
Invesco Vision Case Study 1: Absolute risk optimization

Creating an efficient frontier

Mean-variance optimization is one of the most common approaches used for portfolio construction. The objective of a mean-variance analysis is to produce a frontier of portfolios that are efficient in terms of portfolio mean and variance (or standard deviation). This is an absolute risk optimization exercise where the risk being optimized, is the total risk of the portfolio. Invesco Vision provides this functionality along with capabilities that allow investors to better understand the risk characteristics of each of the portfolio assets, as well as for any portfolio that might be part of the analysis, efficient or otherwise. In this example, we consider an efficient frontier comprised of a small number of fixed income and equity indices. A hypothetical existing portfolio is also included for comparison.

Figure C1a presents the output of an unconstrained mean-variance analysis and is divided into four quadrants. The upper left quadrant presents the efficient frontier, individual portfolio assets, as well as any pre-specified portfolio (commonly an investor's current portfolio) charted along some measure of return and risk. Detailed factor analyses are easily accessible for any point included on this chart. Furthermore, horizontal and vertical projection lines for both the portfolio and benchmark onto the mean-variance efficient frontier provide an easy assessment of possible improvements that could be made in terms of portfolio return and risk.

The upper right part of Figure C1a presents a factor analysis section that provides a deep dive into factor risks associated with a selected investment. If a portfolio or benchmark has been included in the analysis, they are always shown for reference purposes and indicated by the pink (portfolio) and gray (benchmark) dots. The factor analysis section allows users to drill deeper and understand factor exposures and risks in more detail. For example, a user can quantify the isolated risk associated with the equity technology sector or the risk associated with corporate bonds. In addition, users can toggle between three different views: isolated risk, contribution to risk and exposures. Figure C1b provides examples of the latter two views.

The bottom two quadrants of Figure C1a are also dynamic and allow for an array of possible analytics. In this specific example, we have chosen to show portfolio weights that are presented as a frontier composition in the bottom left quadrant. You will notice that the composition chart is aligned with the efficient frontier above. This allows for a quick assessment of how the asset allocation evolves from the lowest risk allocation on the left to the highest risk allocation on the right. Next, the chart in the bottom right quadrant presents the exact asset-weights associated with any point selected on the frontier. In this case, the user's current portfolio is selected. Just like the factor analysis section we again can see the portfolio and benchmark for reference purposes. Users can also conduct historical and hypothetical scenario analyses, review asset correlations, as well as assess cash flows provided by selected portfolios.

While we have presented a simple mean-variance analysis, it serves to highlight the capabilities provided by Invesco Vision that provide support for making better informed investment decisions. Users can evaluate asset and portfolio risks, compare detailed risk and return characteristics of candidate portfolios with current or benchmark portfolios, and run various analyses that provide for a much deeper understanding of the trade-offs presented by investments under consideration. These capabilities facilitate both the portfolio construction exercise as well the ultimate task of selecting a portfolio that is closely aligned with a user's preferences.

Figure C1a: Absolute risk optimization
Unconstrained mean-variance efficient frontier

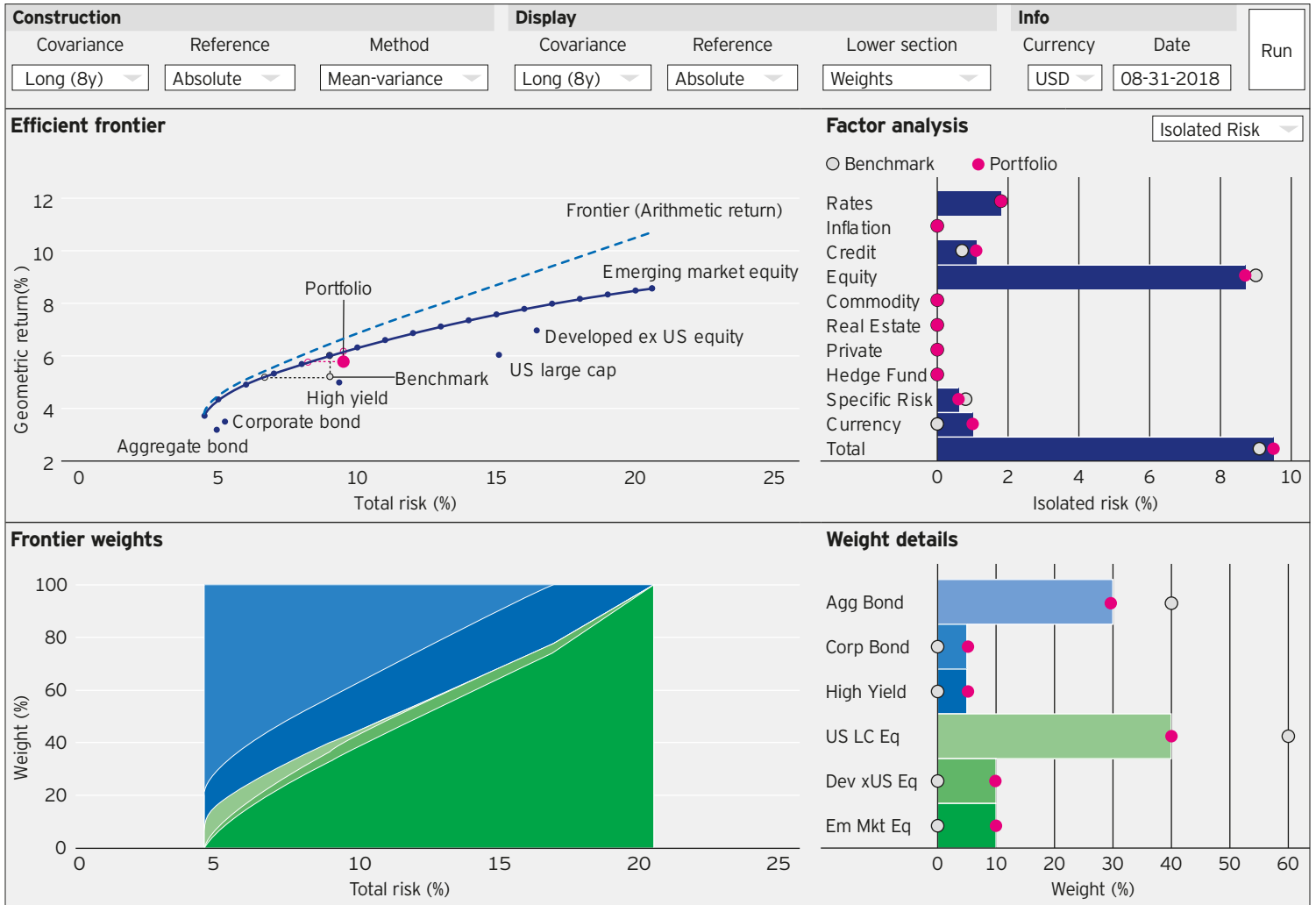
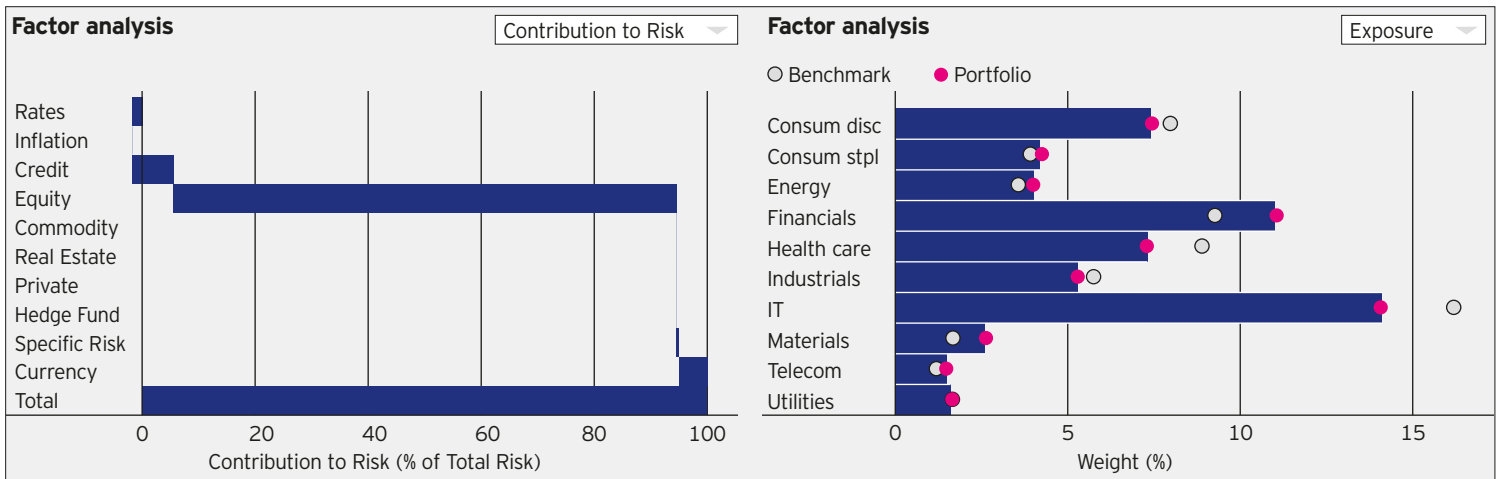


Figure C1b: Absolute risk optimization
Portfolio factor analytics



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