Abstract

A portfolio optimization problem having n assets and with inequality constraints can be formulated as a parametric quadratic programming problem. As the risk aversion parameter, t, is increased from zero, the efficient frontier is traced out and the efficient portfolios are piece-wise linear functions of t. In general, it is not possible to obtain closed form results. However, Best and Hlouskova [1] did obtain such results for a model with uncorrelated assets (i.e., a diagonal covariance matrix) with lower bound constraints. Their assumption of uncorrelated assets is generally considered unduly restrictive. Here, we weaken this assumption to partially correlated assets in the sense of a triple-branch covariance matrix where all but one asset are uncorrelated and the remaining asset is correlated with all the other assets. We show that the efficient frontier consists of n intervals and in the k-th interval (k between 1 and n-1), the holdings in the k-1 assets with the smallest expected returns are zero and at the end of the interval, the holdings in the asset with the k-th smallest expected return is reduced to zero. We also consider the introduction of a risk free asset. Our results generalize those of Best and Hlouskova to partially correlated assets.