

Some classes of univariate and multivariate beta-generated distributions to model financial data

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Abstract

Empirical features of many financial data series have motivated the study of flexible classes of distributions which can incorporate properties such as skewness and fat-tailedness. In this paper, we propose the use of some models of univariate and multivariate beta-generated and generalized beta-generated distributions, for modelling financial data. We begin studying two classes of skew t distributions. The first family depends on two shape parameters which control the skewness and the tail weight, and the second family includes an extra parameter. We obtain analytical expressions for the cumulative distribution function, quantile function and moments, and some quantities useful in financial econometrics, including the value at risk. We provide several stochastic representations for these families in terms of usual distributions functions. Then, we propose some multivariate extensions and explore some of their properties. An empirical application with real data is provided, applying two alternative methods to estimate the parameters. On the one hand, we perform a conventional estimation of the parameters by maximum likelihood. We also explore the estimation of the parameters by modeling them as a function of other covariates, using non-parametric techniques.

Key words: asymmetric distribution; value at risk; multivariate extensions