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# Econometrics

## Lecture 2: Understanding stock's price race

Consider the Capital Asset Pricing Model(CAPM) model

$$y_t = \alpha + \beta x_t + u_t \quad (1)$$

where  $y_t$  is the excess return on a company's stock at time  $t$ ,  $x_t$  is the excess return of the market portfolio (in our case we will use a stock index - NASDAQ) and  $u_t$  is the error term of the regression.

$\beta$  is an indicator of risk and return associated with the stock. When  $\beta = 1$ , the expected net return is equal to the return of the market. When  $\beta < 1$ , the expected net return is lower than the return of the market, correspondingly the security is less risky. Finally, when  $\beta > 1$ , the expected net return of the asset is greater than the return of the market and, therefore, the security is more risky. Recall that, if the CAPM is verified,  $\alpha = 0$ .

1. Consider time interval 23/05/2019 – 22/07/2019. Using yahoo finance, get the following daily time series:
  - Ferrari;
  - NASDAQ Composite Index;
  - 3-month Treasury Bill.
2. Compute the daily excess return of the above series and call them *er\_ferr* (Ferrari) and *er\_nsdq* (Nasdaq Composite Index).
3. Estimate equation (1).
4. Compute the 95% confidence interval for the above parameters.
5. Test the following hypotheses:
  - i.  $H_0 : \alpha = 0$  vs  $H_1 : \alpha \neq 0$ ;
  - ii.  $H_0 : \beta = 0$  vs  $H_1 : \beta > 0$ .
6. The standard deviation of the OLS residuals measures the individual risk of the stock and the  $R^2$  of the regression measures the proportion of the risk attributable to the market (as opposed to individual factors). Comment on the values you observe.

Remark: see the end of the script file to see how to download data.