

ECON 593 2019. Problem Set PS_01.

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Dataset:

- ECON_593_PS_01 data.xlsx

available on CANVAS

Exercise 1 The file `ECON_593_PS_01 data.xlsx` contains data on daily returns on different indexes (all series with JPM in the name are bond indexes, all series with MSCI in the name are stock indexes and then we have the dollar daily returns on yen, GB pound and Euro). Pick a series for bond, stock and exchange rate returns and compute the correlogram and the Jarque Bera tests for the series and the squared of the series. Comment the results.

Exercise 2 Compute the IID tests for the 3 series of your choice and interpret the results.

Exercise 3 For a bond and a stock series of your choice estimate a ARCH(1) model of the kind:

$$\begin{aligned}y_t &= c + \phi_1 \times y_{t-1} + u_t \\h_t &= \alpha_0 + \alpha_1 \times u_{t-1}^2\end{aligned}$$

Comment the results

Exercise 4 Verify the presence of ARCH effects in all known ways.

Exercise 5 Find an analytical expression for the kurtosis of u_t , the process used in Exercise 3. When is such kurtosis equal to 3?. Discuss the results.

Exercise 6 Estimate a GARCH(1,1) model for the two series you have chosen. Test for the significance of the GARCH coefficients. Obtain and plot the series of the standardised residuals:

$$\frac{\tilde{u}_t}{\sqrt{\hat{h}_t}} \tag{1}$$