Asymptotics of Cholesky GARCH Models and Time-Varying Conditional Betas

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This paper proposes a new model with time-varying slope coefficients. Our model, called CHAR, is a Cholesky-GARCH model, based on the Cholesky decomposition of the conditional variance matrix introduced by Pourahmadi (1999) in the context of longitudinal data. We derive stationarity and invertibility conditions and prove consistency and asymptotic normality of the Full and equation-by-equation QML estimators of this model. We then show that this class of models is useful to estimate conditional betas and compare it to the approach proposed by Engle (2016). Finally, we use real data in a portfolio and risk management exercise. We find that the CHAR model outperforms a model with constant betas as well as the dynamic conditional beta model of Engle (2016).

This is joint work with Christian Francq and Sébastien Laurent.