Econometrics

Lecture 6: The effect of bad news on market capitalization

File "bnews.data" contains monthly data for five years regarding two variables. Variable y represents the market capitalization [1000$] of company B, while variable x is the price of oil [dollars per barrel].

The share price of a company can be sensitive to bad news. Suppose that Company B is in an industry which is particularly sensitive to the price of oil. If the latter grows up, then the profits of the company will tend to go down and some investors, anticipating this, will sell their shares of Company B driving its price (and market capitalization) down.

This effect might not happen immediately - for instance, it may occur with a few months of delay. For instance, if Company B holds large inventories produced with cheap oil, it can sell these and maintain its profits for a while. But when new production is required, the higher oil price will lower profits. Furthermore, the effect of the oil price might not last forever, since Company B also has some flexibility in its production process and can gradually adjust to higher oil prices.

Hence, the news about oil price can affect the market capitalization of Company B, but the effect might not happen immediately and might not last too long. This theoretical model can be subject to empirical verification.

Consider the following model

$$y_t = \alpha + \beta_0 x_t + \beta_1 x_{t-1} + \epsilon_t \tag{1}$$

where y_t is the market capitalization, x_t is the price of oil and $\epsilon_t \tilde{(}0, \sigma_t^2)$.

1. Estimate the above model by the OLS and discuss the results.
2. Test for the presence of heteroskedasticity.
3. Given the use of time series data, autocorrelation can be present. Test for the presence of autocorrelation. Consider a level of significance of 10% and order of autocorrelation of 6.
4. If the null hypothesis of no autocorrelation is rejected, estimate again model (1) by adding three additional lags for the independent variable to the equation (up to $t-4$):
$$y_t = \alpha + \beta_0 x_t + \beta_1 x_{t-1} + \beta_2 x_{t-2} + \beta_3 x_{t-3} + \beta_4 x_{t-4} + \epsilon_t. \tag{2}$$
5. Test for the presence of autocorrelation.Consider a level of significance of 10% and order of autocorrelation of 6.
6. Compare the results of point 4 and 5.

Notes by Andrea Perchiazzo. Thanks to professor Andrea Monticini.