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Forming a Portfolio of Exchange Traded Funds with the Clustering and UTADIS Hybrid Models

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EXTENDED ABSTRACT

INTRODUCTION

In many cases, it is necessary to rank among the limited number of investment options in order to choose one. The ranking is based on the priorities and benefits of each one compared to the other, which is usually offered in terms of certain indices. Thus, the position of each investment option is determined in relation to the other options and the decision maker can make the right choice by assuring the superiority of each one over the other. On the other hand, investment funds can play a major role regarding public interest in the stock market and contribute to reducing inflation, increasing production and boosting the national economy by adopting appropriate policies. On this basis, besides considering the role of utility in decision-making, and investor's risk-taking, the aim of this study is to use a hybrid model of clustering and utilities additives discriminates (UTADIS) methods to rank and form a portfolio of exchange traded funds.

METHODOLOGY

This research is applied in terms of purpose and descriptive in terms of data collection method, and the analytical-mathematical method has been utilized in it. Regarding the field of research, it falls under operational and financial management. The data were analyzed and the variables were calculated using Excel. Based on the obtained information and using MATLAB, cluster analysis was done applying the k-means method. Finally, the calculation of the utilities additives discriminates (UTADIS) method was calculated using Excel and GAMS and the initial model was solved.

FINDINGS

In this study, during a five-stage process, first the exchange traded investment funds were chosen for ranking as a case study, and from 32 Exchange Traded Funds (population), 26 Funds from Iran's capital market were selected as samples from March 2013 to November 2018. In the second step, three benchmark groups consisting of performance evaluation general criteria (return, risk and portfolio beta), modern criteria (sharp, treynor, Jensen and M2 ratios), and postmodern criteria (omega, sortino, kappa and upside potential) of the portfolio theory used in earlier research were calculated for the sample funds and were clustered with the mentioned criteria using the K-means method. Afterwards, considering certain validation indexes, the ideal number of clusters was determined. The results of the clustering method were the input data of the UTADIS method and the funds were ranked. After solving the primal model, in order to improve the results, a post-optimality analysis was done, after which, the weight of the criteria and the utility of alternatives were determined. Then in order to validate the results, the classification results validity test and the classification error test were carried out.

CONCLUSION

The results show that the hybrid method used was suitable and the return index with a weight of 0/153 had the biggest role and the Treynor ratio index with a weight of 0/039 had the smallest role in the Investment Portfolio. Also, with regard to the obtained results from the classification validity and testing the test sample, it was determined that the model was 100 percent accurate. Finally, three exchange traded funds of Arman Ati Kosar, Kian fund, tradable with a fixed income and Parand Paidar Sepehr, fell into the first cluster according to the k-mean clustering method and based on the utilities additives discriminates method, were the most desirable and were selected for portfolio formation.

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