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Fuzzy compromise programming for portfolio selection

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Abstract

The aim of this paper is to solve a portfolio selection problem using Sharpe's single index model in a soft framework. Estimations of subjective or imprecise future beta for every asset can be represented through fuzzy numbers constructed on the basis of statistical data and the relevant knowledge of the financial analyst; the model, therefore, works with data that contain more information than any classical model and dealing with it does not involve a great extra computational effort. In order to solve the portfolio selection problem we have formulated a Fuzzy Compromise Programming problem. For this task we have introduced the fuzzy ideal solution concept based on soft preference and indifference relationships and on canonical representation of fuzzy numbers by means of their \hat{I}_{\pm} -cuts. The accuracy between the ideal solution and the objective values is evaluated handling the fuzzy parameters through their expected intervals and using discrepancy between fuzzy numbers in our analysis. A major feature of this model is its sensitivity to the analyst's opinion as well as to the decision-maker's preferences. This allows interaction with both when it comes to design the best

preferences. This allows interaction with both when it comes to design the best portfolio.



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Keywords

Portfolio selection; Fuzzy sets; Fuzzy compromise programming; Discrepancy between fuzzy numbers

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