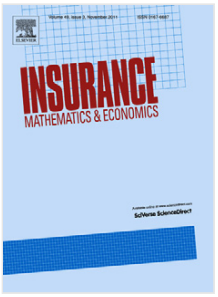

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Fuzzy portfolio optimization model under real constraints

Yong-Jun Liu, Wei-Guo Zhang*

School of Business Administration, South China University of Technology, Guangzhou, 510641, P.R. China

Abstract

This paper discusses a multi-objective portfolio optimization problem for practical portfolio selection in fuzzy environment, in which the return rates and the turnover rates are characterized by fuzzy variables. Based on the possibility theory, fuzzy return and liquidity are quantified by possiblisitic mean, and market risk and liquidity risk are measured by lower possiblisitic semivariance. Then, two possibilistic mean-semivariance models with real constraints are proposed. To solve the proposed models, a fuzzy multi-objective programming technique is utilized to transform them into corresponding single-objective models and then a genetic algorithm is designed for solution. Finally, a numerical example is given to illustrate the application of our models. Comparative results show that the designed algorithm is effective for solving the proposed models.

JEL classification C61; G11; D81; C63

Key words: Portfolio selection; Fuzzy number; Real constraints; Multi-objective optimization; Genetic algorithm

1. Introduction

The mean-variance (M-V) model of portfolio selection problem, originally proposed by Markowiz (1952), has played an important role in the development of modern portfolio selection theory. The basic idea of the M-V model is to quantify the expected return of portfolio as the investment risk and use the variance

*Corresponding author. Tel.: +86208711421; fax: +86208711405. *E-mail address:* liuyongjun0202@aliyun.com (Y.J. Liu), wgzhang@scut.edu.cn, zhwg61@263.net (W.G. Zhang).