Econometrics

Lecture 1: Stressful days in Wall Street

The file "djia daily.dta" contains the daily time series of the Dow Jones Industrial Average Index (DJIA) over the period $01/10/1970 - 26/09/2013$.

1. Import data and show the first few rows of the dataframe. Plot DJIA daily values.
2. Plot the daily return of the DJIA, calling the new variable *ret_djia*.
3. Compute some descriptive statistics for the variable *ret_djia*.
4. Define a subsample of *ret_djia* called *ret_djia_sub* of the period $01/09/1987-17/10/1987$. Compute the average and the standard deviation of the new variable and make a boxplot of it.
5. Plot the density of the new variable.
6. Given a normal distribution with mean and standard deviation equal to those of *ret_djia_sub*, compute the probability to observe a value smaller than -22%. Notice that on Monday, October 19, 1987, the DJIA fell 508 points dropping from 2,246.73 to 1,738.74 (-22.61%). Using the same setting, compute the probability to observe a value smaller than -2%.
7. Using a t distribution with 3 d.f., compute the probability to obtain a value smaller than -2%.
8. Add a gaussian random variable with mean 5 and standard deviation 2 and call it *gauss*.
9. Plot a scatterplot between the variable *gauss* and *ret_djia_sub*. Can you observe any particular relationship?
10. Save the series *ret_djia* in a .csv file.
11. *Extra* Load the SPX, the Coca Cola and the US CPI time series from Jan 2010 to February 2024.
12. *Extra* Compute log-return and return of Coca Cola and of the S&P 500 index. Compute the compound return using both log-return and total return of Coca Cola and compare them.
13. *Extra* Consider the US CPI as price deflator. Compute the deflated time-series of Coca Cola.
14. *Extra* Estimate the CAPM model for Coca Cola (with S&P 500 as the market return). Assume zero risk free. Comment on the estimated α and β.