

HW#1. Black-Litterman Model

There have been a number of questions regarding this homework. So let me explain it a bit more.

The major work is to calculate two sets of weights: equation (10) and equation (13) of our paper. To do that:

1. Let Σ be data (i.e. sample covariances) and also let $\underline{\mu}$ be data (i.e. sample means)
2. You still need to specify Ω and $\underline{q}$. This is quite subjective (and view-related).
The easiest way is to set the view matrix as the identity matrix $P = I$ and let $\Omega = \Sigma$. Or a little better, is to specify a view matrix (like our paper) and let $\Omega = [\omega_{ii}] = \underline{p}'_i \Sigma \underline{p}_i$ where $\underline{p}_i$ is the i th column of the view matrix. That is, let the diagonal elements of Ω be a view-impacted Σ . This is equation (20) of our paper. Of course, you can follow any suggestions by other authors.
3. To specify $\underline{q}$, you can do the same by letting $q_i = \underline{p}'_i \underline{\mu}$ (but for this, the view matrix must be a square matrix). This is equation (21) in our paper. Of course, you can follow any suggestions by other authors.
4. Finally, note that λ is arbitrary (some authors use Sharpe ratio) but usually it is a value less than 1.

Note that you can ignore equation (11) which is the Markowitz's mean-variance (efficient frontier) result. We do not use it in this homework at all. Hence, one bullet item in the requirement is removed (see a revised syllabus).