

Several Strategies to Cope with Negative Weights in the Optimal Portfolio Allocation and Their Implementation

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Abstract

The mean-variance approach to optimal portfolio allocation, formulated and solved by the Nobel Prize winner Harold Markowitz, may lead to negative weights that require short selling actions. Traditional investors, such as mutual funds, try to avoid short selling. We consider several strategies to cope with negative weights in the linear combination of financial securities: truncation, using quadratic programming, and L_1 -penalization. Geometric illustration is provided and the numerical implementation is discussed using special packages in R, a popular statistical language. These strategies are applied to a specific type of financial securities, called Special Derivatives (SPD), and evaluated using Sharpe ratio.