ESTIMATION OF TIME-VARYING COVARIANCE MATRICES FOR LARGE DATASETS

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Time variation is a fundamental problem in statistical and econometric analysis of macro-economic and financial data. In the context of the estimation of covariance matrix of large dimensional panels, such data requires taking into account time variation, possible dependence and heavy tailed distributions. In this paper we introduce a non-parametric version of regularisation technique of sparse large covariance matrices developed by Bickel and Levina (2008) [1] and others. We focus on the robustness of such a procedure to time variation, dependence and heavy-tailedness of distributions. The paper includes a set of results on Bernstein type inequalities for dependent unbounded variables which are expected to be applicable in statistical analysis beyond estimation of large covariance matrices. We discuss the utility of the robust thresholding method comparing it with other estimators in simulations and empirical application like the designing of the minimum variance portfolios.

References