

QUANTITATIVE ANALYSIS

Correlation Coefficient, r

The *correlation coefficient* is bounded by -1 and +1. If the correlation is zero, the variables x and y are uncorrelated.

$$r_{x,y} = \frac{\text{cov}(x,y)}{\sigma_x \sigma_y} = \sqrt{R^2}$$

Measures of Central Tendency

Arithmetic mean: sum of all observation values in sample/population divided by the number of observations. *Mode*: value that occurs most frequently in a data set. *Median*: midpoint of a data set when data is arranged in an ascending or descending order.

Variance and Standard Deviation

Variance: average of squared deviations from the mean.

$$\text{population variance} = \sigma^2 = \frac{\sum_{i=1}^N (X_i - \mu)^2}{N}$$

$$\text{sample variance} = s^2 = \frac{\sum_{i=1}^n (X_i - \bar{X})^2}{n-1}$$

Standard deviation: square root of the variance.