Track 7: Synthetic versus cash credit risk market

Credit Default Swaps (CDS) are derivative contracts which allow to synthetically hedge credit risk of a specific security on which the contract is written. They can be thought as insurance contracts against the haircut of a security value due to a credit event (default, delay in payment of debt..). The CDS buyer (long position) pays a periodic fee (the CDS spread) and will be repaid of the loss in case of default of the issuer. CDS are customly used as a metric of the issuer's credit risk.
Alternatively, credit risk can be proxied with the spread of target security on a benchmark, risk-free rate. The time series report the CDS spread (5y) written on soverign Spanish bonds and the 5-year OIS spread of 5y Spanish bond, as two different proxies for Spanish credit risk.

- Report descriptive statistics of all the time series: mean, standard deviation and correlation matrix.
- Test for unit root and determine the order of integration of each process.
- Fit a one-dimensional AR(p) process to each of the time series. Report the AIC, BIC values and the adjusted R^2 statistic.
- Analyze residuals to check the adequacy of the model (residual correlation, heteroscedasticity and gaussianity).
- Estimate a VAR($\bar{p}$) model, being $\bar{p} = \max\{p_i\}$ and p_i the estimated number of lags of each process. In case each of the processes displays unit root, test for cointegration using the model H1*, and report also the eventual cointegrating matrix and speeds and the correspondent confidence intervals (use `jcontest`). Otherwise, estimate the model in differences.
- Determine which of the two metrics is driving the others by checking Granger causality in the previously estimated VAR model.
- Fit a GARCH(1,1) model to each of the time series separatedly and compare the two volatilities processes. Comment the results.