

Mathematics of Optimal Currency Alpha Allocation

Because currency alpha can be accessed without allocating capital, it does not displace any of the other asset classes in the portfolio. This makes the portfolio optimisation mathematics for currency alpha different from that of other asset classes.

The allocation to currency alpha, w , that preserves the expected return per unit risk of the portfolio is:

$$w = \frac{2V_p p \alpha - 2p^2 \text{Cov}(p, \alpha)}{p^2 V_\alpha - \alpha^2 V_p}$$

Where,

α = expected return to currency alpha

V_α = variance of currency alpha

p = expected return to portfolio without currency alpha

V_p = variance of portfolio without currency alpha

Examples

If the target annual volatility of the asset portfolio is 10%, with an expected return of 8%, then the optimal allocation to a 10% volatility currency alpha program is:

Example A

Currency alpha information ratio = 0.4

Correlation b/w assets and ccy alpha = 0.3

Optimal allocation to ccy alpha = 53%

Example B

Currency alpha information ratio = 0.5

Correlation b/w assets and ccy alpha = 0.4

Optimal allocation to ccy alpha = 74%

The role of correlations

Because currency alpha does not displace other asset classes, the correlation between it and the rest of the portfolio, ρ , is less important in the allocation decision than it is with funded asset classes. In fact, the optimal currency alpha allocation is above zero when:

$$\rho < \frac{\left(\frac{\alpha}{\sqrt{V_{\alpha}}}\right)}{\left(\frac{p}{\sqrt{V_P}}\right)} = \frac{\text{Currency Alpha IR}}{\text{Asset Portfolio IR}}$$

Examples

Under the same assumptions as above:

Example C

If,

Currency alpha information ratio = 0.4

Asset portfolio information ratio = 0.8

Then some ccy alpha is appropriate if:

Corr b/w assets and ccy alpha < 0.5

Example D

If,

Currency alpha information ratio = 0.6

Asset portfolio information ratio = 0.6

Then some ccy alpha is appropriate if:

Corr b/w assets and ccy alpha < 1.0