One-Minute Spotlight

OPTQUEST: EFFICIENT FRONTIER

OptQuest, the optimization tool available with Oracle's Crystal Ball, enhances simulation models by automatically searching for and finding optimal solutions.

OptQuest includes several advanced features, one of which is its ability to automatically perform an Efficient Frontier Analysis. This type of analysis is especially useful for finding optimal portfolios of investments or assets. This spotlight uses a simple portfolio example (shown below) to provide a basic overview of OptQuest's Efficient Frontier function.

WHAT IS AN EFFICIENT FRONTIER?

If you were to examine all the combinations of investment strategies for a given set of assets, you would notice that each potential portfolio has its own specific mean return and standard deviation of return. Plotting the means on one axis and the standard deviations on another axis, you can create a graph like this:
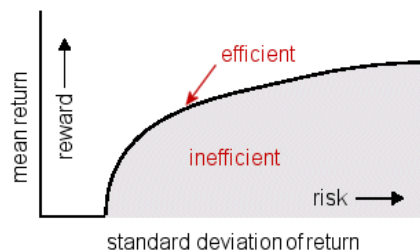
Efficient Frontier, continued

Points on or under the curve (in the gray area) represent the possible combinations of investments. Points above the curve (in the white area) are unobtainable combinations given the particular set of available assets.

The curve itself represents portfolios where you cannot obtain higher mean returns without generating higher standard deviations, or lower standard deviations without generating lower mean returns. The portfolios that lie directly on the curve are called "efficient," and the curve itself is often called the "efficient frontier." Portfolios that lie below the curve are called "inefficient," meaning that better portfolios exist with higher returns, lower standard deviations, or both.

OptQuest can create an efficient frontier by determining an optimal reward for multiple levels of risk that you define.

SETTING AN EFFICIENT FRONTIER REQUIREMENT

To use the Efficient Frontier function, you must first define a requirement in the Objectives dialog (shown below). Once the requirement is created, you click on the Efficient Frontier button and OptQuest adds a second line in the requirement that sets the bounds around your Efficient Frontier.
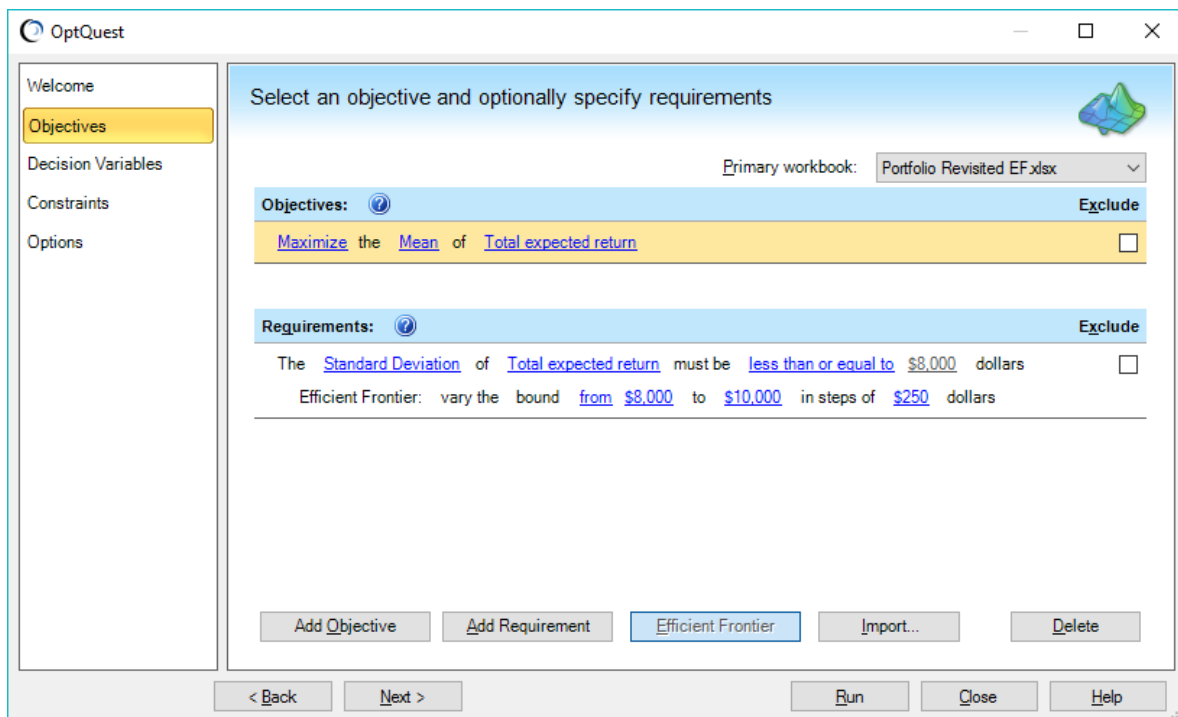
In this portfolio example, you want to maximize the Total expected return (the objective) on an investment of $100,000, but you also want to limit your exposure.

In this example, OptQuest will run one full optimization starting at the limiting requirement of $8000. After completing that, OptQuest will increase the requirement value by $250 and run another optimization. When OptQuest reaches and completes the optimization at the

requirement of $10,000 (highest risk), it will have run 11 total optimizations. This lets you see the effects of tightening or loosening a requirement.

RUNNING AN EFFICIENT FRONTIER

When you run OptQuest, it begins its first optimization using the initial requirement point (the most restrictive end of the range). In this example, that first point is $8000, so OptQuest rejects all solutions where the standard deviation is greater than or equal to $8000.

OptQuest searches for an optimal solution until there is no significant improvement between best solutions or until it reaches a maximum number of simulations. OptQuest then begins an optimization on the second requirement point..

Because OptQuest has already evaluated and stored many solutions from the first optimization, succeeding optimizations take less time. OptQuest runs the successive requirement points for approximately half the time of the initial requirement point. However, be aware that efficient frontiers do take more time to run than regular optimizations. Optimizations that use variable requirements take significantly longer to run because they are running an optimization for each point in the variable requirement range.
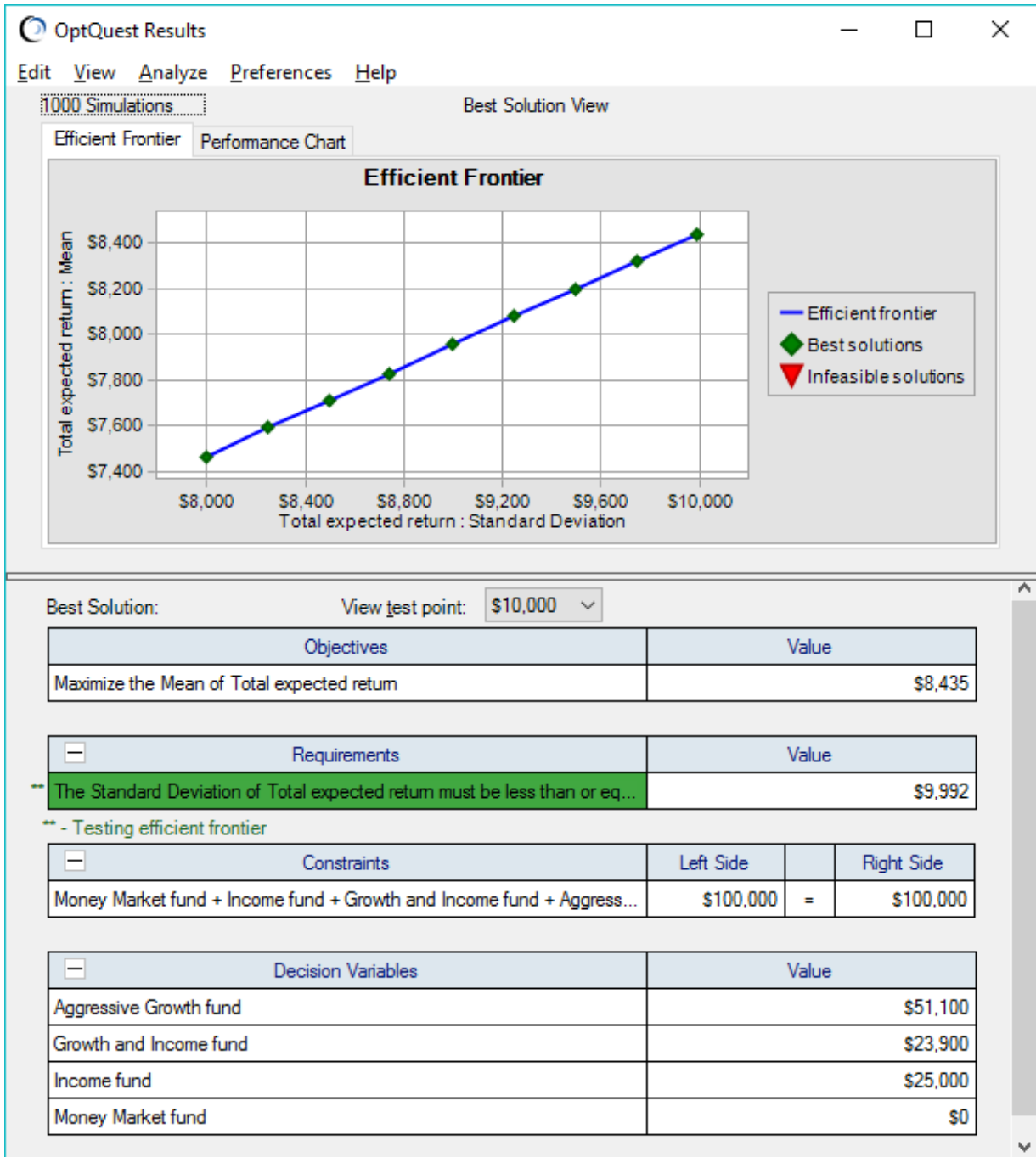
ANALYZING THE EFFICIENT FRONTIER CHART

As the optimizations progress, you can view the progress in the OptQuest Results window (shown below). This window is only available if you have defined an Efficient Frontier requirement.

Once OptQuest has completed the Efficient Frontier analysis, you can also review the best result for each Efficient Frontier solution (in tis example, these are efficient portfolios) by clicking on the point in the Efficient Frontier Chart. You can then view the Performance Chart for that solution by clicking on the point in the Efficient Frontier Chart and then selecting the Performance Chart tab.

Your final investment strategy will depend on which results mean the most to you and on how much exposure you deem reasonable.

Efficient Frontier, continued

For more information or to contact us, browse to
http://www.oracle.com/technetwork/middleware/crystalball/overview/index.html.