MSc in Data Science

Time Series and Forecasting Methods

Lecturer: Ioannis Vrontos

The data you will have to analyze are in the eclass in the excel JP_MORGAN_US_FUNDS.xls file. The dependent variables for which you will construct the models you are asked for are the returns of different US Mutual Funds (22 mutual fund returns, sheet: 'JP_MORGAN_US') for the period 8/1987 – 7/2019. The independent variables you will use in the models refer to monthly returns for the variables x1 = Mkt-Rf, x2 = SMB, x3 = HML, x4 = RMW, x5 = CMA, x6 = MOM, for the period 8/1987 - 7/2019 (sheet: 'Factors', Note: divide the factor values/100).

Analyze the dependent variables:

1. Construct an appropriate time series model (AR, MA, ARMA).
2. Develop an appropriate regression model
    a. In case of autocorrelation problem of regression residuals, correct the autocorrelation problem (using time series AR, MA, ARMA models).
    b. In case of heteroscedasticity problem of regression residuals, correct the heteroskedasticity problem (using time-varying ARCH, GARCH models).
3. Write the models you have found at questions (1) - (2). Assess the goodness of fit of these models based on the AIC and BIC information criteria.

[Each student will have to analyze **two only** dependent variables].

Date of delivery of the assignment: Exam date of the course.