EGARCH Model

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$$x_t = \mu + a_t$$ $$\ln\sigma_t^2 = \alpha_o + \sum_{i=1}^p {\alpha_i \left(\left|\epsilon_{t-i}\right|+\gamma_i\epsilon_{t-i}\right)}+\sum_{j=1}^q{\beta_j \ln\sigma_{t-j}^2}$$ $$a_t = \sigma_t \times \epsilon_t$$ $$\epsilon_t \sim P_{\nu}(0,1)$$ Where:

- x_t is the time series value at time t.
- μ is the mean of GARCH model.
- a_t is the model's residual at time t.
- σ_t is the conditional standard deviation (i.e. volatility) at time t.
- p is the order of the ARCH component model.
- $\alpha_o,\alpha_1,\alpha_2,...,\alpha_p$ are the parameters of the the ARCH component model.
- q is the order of the GARCH component model.
- $\beta_1,\beta_2,...,\beta_q$ are the parameters of the the GARCH component model.
- $\left[\epsilon_t\right]$ are the standardized residuals: $$\left[\epsilon_t \right] \sim i.i.d$$ $$E\left[\epsilon_t\right]=0$$ $$\mathit{VAR}\left[\epsilon_t\right]=1$$
- P_{ν} is the probability distribution function for ϵ_t. Currently, the following distributions are supported:
    1. Normal distribution $$P_{\nu} = N(0,1)$$
    2. Student's t-distribution $$P_{\nu} = t_{\nu}(0,1)$$ $$\nu \succ 4$$
    3. Generalized error distribution (GED) $$P_{\nu} = \mathit{GED}_{\nu}(0,1)$$ $$\nu \succ 1$$

Remarks

1. The E-GARCH model differs from GARCH in several ways. For instance, it used the logged conditional variances to relax the positiveness constraint of model coefficients
2. EGARCH(p,q) model has 2p+q+2 estimated parameters

See Also

[template("related")]