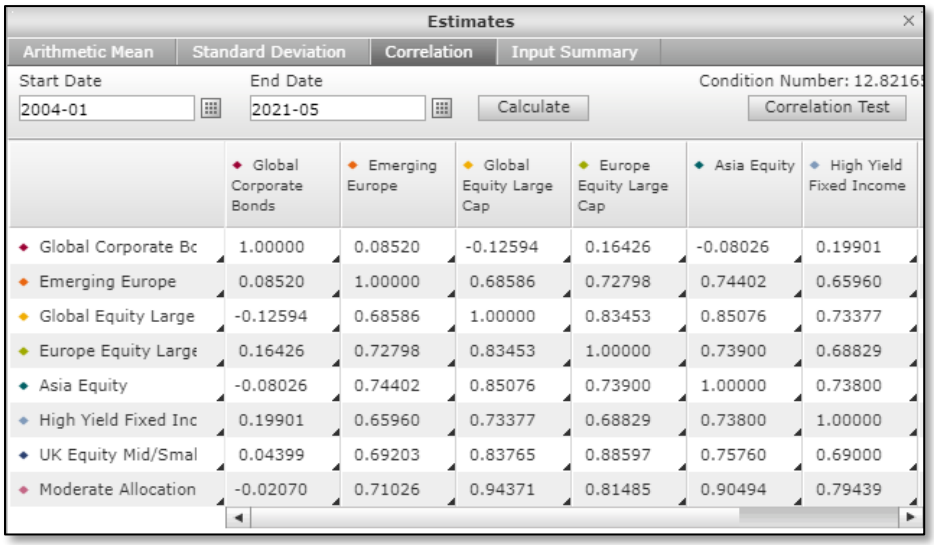
Click **Common Time Period** and then click **Apply**

Correlation Test

When running your analysis, it is important to run a correlation test to ensure there is no overlap of asset classes.

1. From the **Estimates** window, click the **Correlation** tab. Notice how the common time period of all asset classes is already set by default.

The **Condition Number** displays in the top-right corner of the window. This number should be below 20%. Anything higher signifies too much overlap between asset classes. If your condition number is too high, consider removing overlapping asset classes or changing representative indices.



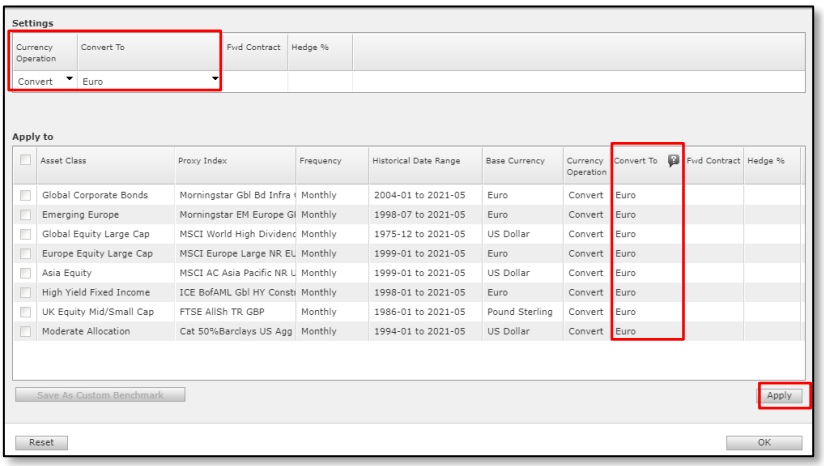
2. Click **OK** to validate your choices.

The Input Summary and Asset Class Statistics (Historical) components recalculate.

Exercise 5: Currency Conversion

We are working with asset classes from various currencies; to reflect the impact of the exchange rate fluctuation, we want to convert those to Euro. To do so, do the following:

1. Click **Currency**. The **Currency** dialogue box opens.
2. Select all asset classes in **US Dollar** and **Pound Sterling** and convert them to **Euro** using the relevant checkboxes to the left.
3. Using the Currency Operation drop-down menu, select **Convert**.
4. Using the **Convert To** drop-down menu, select **Euro**.
5. In the bottom-right corner of the dialogue box, click **Apply**.



Use options as shown in the highlighted areas

☞ **Note:** You will also find **Hedging** options under the **Currency Operation** drop-down menu.

☞ **Note:** You can save a converted asset class as a Custom Benchmark by selecting it and clicking **Save as Custom Benchmark** (it will then be saved under Portfolio Management > Custom Benchmarks in the Direct software.

6. Click **OK**.

Exercise 6: Saving Inputs and Case files

Before moving on to **Optimisation**, we can save our work. Each workspace in Morningstar Asset Allocation makes use of two files:

- The **Input file** contains your CMAs (asset classes, distribution model, expected return methodology, constraints)
- The **Case file** contains your asset mixes, the efficient frontier, forecasting information and the layout of your report (how your report looks like, the components you display)

☞ **Note:** To create an input file, you don't require a case file and input files can be used in 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.

☞ **Note:** To create a case file, you require an input file; a case file can also support multiple input files.

To save the **Input file**, do the following:

1. In the top-left corner of the **Morningstar Asset Allocation** window, click the **Gear** icon  .
2. Click **Save Inputs as**. The **Save Input File** dialogue box opens.
3. Type **Europe Input**.
4. Click **OK**.
5. Click **OK** again on prompt.

To save the **Case file**, do the following:

1. In the top-left corner of the **Morningstar Asset Allocation** window, click the **Gear** icon  .
2. Click **Save Case as**. The **Save Case File** dialogue box opens.
3. Type **Europe Case**.
4. Click **OK**.
5. Click **OK** again on prompt.

Exercise 7: Assigning Constraints

Constraints are saved as part of our **Inputs file** and are set to ensure a minimum/maximum allocation per asset class or group of asset classes.

To set **Constraints**, do the following:

1. From the Optimizer toolbar, click **Constraints**.

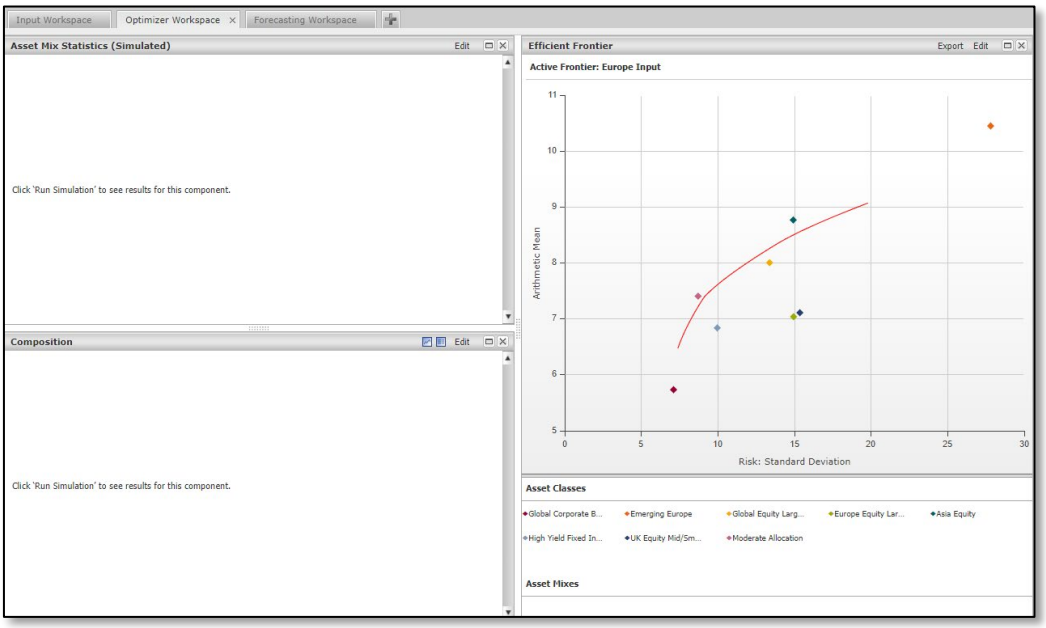
   ☞ **Note:** There are three types of constraints: **Individual**, **Group**, and **Relative**.

2. Set your constraints as shown below:

Asset Class	Min Holding	Max Holding
Moderate Allocation	5	100
UK Equity Mid/Small Cap	5	100
High Yield Fixed Income	10	100
Asia Equity	0	60
Europe Equity Large Cap	10	100
Global Equity Large Cap	5	100
Emerging Europe Equity	5	70
Global Corporate Bond	5	100

3. Click **OK**.

The **Efficient Frontier** chart updates.



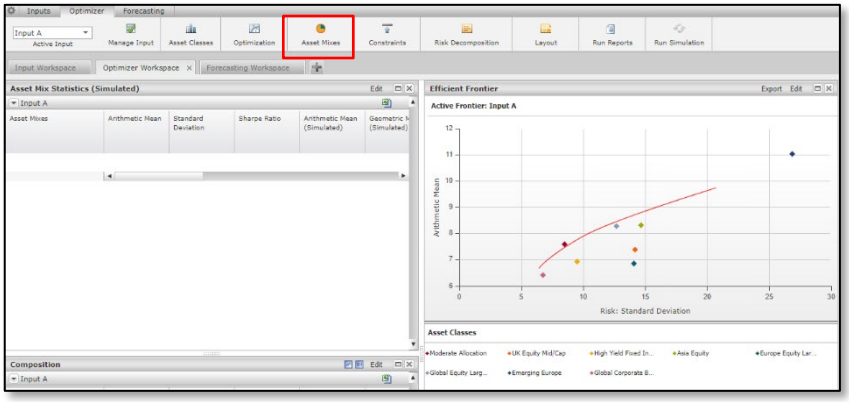
4. Click the **Gear** icon to save your **Inputs file**.
5. Click the **Gear** icon to save your **Case file**.

Exercise 8: Plotting our Current Allocation

We now want to see where our current policy fits on the **Efficient Frontier**.

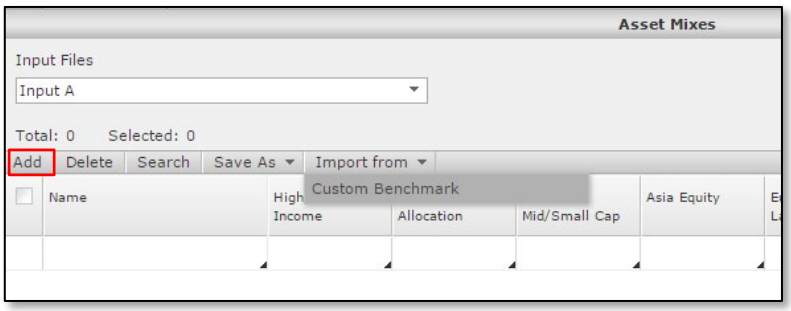
To add our policy as an **Asset Mix**, do the following:

1. From the **Optimiser** tab, click **Asset Mixes** on the **Toolbar**. The Asset Mixes dialogue box opens.



Click here to work with **Asset Mixes**

☞ **Note:** You can manually enter positions, or select an existing Custom Benchmark representing your policy.



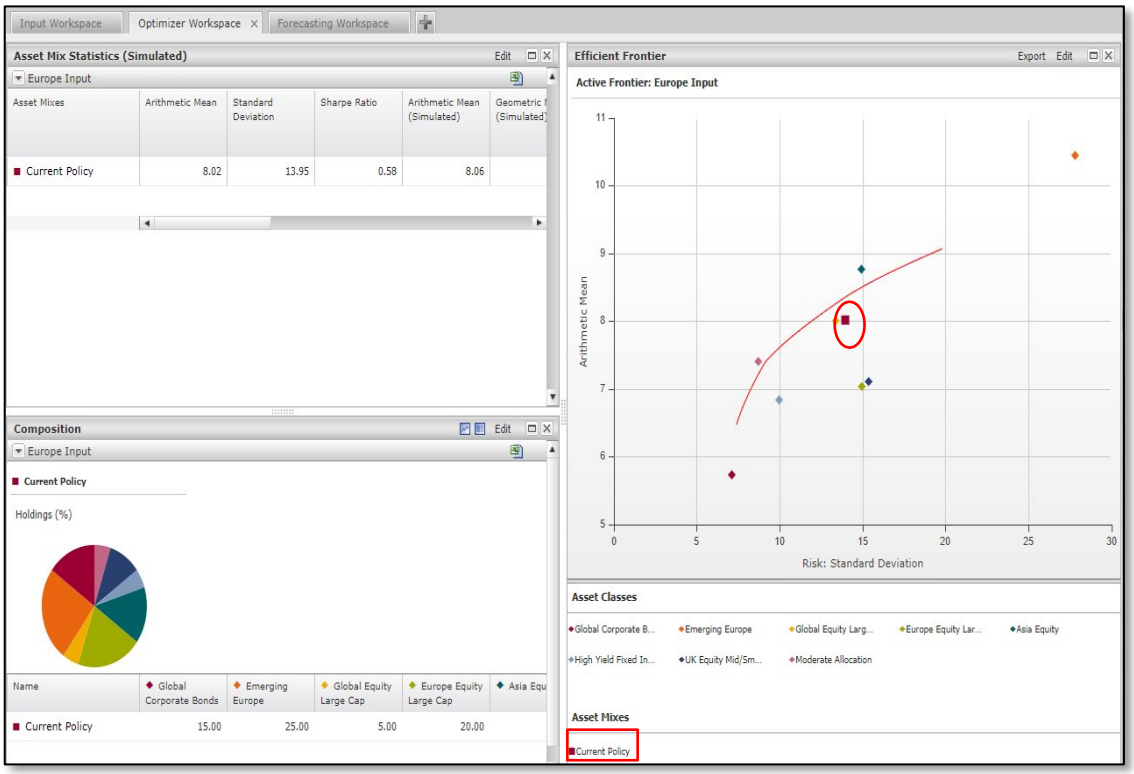
Click **Add**.

2. Click **Add**. A row appears where you can enter your positions.
3. Under Name, type "Current Policy".
4. Enter the weights as shown in the table below.

Asset Class	Weight
Global Corporate Bonds	15%
Emerging Europe	25%
Global Equity Large Cap	5%
Europe Equity Large Cap	20%
Asia Equity	15%
High Yield Fixed Income	5
UK Equity Small/Mid Cap	10
Moderate Allocation	5

Rename the **Asset Mix**

5. Click **OK** to view the asset mix on the **Efficient Frontier** graph.
6. From the toolbar, click **Run Simulation** to populate the **Asset Mix Statistics (Simulated)** and **Composition** components.



Our Policy appears below the Efficient Frontier line. This means there exists an Asset Mix on the Efficient Frontier with a higher return for the same level of risk.

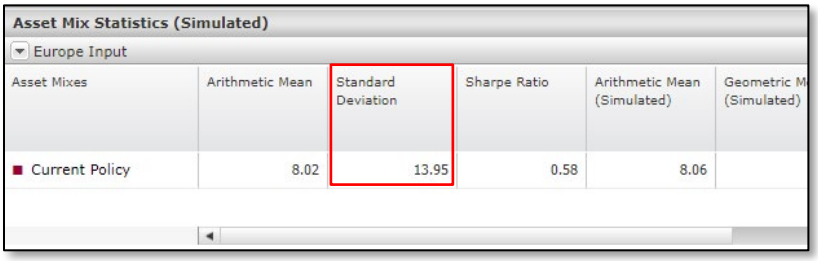
We will next learn to search for that asset mix and add it to the Efficient Frontier.

Exercise 9: Searching for an Asset Mix with a similar risk level

Morningstar Asset Allocation holds a **Search** function to find **Asset Mixes** that fit specific criteria.

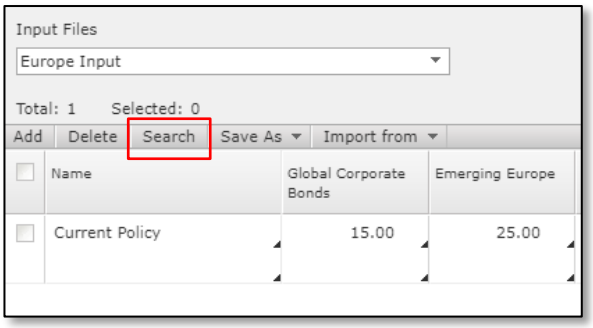
To search for an **Asset Mix** with a high standard deviation, do the following:

1. Under the **Asset Mix Statistics** table in the top-left corner of the **Morningstar Asset Allocation** window, check the **Standard Deviation** of your **Current Policy** asset mix.



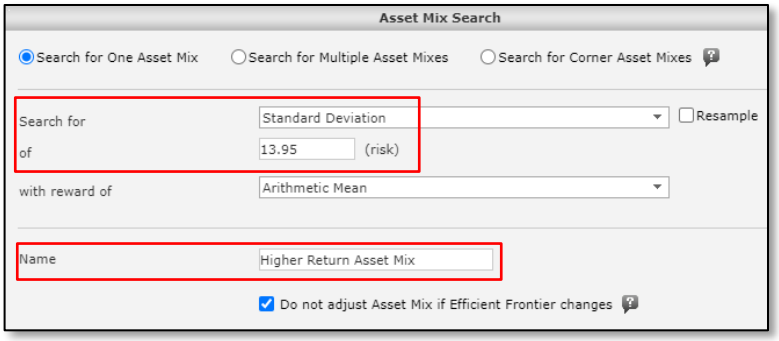
Check the **Standard Deviation** of your asset mix

2. From the **Toolbar**, click **Asset Mixes**. The **Asset Mixes** dialogue box opens.
3. Click **Search**.



The **Asset Mix Search** dialogue box opens.

4. Select the **Search for One Asset Mix** radio button (default option).
5. Using the **Search for** drop-down menu, select **Standard Deviation**.
6. In the **of** field, enter the standard deviation value found under the **Asset Mix Statistics** table (12.77 in this instance).
7. In the **Name** field, type **Higher Return Asset Mix**.



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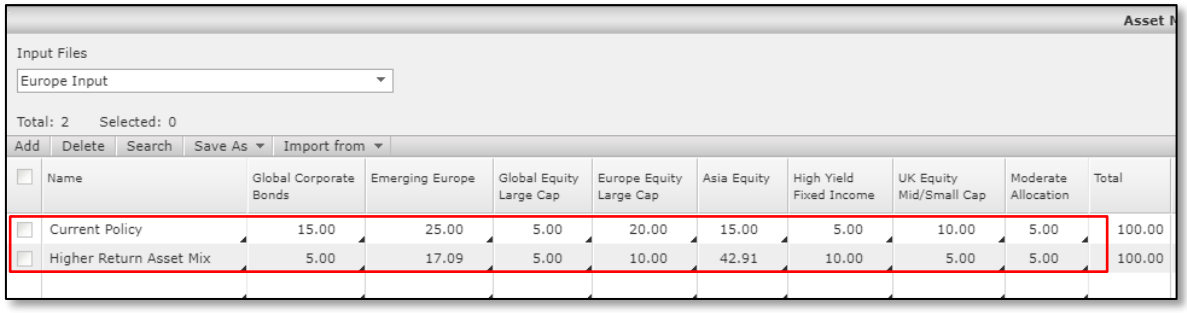
8. Click **OK**.

The **Asset Mixes** table now contains our current policy, as well as an asset mix with similar risk but higher return.

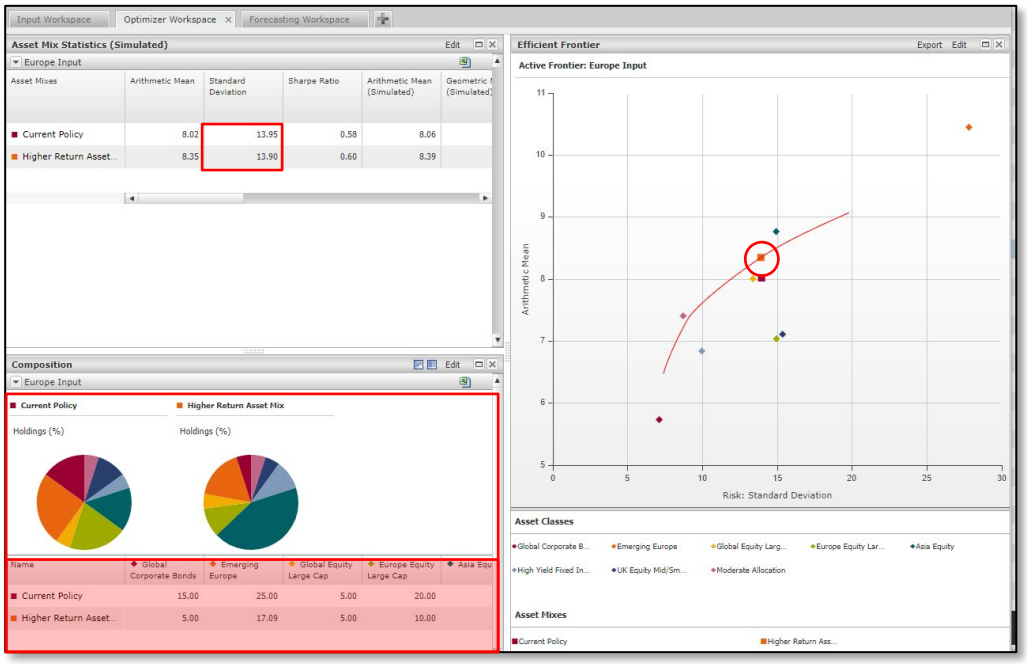


Name	Global Corporate Bonds	Emerging Europe	Global Equity Large Cap	Europe Equity Large Cap	Asia Equity	High Yield Fixed Income	UK Equity Mid/Small Cap	Moderate Allocation	Total
Current Policy	15.00	25.00	5.00	20.00	15.00	5.00	10.00	5.00	100.00
Higher Return Asset Mix	5.00	17.09	5.00	10.00	42.91	10.00	5.00	5.00	100.00

9. Click **OK**.

We notice several things:

- **Efficient Frontier**: the new Asset Mix displays on the Efficient Frontier itself.
- **Asset Mix Statistics**: "Higher Return Asset Mix" has a return of **8.36%** vs. **8.22%** for "Current Policy".
- **Composition**: the pie charts representing both asset mixes are displayed. Note the table showing the allocation numbers below the charts.



By increasing our allocation to Asia Equity and High Yield Fixed Income, and decreasing it in for quite a few other asset classes, we can increase our policy return for the same level of risk.

Name	Global Corporate Bonds	Emerging Europe	Global Equity Large Cap	Europe Equity Large Cap	Asia Equity	High Yield Fixed Income	UK Equity Mid/Small Cap	Moderate Allocation
Current Policy	15.00	25.00	5.00	20.00	15.00	5.00	10.00	5.00
Higher Return Asset...	5.00	17.09	5.00	10.00	42.91	10.00	5.00	5.00

Exercise 10: Decomposing your Risk

Risk decomposition gives you the ability to identify how the risk portion of a specific Asset Mix breaks down and how it can change if you alter your allocation to each asset class.

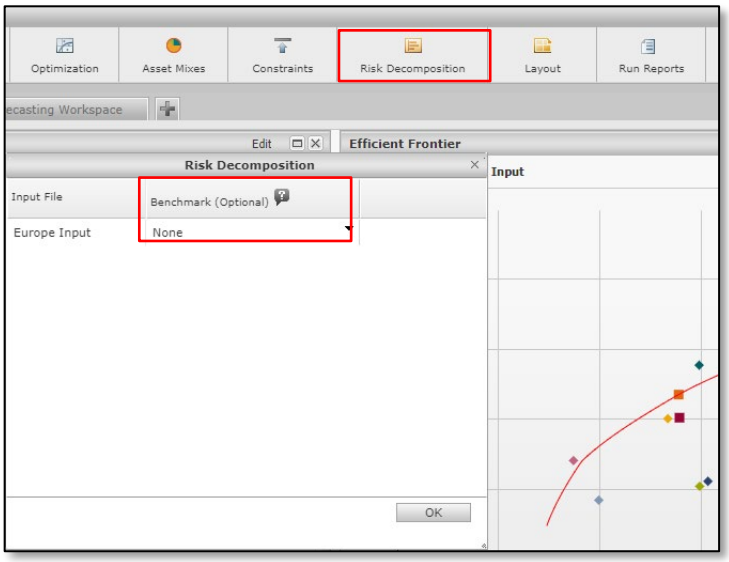
There are two components to risk decomposition:

- What asset classes contribute to the overall standard deviation (**Total Risk**)
- What asset classes contribute to the overall tracking error (**Active Risk**)

Total Risk

To perform **Total Risk** (standard deviation) decomposition, do the following:

1. Click the **Optimiser** tab.
2. From the **Toolbar**, click **Risk Decomposition**. The **Risk Decomposition** dialogue box opens.
3. Under **Benchmark (Optional),** select **None**.
4. Click **OK**.



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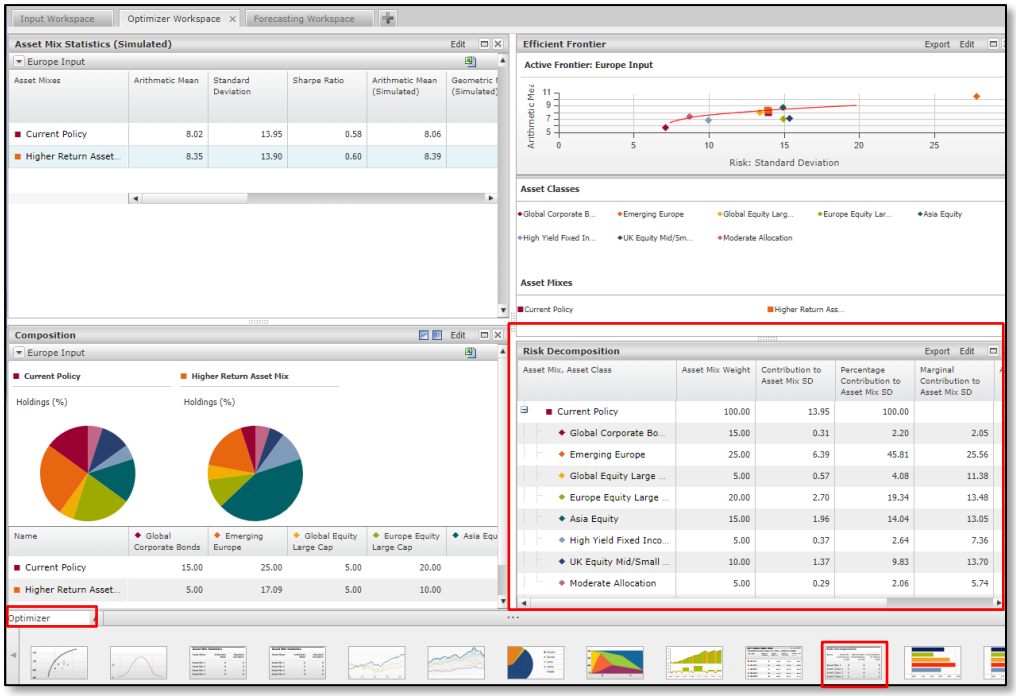
The **Risk Decomposition** charts and tables can be accessed through the **Optimiser Components** at the bottom of the **Morningstar Asset Allocation** window.

5. Click the three dots at the bottom of the window to open the **Components** section.
6. Select the **Optimiser** section.
7. Drag and drop the third item from the right onto the **Efficient Frontier**.



See highlighted fields

The **Risk Decomposition** component is added to our template.

8. Click the **Expand** icon  to get a better view of the data.

Risk Decomposition

Asset Mix, Asset Class	Asset Mix Weight	Contribution to Asset Mix SD	Percentage Contribution to Asset Mix SD	Marginal Contribution to Asset Mix SD	Asset Mix Return	Percentage Contribution to Asset Mix Return
Current Policy	100.00	13.95	100.00		8.02	100.00
Global Corporate Bo...	15.00	0.31	2.20	2.05	5.73	10.73
Emerging Europe	25.00	6.39	45.81	25.56	10.45	32.58
Global Equity Large ...	5.00	0.57	4.08	11.38	8.01	4.99
Europe Equity Large ...	20.00	2.70	19.34	13.48	7.04	17.56
Asia Equity	15.00	1.96	14.04	13.05	8.77	16.40
High Yield Fixed Inco...	5.00	0.37	2.64	7.36	6.84	4.26
UK Equity Mid/Small ...	10.00	1.37	9.83	13.70	7.11	8.87
Moderate Allocation	5.00	0.29	2.06	5.74	7.41	4.62
Higher Return Asset Mix	100.00	13.90	100.00		8.35	100.00

What conclusions do we draw from this analysis?

- In our Current Portfolio, Emerging Europe Equity contributed the most in terms of percentage to our overall risk with **32.58%** (**Percentage Contribution to Asset Mix Return**).
- If we were to increase the weight from 25% to 26% and given that our **Marginal Contribution to Asset Mix SD** is **25.56%,** then we would increase our risk by **0.2556%**.

Active Risk

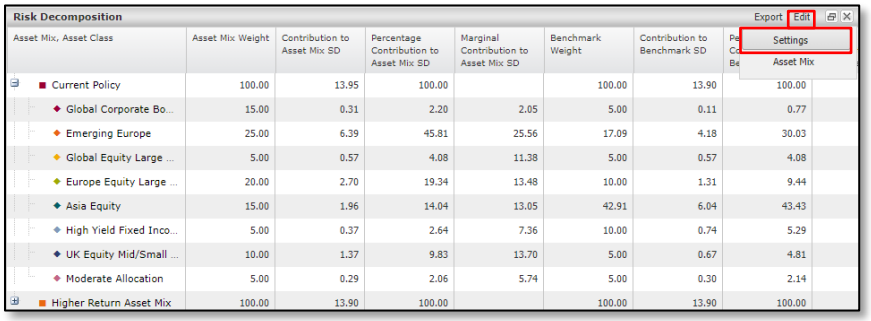
To decompose **Active Risk** (tracking error) – the risk you incur from deviations from the Benchmark weights – you must select a benchmark.

To do so, do the following:

1. Click **Risk Decomposition** on the **Toolbar**. The **Risk Decomposition** dialogue box opens.
2. Under **Benchmark (Optional),** select your policy benchmark, or in this case, the better performing asset mix Higher Return Asset Mix.
3. Click **OK**.

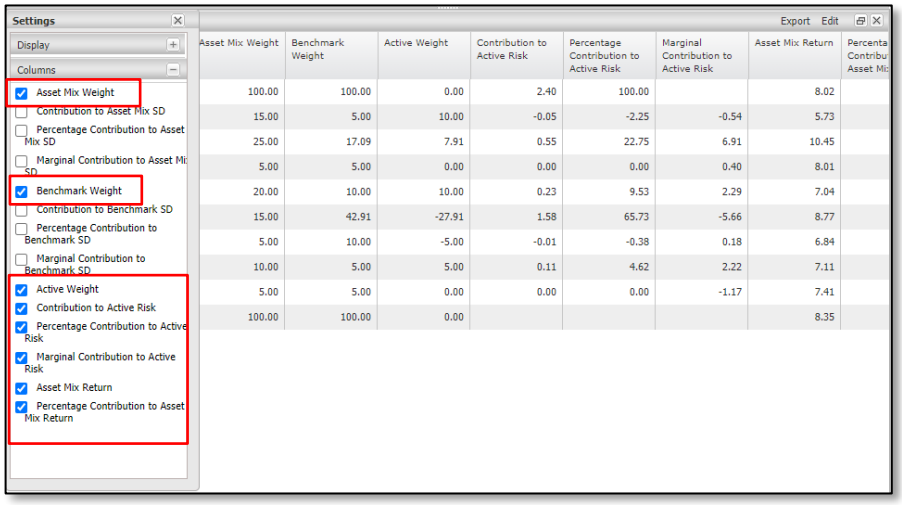
The **Risk Decomposition** table refreshes and additional columns appear in the table. We can customise the data to remove some columns from view.

4. Click **Edit > Settings**. The **Settings** dialogue box opens.



Click **Edit > Settings** to edit data columns

5. Click **Columns** at the bottom of the dialogue box to expand this view.
6. Deselect columns as shown below (we are hiding the Standard Deviation columns).



Select the highlighted data points

7. Click the cross in the top-right corner of the **Settings** dialogue box to close it to refresh the data.

Asset Mix, Asset Class	Asset Mix Weight	Benchmark Weight	Active Weight	Contribution to Active Risk	Percentage Contribution to Active Risk	Marginal Contribution to Active Risk	Asset Mix Return	Percentage Contribution to Asset Mix Return
Current Policy	100.00	100.00	0.00	2.40	100.00		8.02	100.00
Global Corporate Bo...	15.00	5.00	10.00	-0.05	-2.25	-0.54	5.73	10.73
Emerging Europe	25.00	17.09	7.91	0.55	22.75	6.91	10.45	32.58
Global Equity Large ...	5.00	5.00	0.00	0.00	0.00	0.40	8.01	4.99
Europe Equity Large ...	20.00	10.00	10.00	0.23	9.53	2.29	7.04	17.56
Asia Equity	15.00	42.91	-27.91	1.58	65.73	-5.66	8.77	16.40
High Yield Fixed Inco...	5.00	10.00	-5.00	-0.01	-0.38	0.18	6.84	4.26
UK Equity Mid/Small ...	10.00	5.00	5.00	0.11	4.62	2.22	7.11	8.87
Moderate Allocation	5.00	5.00	0.00	0.00	0.00	-1.17	7.41	4.62
Higher Return Asset Mix	100.00	100.00	0.00				8.35	100.00

Supposing we have a mandate below 2%, what conclusions do we draw from this analysis?

- Our current total **Contribution to Active Risk** is **2.40%**.
- Emerging Europe has the highest **Marginal Contribution to Active Risk** with **6.91%**.
  - ➢ If we were to increase its weight from 25% to 26%, then we would increase our risk by **0.0691%**.
- Asia Equity has a negative **Marginal Contribution to Active Risk** with **-5.66%**.
  - ➢ If we were to increase its weight from 15% to 16%, then we would decrease our risk by **0.0566%**.

☞ **Note:** The same applies to **Moderate Allocation** and **Global Corporate Bonds**.

Based on this analysis, let's create a new asset mix with new positions.

To do so, do the following:

1. Click **Asset Mixes** on the **Toolbar**.
2. Click **Add**.
3. Under the **Name** column, type **New Policy** and enter the weights as defined above.
4. Click **OK**.

Input Files

Europe Input

Total: 3 Selected: 0

Add | Delete | Search | Save As | Import from

Name	Global Corporate Bonds	Emerging Europe	Global Equity Large Cap	Europe Equity Large Cap	Asia Equity	High Yield Fixed Income	UK Equity Mid/Small Cap	Moderate Allocation	Total
Current Policy	15.00	25.00	5.00	20.00	15.00	5.00	10.00	5.00	100.00
Higher Return Asset Mix	5.00	17.09	5.00	10.00	42.91	10.00	5.00	5.00	100.00
New Policy	10.00	15.00	5.00	10.00	40.00	5.00	5.00	10.00	100.00

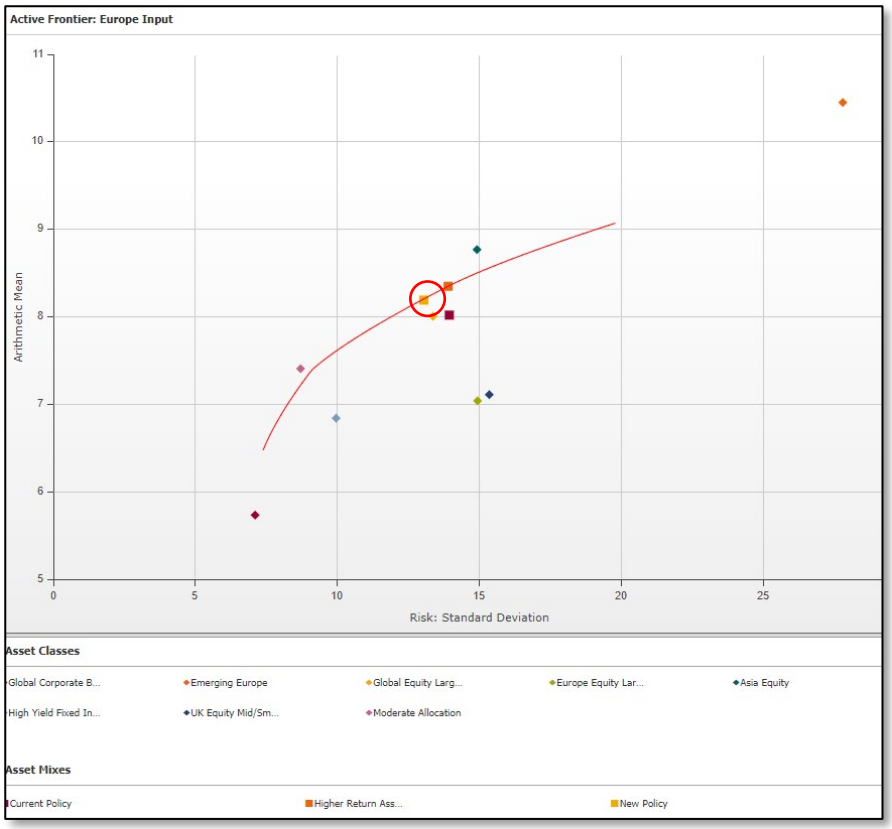
Input your new policy weights

The new **Asset Mix** displays in the **Risk Decomposition** table with an Active Risk of **1.22%**, which is within our mandate.

Risk Decomposition Export Edit

Asset Mix, Asset Class	Asset Mix Weight	Benchmark Weight	Active Weight	Contribution to Active Risk	Percentage Contribution to Active Risk	Marginal Contribution to Active Risk	Asset Mix Return	Percentage Contribution to Asset Mix Return
Current Policy	100.00	100.00	0.00	2.40	100.00		8.02	100.00
Global Corporate Bo...	15.00	5.00	10.00	-0.05	-2.25	-0.54	5.73	10.73
Emerging Europe	25.00	17.09	7.91	0.55	22.75	6.91	10.45	32.58
Global Equity Large ...	5.00	5.00	0.00	0.00	0.00	0.40	8.01	4.99
Europe Equity Large ...	20.00	10.00	10.00	0.23	9.53	2.29	7.04	17.56
Asia Equity	15.00	42.91	-27.91	1.58	65.73	-5.66	8.77	16.40
High Yield Fixed Inco...	5.00	10.00	-5.00	-0.01	-0.38	0.18	6.84	4.26
UK Equity Mid/Small ...	10.00	5.00	5.00	0.11	4.62	2.22	7.11	8.87
Moderate Allocation	5.00	5.00	0.00	0.00	0.00	-1.17	7.41	4.62
Higher Return Asset Mix	100.00	100.00	0.00				8.35	100.00
New Policy	100.00	100.00	0.00	1.22	100.00		8.19	100.00

It also displays on the **Efficient Frontier** and we can see that, with a slightly lower risk than our current policy, but also a slightly higher return.



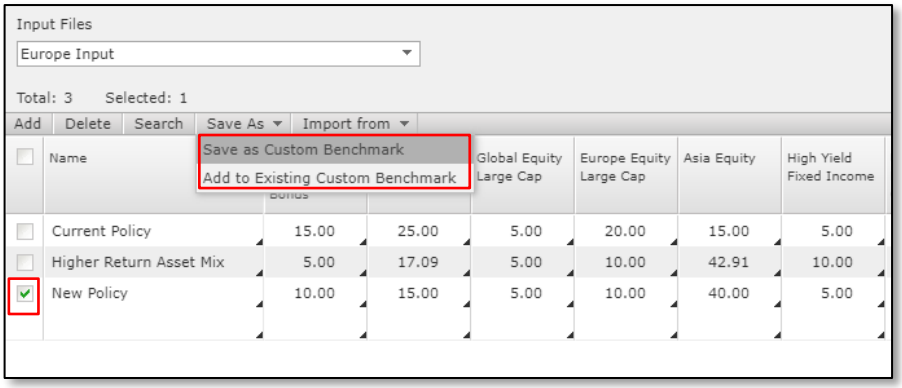
Note the position of the new policy on the **Efficient Frontier**

Exercise 11: Saving an Asset Mix as a Custom Benchmark

You can now save your **Asset Mix** as a **Custom Benchmark**, allowing further use in other modules of Morningstar Direct™, such as Portfolio Analysis for Total Portfolio Attribution (macro attribution) or Presentation Studio.

To save the **Custom Benchmark**, do the following:

1. From the **Toolbar**, click **Asset Mixes**.
2. Select the checkbox to the left of the asset mix you want to save.
3. Click **Save As > Save as Custom Benchmark**. The **Save as Custom Benchmark** dialogue box opens.



☞ **Note:** You can also decide to add this new asset mix to an existing Custom Benchmark to record a change in the benchmark composition.

4. Select the **Currency** and **Portfolio Date** for your positions. We will assign 01/01/2004, which is the common start date for our asset classes.
5. Under **Apply to**, select the checkbox to the left of your Asset Mix name.
6. Click **Apply**. The Currency and Portfolio Date are applied to your Asset Mix.
7. Click **OK**.

You will be prompted to confirm that the Custom Benchmark was saved successfully.

8. Click **OK** twice to return to your case.
9. Click the **Gear** icon and **Save** the **Inputs** and **Case** files.

You will find your saved Custom Benchmark in Morningstar Direct™ Desktop edition under **Portfolio Management > Custom Benchmarks** and ready to use in other modules, such as Presentation Studio or Total Portfolio Attribution.