

Take Home Exam – Python for Finance – MaBDA

In order to complete this exam, you need to download from [my personal website](#) the excel file named `data_exam_nomacro.xlsx`. Note that the excel file contains two spreadsheets: `stocks` and `bonds`. You must submit your Python notebook (or script + output) by April 14 at midnight by sending me an email at nborri@luiss.it. Feel free to email me with questions and clarifications, and/or Skype me (my userid is `nborri1`). To answer the questions below, I recommend to follow the Python notebooks we discussed in class, and that you also find on my website. It would be useful if you can add short text comments to explain step-by-step what you do. Good luck!

Problem 1 (95% of the grade)

Consider the spreadsheet `stocks`. It contains daily stock prices for the Italian stock index (FTSE MIB), and for five Italian listed companies (Fiat, Unicredit, IntesaSanPaolo, ENI, and Luxoctica):

1. build daily returns for the stock index and for the five stocks;
2. report mean and standard deviation (annualized);
3. report additional descriptive statistics that you think are useful (i.e., skewness, kurtosis, etc.).
4. plot the mean and standard deviation of returns computed over a rolling window of 60 days.
5. for each of the five stock, estimate a OLS regression where the dependent variable are the daily stock returns and the independent variables are the daily returns on the stock index (and a constant). Call the OLS coefficient on the stock index β . Report the β , and the associated p-values at 5% significance level.
6. plot the β of each stock (x-axis) against the average daily stock returns (y-axis).

Problem 2 (5% of the grade)

Consider the spreadsheet `bonds`. It contains monthly yield to maturities of Italian sovereign zero-coupon bonds with maturities 3-months, 1-year, 2-year, 5-year, and 10-year.

1. plot the yield curve for the first and last available dates, along the average yield curve (recall: the yield curve is a plot of the yield to maturities as function of the zero-coupon bond maturities).
2. is the average yield curve flat, or is it positive/negative sloped?

3. compute the monthly zero-coupon bond prices implied by the yield to maturity on the zero-coupon bond (recall: for the 1-year bond the following relation holds $P_t^{(12)} = 100/(1 + y_t^{(12)})$, where the superscript denotes the months to maturity).