A Useful Transformation for Analyzing Multivariate Volatility Processes

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Abstract

This article proposes the adoption of a linear transformation to rearrange multivariate volatility processes according to their ARCH effects. By showing that the principal components analysis of a special covariance contains all the information needed to identify the transformation, the proposed method on the one hand has the advantages of easy calculation and the robustness of its parametric assumptions. On the other hand, the conditionally heteroskedastic factor model is similar in terms of the transformation. The relationship between the transformation and the model are also discussed. Finally, the properties of the proposed method are illustrated via simulations and data analysis.

KEY WORDS: ARCH; Common features; Principle components analysis; Stock returns.