QUANTITATIVE FINANCE

School of Finance, SUFE

Exercise for Part I (Spring, 2020)

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Go to Yahoo!Finance (https://finance.yahoo.com/) to download daily and monthly data for the Dow Jones Industrial Average (DJIA) from 1990/01/01 - 2020/01/01. Use adjusted close prices for the return calculation below.

a. (Simple Returns) Calculate the daily and monthly simple returns in percentages. Compute the sample mean, standard deviation, skewness, excess kurtosis, minimum, and maximum of the percentage simple returns for both data frequency.

b. (Log Returns) Transform the simple returns to log returns, and compute the sample mean, standard deviation, skewness, excess kurtosis, minimum, and maximum.

c. Compare the mean, standard deviation, skewness, and excess kurtosis of daily returns to those of the monthly returns.

d. Apply the MLE method to estimate the parameters of the following distributions for the daily log returns: 1) Normal Distribution; 2) Mixture Normal Distribution in PPT Equation 18; 3) Mixture Normal Distribution in PPT Equation 26. And compare them.

e. Repeat the last step d for the monthly returns. Do you find that the monthly returns are closer to being normal?

f. What are the daily and monthly simple and log returns of investing in a portfolio consisting of two equally weighted uncorrelated assets with the same mean as the DJIA?