Invesco Vision Case Study 2: Relative risk optimization

Creating a style-premia portfolio

While analyzing and understanding portfolios in an absolute risk context is a common starting point for any portfolio construction exercise, it is often the case that portfolios are evaluated relative to some predetermined benchmark. In these cases, we may be interested in creating portfolios where return and risk are considered relative to a reference investment. In this example, we assume we are trying to construct a portfolio with style equity ETFs that will closely track the S&P 500. The rationale for such a portfolio would be to outperform the S&P 500 by efficiently tilting toward various style premia while still tracking the index within acceptable tolerances. In this example, we consider the following equity style ETFs: quality, momentum, high dividend, low volatility, value and size.

In Figure C2b, we provide a first pass at this portfolio construction exercise where we use unconstrained mean-variance to identify our style premia portfolio. You will notice that we have changed the output so that it is presented in relative terms. The ability of decoupling the optimization exercise from how we choose to view the results can at times be important.
For example, we may want to see how a frontier constructed in a relative context looks like from an absolute risk perspective. Here, we see the benchmark (the S&P 500) is placed at zero return and zero risk as would be expected, given that this is a relative optimization exercise. The relative efficient frontier lies above and to the right of the benchmark. This is driven by the higher return estimates for the underlying ETFs. In this instance, the lowest risk (minimum tracking error) portfolio has been selected to present relevant portfolio characteristics. While this portfolio may not have the highest return, it is the portfolio that would be expected to track the S&P better than any other portfolio.

As is indicated in the weight analysis section, this portfolio is comprised of 32.4% quality, 33.0% momentum, 14.1% high dividend, 4.4% low volatility and 16.0% value. Small cap exposure was not included at all. In the factor analysis section, we have drilled into the equity style factors and have switched to the exposure view to better understand our relative style factor exposures. As would be expected, we see several positive loadings that could be the key drivers of any outperformance. In some cases, we may have priors about the ETFs that have been included or we may want to manually constrain portfolio asset exposures. In Figure C2b we present a second pass at this exercise where we employ the scenario capability to overlay how the frontier would look if we impose the constraint that the portfolio must hold at least 10% of each of the ETFs considered. As one would expect, the frontier in this example is less efficient. By selecting the lowest risk portfolio on this constrained frontier, we observe in the weights section that the portfolio conforms to the constraints. In addition, the solution has slightly higher relative risk (and lower relative return) compared with the unconstrained solution.

Figure C2a: Relative risk optimization – Style-premia portfolio
Unconstrained relative mean-variance efficient frontier

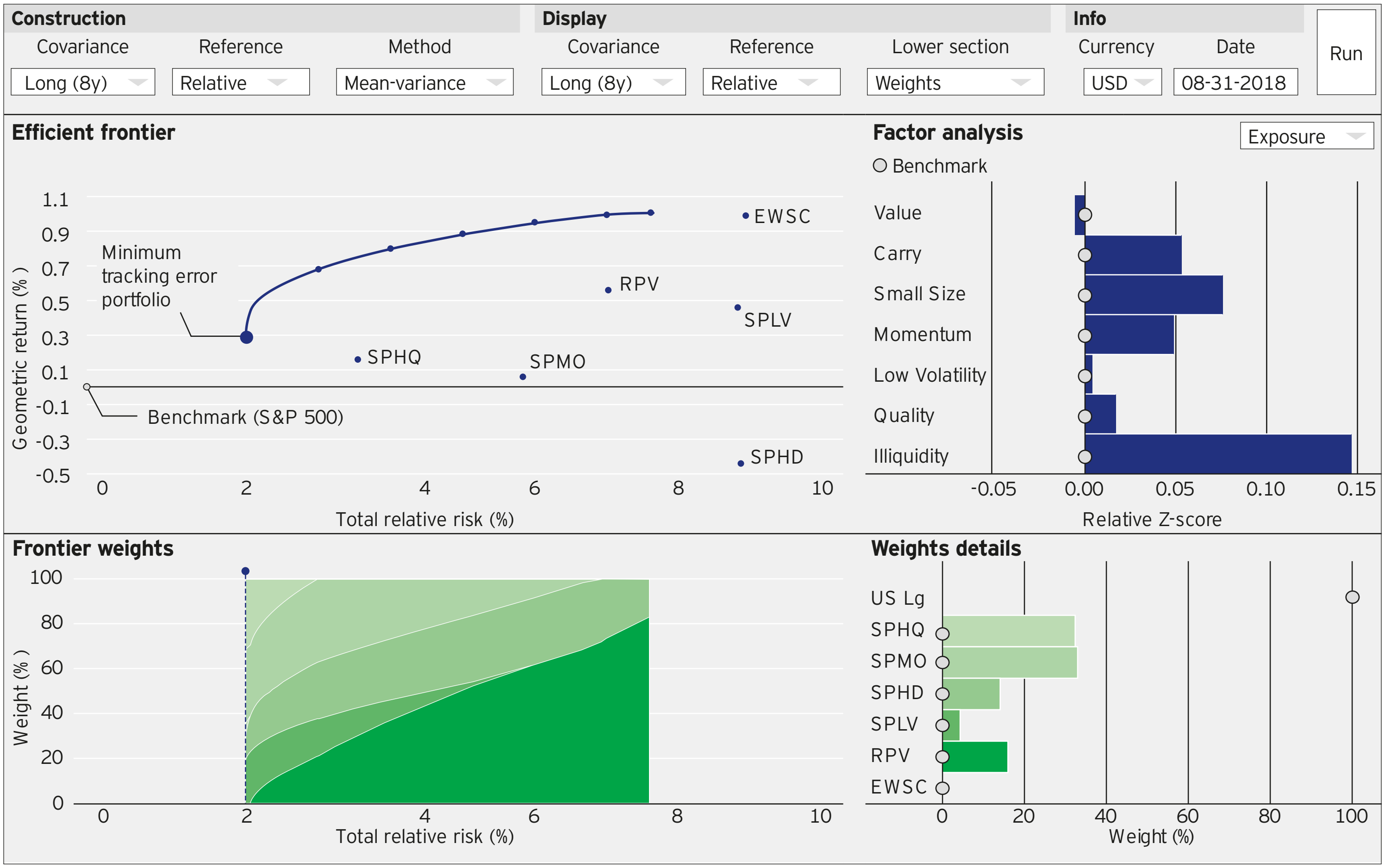
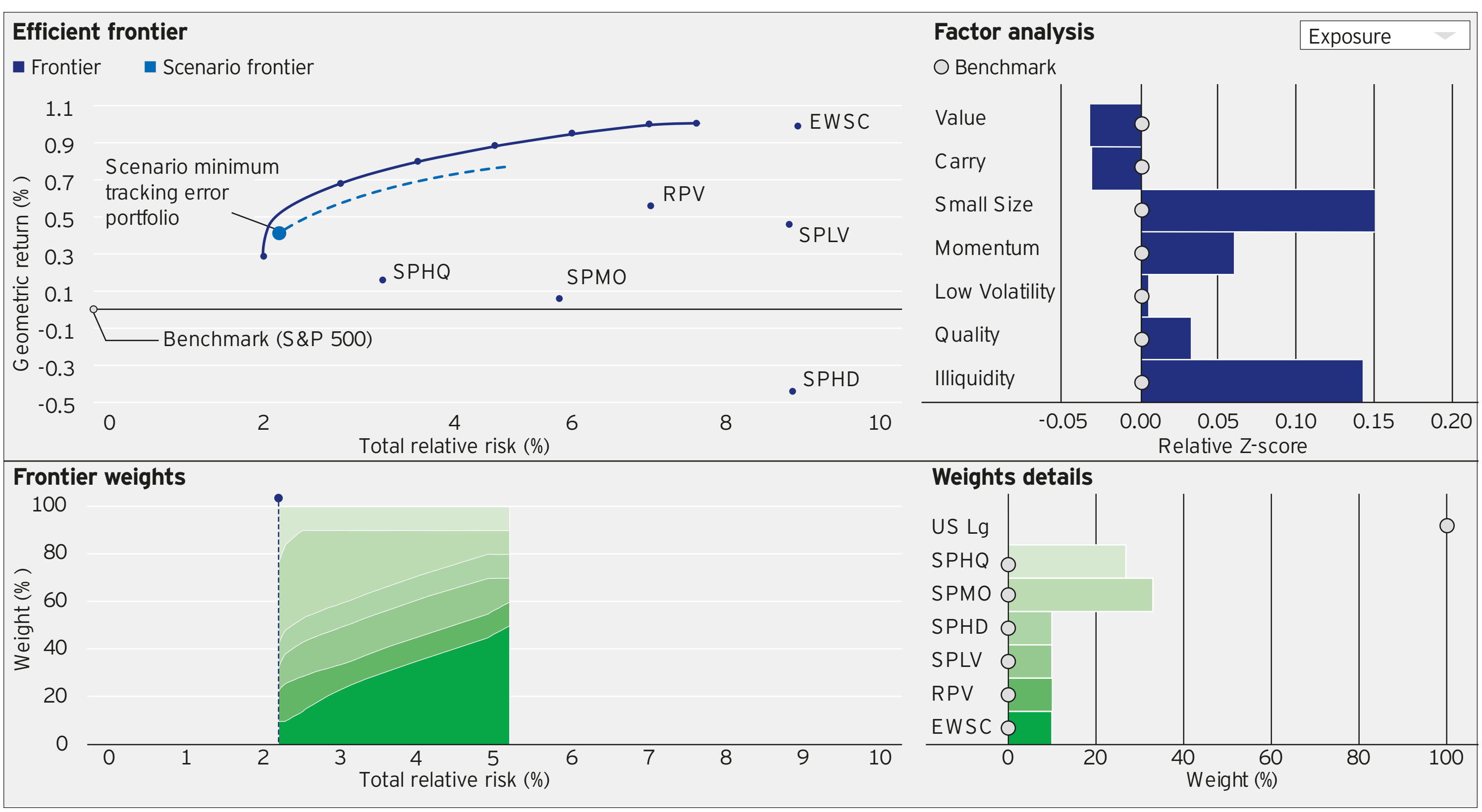


Figure C2b: Relative risk optimization – Style-premia portfolio
Constrained relative mean-variance efficient frontier (Requiring at least 10 percent in each constituent ETF)



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