

Assignment 8: GARCH Models

Using the French Databases introduced in the lectures

1. Estimate a univariate GARCH model for market returns and produce forecasts for the first two moments of this variable
2. Estimate over the sample 2000:1-2011:12 the following model

$$\begin{aligned}PR15_t &= \beta_0 + \beta_1 PR15_{t-1} + \beta_2 Jan_t + \beta_3 r_t^{mkt} + \sigma_1 u_{1t} \\ r_t^{mkt} &= \gamma_0 + \sigma_{2,t} u_{2t} \\ \sigma_t^2 &= \omega_0 + \omega_1 \sigma_{t-1}^2 + \omega_2 (r_t^{mkt} - \gamma_0)^2\end{aligned}$$

- (a) simulate the model with bootstrap to derive the VaR of holding Port15 in over the period 2012:1-2015:12, compare the VaR obtained by this procedure with the VaR derived by estimating a CAPM for PR15 and aCER for the market with constant volatilities
- (b) backtest the VaR from the model over the sample 2000:1-2015:12