

Statistical inferences for market network analysis

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Abstract

Network model of financial market attracts a growing attention last decades. In this model each stock corresponds to a vertex and a weighted link between two vertices is given by a measure of similarity of corresponding returns. The obtained network is a complete weighted graph. Market network analysis is an investigation of different characteristics of this graph. Most popular characteristics are minimum spanning tree, planar maximally filtered graph [1], market graph, maximum cliques and maximum independent sets [2].

Existing publications in the field does not pay attention to stochastic nature of financial data. As a consequence the statistical uncertainty of obtained results is out of control. In the present paper a general approach to handle this problem is proposed. This approach is based on statistical multiple decision theory. It is shown that network characteristics in Pearson correlation network are not robust. In contrast stable measure of similarity in the class of elliptically contoured distribution is proposed. This measure is based on probability of signs coincidence of random variables. Optimal statistical procedures for network characteristic identification are proposed. The statistical uncertainty of some popular network structures is investigated and compared for different financial markets. Some results in this direction are presented in [3, 4].

Keywords: market network analysis, statistical inference.

References

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