Empirical Finance: Methods & Applications
Problem Set 1

Data

Collect the following data (e.g., Bloomberg, Datastream, Yahoo Finance)

- S&P500 Index (SP500)

- GBPUSD exchange rate (GBPUSD)

- US Federal Fund Rate (FFR).

Exercise 1

Using both daily simple and log returns

a) Plot your simple returns,

b) Compute summary statistics like mean, median, standard deviation, skewness, kurtosis (including the robust ones) min, max, and first-order serial correlation, and report then in % per annum,

c) Plot the histogram of each return series,

d) Compute the variance-covariance matrix.

Exercise 2

Using both end-of-month simple and log returns

a) Plot your simple returns,

b) Compute summary statistics like mean, median, standard deviation, skewness, kurtosis (including the robust ones) min, max, and first-order serial correlation, and report then in % per annum,

c) Plot the histogram of each return series,

d) Compute the variance-covariance matrix.

Exercise 3

a) Sample 1000 draws from a Normal distribution with $\mu = 0$ and $\sigma = 1$. Plot the histogram of these draws.

b) Sample 1000 draws from a Standardized t-distribution with $\mu = 0$, $\sigma = 1$, and $v = 5$. Plot the histogram of these draws.

c) Sample 1000 draws from a Standardized t-distribution with $\mu = 0$, $\sigma = 1$, and $v = 30$. Plot the histogram of these draws.

d) Sample 1000 draws from a Standardized skewed t-distribution with $\mu = 0$, $\sigma = 1$, $v = 5$, and $\xi = 0.5$. Plot the histogram of these draws.

e) Sample 1000 draws from a Standardized skewed t-distribution with $\mu = 0$, $\sigma = 1$, $v = 5$, and $\xi = 2$. Plot the histogram of these draws.

Don't forget to set the random seed
Set the parameters clearly

in the TA's file, for t distrib function, df stands for degrees of freedom not dataframe

Skewness might shift density to left or right

Skewness is about symetry
kurtosis is about