
Preface

Most of the existing portfolio selection models are based on the probability theory. Though they often deal with the uncertainty via probabilistic approaches, we have to mention that the probabilistic approaches only partly capture the reality. Some other techniques have also been applied to handle the uncertainty of the financial markets, for instance, the fuzzy set theory [Zadeh (1965)]. In reality, many events with fuzziness are characterized by probabilistic approaches, although they are not random events. The fuzzy set theory has been widely used to solve many practical problems, including financial risk management. By using fuzzy mathematical approaches, quantitative analysis, qualitative analysis, the experts' knowledge and the investors' subjective opinions can be better integrated into a portfolio selection model.

The contents of this book mainly comprise of the authors' research results for fuzzy portfolio selection problems in recent years. In addition, in the book, the authors will also introduce some other important progress in the field of fuzzy portfolio optimization. Some fundamental issues and problems of portfolio selection have been studied systematically and extensively by the authors to apply fuzzy systems theory and optimization methods. A new framework for investment analysis is presented in this book. A series of portfolio selection models are given and some of them might be more efficient for practical applications. Some application examples are given to illustrate these models by using real data from the Chinese securities markets. The main innovative results of this book include: portfolio selection models with fuzzy liquidity constraints in a frictional securities market are proposed; based on the fuzzy decision theory, fuzzy portfolio selection models with S shape fuzzy numbers are formulated; an estimation approach for interval returns of securities is proposed; the concept of semi-absolute deviation interval risk function is given, portfolio selection models with interval returns and interval risk are formulated; and the semi-definite programming approach for estimating possibility distribution of returns of securities is proposed. Moreover, the center spread possibility distribution portfolio selection models in a frictional securities market are formulated, and the four fuzzy index tracking portfolio selection models

are formulated, based on the four different measuring methods for tracking index error.

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Theory and Methods

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