Let be the historical returns of indices corresponding to CMA asset classes for periods. Generally, . Using Singular Value Decomposition (SVD) –

where are the full left and right orthonormal eigenvectors and has the singular values along its diagonal.

We may limit the dimensionality to the first N columns of –

Given , as the historical returns of risk factors, we can propose a linear relationship between the factors and the CMA indices as –

So, we can estimate . From the above equations, we have –

Thus, given a vector of projected returns for the CMAs, , we can estimate a vector of projected returns for risk factors, .

In order to estimate –

where is the CMA-provided covariance of the indices.