Invesco Vision Case Study 11: Portfolio analysis with regulatory considerations

Solvency II

Invesco Vision has been designed to address both economic risk focused challenges, as well as those presented by regulatory requirements. There is no better example for showcasing this capability than with an insurance entity. Here we examine a UK-based insurer that is subject to Solvency II. For reasons of simplicity, we do not include a liability in the exercise, even though this could readily be done. We assume the insurer is looking to invest in some basic asset classes such as sovereign bonds, corporate bonds, direct real estate, and equities.

In the top panel of Figure C11a, we showcase a Solvency II based efficient frontier for a set of selected benchmarks. We also include a hypothetical portfolio that is mostly comprised of Gilts and GBP corporate bonds with a small allocation to Sovereign EM, UK equities and UK property. As can be seen, the frontier looks very similar in shape and spirit to a typical economic efficient frontier, with the main difference being that risk is now measured in terms of solvency capital requirement (SCR) charges. To create the frontier, we employ the published Solvency II correlation matrices under both negative and positive interest rate shocks. In this case, since there is no liability benchmark, the positive interest rate shock will be used across the entire frontier as it leads to the highest SCR charges.

In the lower panel of Figure C11a, we showcase the Solvency II SCR decomposition for three of the indices. Here, the UK Corporate block has SCR charges which stem from both interest rate exposure and spread exposure. The interest rate exposure is computed based on re-pricing the index based on EIOPA prescribed shocks for the UK sovereign curve. The spread exposure is computed based on the underlying bond spread durations and ratings, as dictated by the governing bodies. The real estate block is only exposed to the private real estate charges of 25%. In this example, we have assumed an unlevered property holding so there is no increase in charges due to leverage. In the case of a typical direct real estate fund, this would unlikely be the case. Finally, we show the Sovereign EM block that is exposed to interest rate charges, spread charges and foreign exchange charges as the bonds are denominated in USD and the based currency in GBP.

In Figure C11b, we revert to the standard economic risk and return axes. Here we can see that, in this context, the corporate index is showing up with lower risk than the Gilt index as dictated by its lower duration and negative correlation between spreads and rates. The Sovereign EM block is also showing up with lower relative risk than what we saw in the SCR framework. This is driven by the lower implied risk due to currency exposure. Finally, it is interesting to note the difference between the economic efficient frontier and the Solvency II frontier when viewed through the economic risk lens. It is evident that the two frontiers are noticeably different. If we dig deeper into the accompanying allocations, we will notice that the SCR frontier generally avoids the available spread assets while the economic frontier seeks them, especially in the lower risk solutions. These types of trade-offs are typical for these kinds of problems and will ultimately come down to what is most important to the investor and the level of improvement beyond which only trivial changes are observed.

EIOPA = European Insurance and Occupational Pensions Authority

Figure C11a: Efficient frontier - Solvency II
Solvency capital requirement efficient frontier

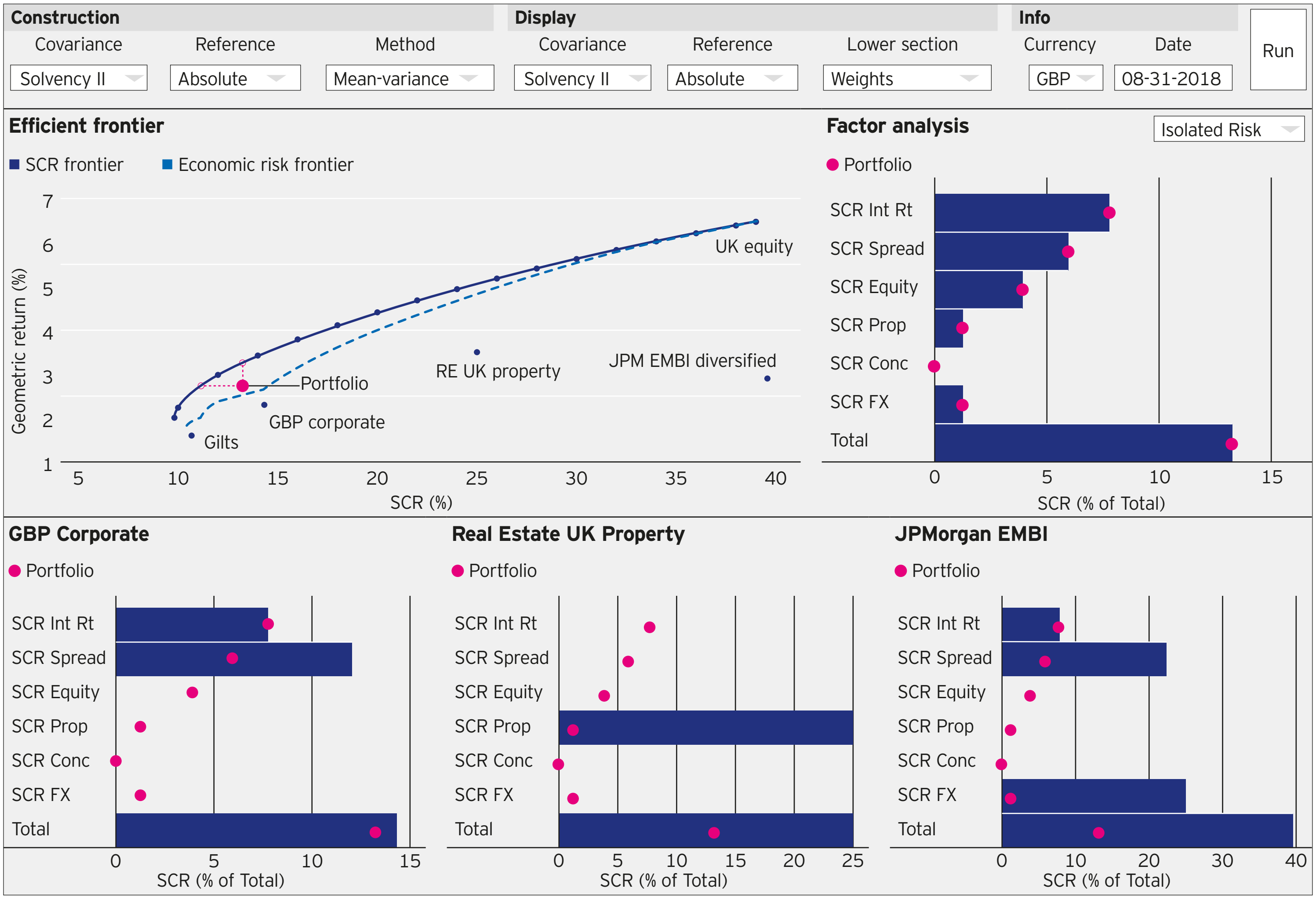
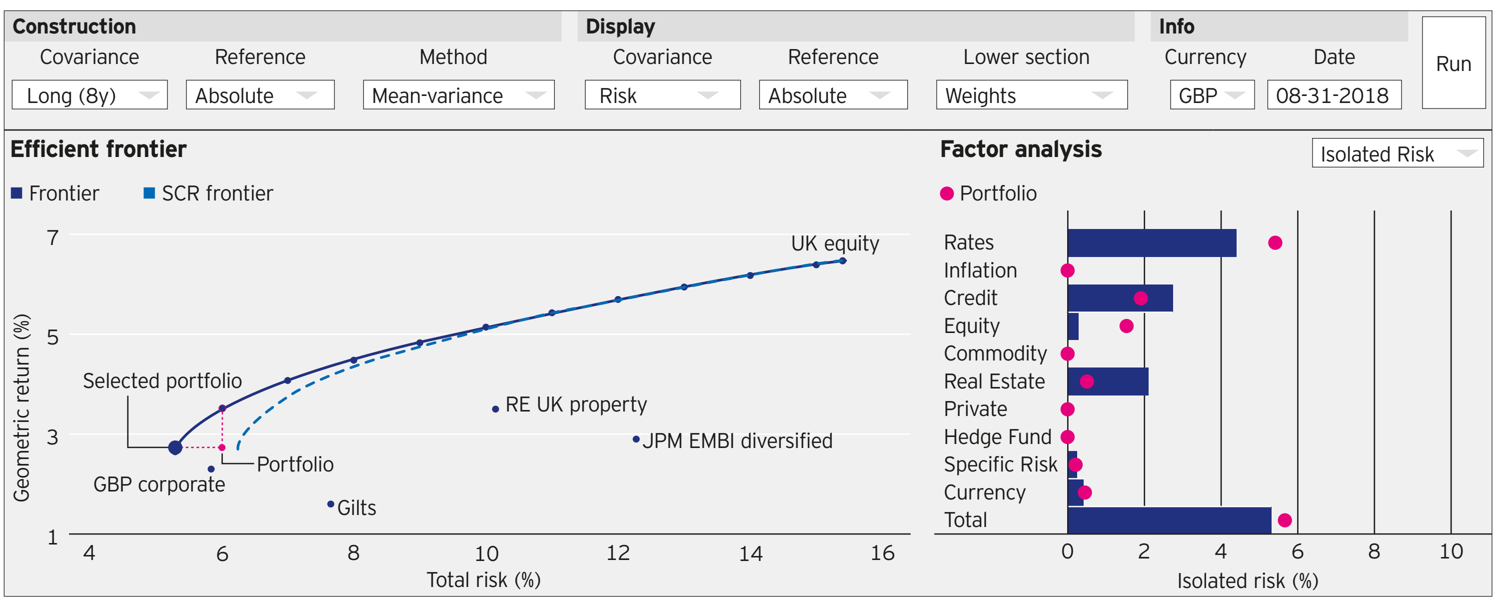


Figure C11b: Efficient frontier - Economic risk
Efficient frontier comparison



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