

## Robust bi-objective mean-CVaR portfolio selection: applications to energy sector

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**Abstract.** A new approach to optimizing or hedging a portfolio of financial positions is presented and tested with applications to energy market. Motivated by uncertainty in the estimation of problem data we consider robust bi-objective optimization problems with mean and conditional value-at-risk objective functions where the underlying probability distribution of portfolio return is only known to belong to a certain set. To tackle the problem of uncertainty we consider two different approaches: in the first one, uncertainty is represented by an elliptic set centered at the sample estimators of mean and covariance matrix; in the second one, uncertainty takes into account experts beliefs. For both approaches, we derive analytical semi-closed-form solutions for the worst case mean-CVaR portfolio; in addition, we provide a characterization of the location of the robust Pareto frontier with respect to the corresponding original Pareto frontier.

**Keywords:** robustness; multi-objective portfolio selection; Conditional Value-at-Risk; efficient frontier; energy portfolio

## References