Problem Set 7 on GARCH and VaR
Econ 40357 Financial Econometrics
University of Notre Dame
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Problems 1-5 are about estimating the GARCH model, and using it to compute value-at-risk. Use the sheet PS04_A in Eviews workfile ps04.wf1. It contains daily market returns stated in **percent**. The returns variable is called 'mkt)'.

1. Let r_t be the market return. Estimate the GARCH(1,1)-M model,

   $$r_t = a_0 + a_1 r_{t-1} + b\sigma_t + u_t$$

   where

   $$\sigma_t^2 = \alpha_0 + \alpha_1 u_{t-1}^2 + \beta\sigma_{t-1}^2$$

   over the sample "@first 10/8/2008". Show the estimation output and interpret (tell a story about) your estimation results.

   Do your estimates support the efficient markets hypothesis?

2. Show a plot, and tell a story to your clients, about the estimated GARCH process.

3. Generate static forecasts of the excess return and the conditional variance over the period 10/09/2008 to 10/13/2008.

   Ask to insert actuals for out-of-sample observations.

   Report the forecasted return and forcasted GARCH from 10/09/2008 to 10/13/2008.

4. Using your 'forecasts' of the market return and conditional variance, compute the one-day 5% value-at-risk of a $1M investment in the market portfolio on 10/9/2008. (I would use Excel for this question)

5. Compute the forecasted one-day 5% value-at-risk of the $1M investment on 10/10/2008.

   Use sheet PS04_B for the remainder of the problem set. These are monthly historical data. dy is the dividend yield, gr is the gross return on the S&P index, p is the price of the index, and pd is the price-divdend ratio (1/dy).

6. Regress the one-month ahead gross return on the current dividend yield. Show your estimation results, and interpret.

7. Plot the one-month ahead gross return and the current dividend yield.

8. Regress the 96-month ahead gross return on the current dividend yield. Show your estimation results and interpret.

9. Plot the 96-month ahead gross return and the current dividend yield.