1060-49-34   **Andreas H Hamel*** (`ahamel@princeton.edu`), Department of Operations Research, and Financial Engineering, Sherrerd Hall, Charlton Street, Princeton, NJ 08544. *The set-valued approach for conical markets models: risk measures and utility functions.*

A main source for incompleteness of a financial market is the presence of transaction costs or bid-ask price spreads. If the set of portfolios which can be exchanged into a portfolio with non-negative positions for all assets in the market is a convex cone at every time point, the market is called conical.

Over the last years, it became apparent that major constructions for such markets, namely super-hedging prices (Schachermayer 2004, Pennanen, Penner 2010) and risk measures (Jouini et al. 2004, Hamel, Heyde 2010) are best understood as set-valued functions. Next to nothing has been published yet about the question how to minimize risk, if the risk is evaluated by a set-valued function.

We present an approach to set-valued optimization problems involving risk minimization and utility maximization in conical markets: A solution concept is defined, and optimality conditions and the construction of dual problems are discussed.

Our approach to utility functions for multivariate random variables is entirely new and different from known constructions (e.g. Campi, Owen 2008). It is based on a transformation of vector-valued utility functions to set-valued ones. The corresponding utility maximization problem turns out to be an optimization problem with a set-valued objective. (Received March 01, 2010)