Econ 423: Pre-Econometrics

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1 Descriptive statistics notation and formulas

Descriptive Statistic	Sample Version	Population Version
Number of observations	n	N
Mean of x	$\overline{x}=\frac{1}{n}\sum_{i=1}^{n} x_i$	$\mu_x=\frac{1}{N}\sum_{i=1}^{N} x_i$
Variance of x	$s_x^2 = \frac{1}{n-1}\sum_{i=1}^{n}(x_i-\overline{x})^2$	$\sigma_x^2=\frac{1}{N}\sum_{i=1}^{N}(x_i-\mu_x)^2$
Standard deviation of x	$s_x = \sqrt{s_x^2}$	$\sigma_x=\sqrt{\sigma_x^2}$
Covariance of x and y	$S_{xy} = \frac{1}{n-1}\sum_{i=1}^{n}(x_i-\overline{x})(y_i-\overline{y})$	$\sigma_{xy}=\frac{1}{N}\sum_{i=1}^{N}(x_i-\mu_x)(y_i-\mu_y)$
Correlation of x and y	$r_{xy} = \frac{s_{xy}}{s_x s_y}$	$\rho_{xy}=\frac{\sigma_{xy}}{\sigma_x\sigma_y}$

Using the frequency method

Descriptive Statistic	Sample Version	Population Version
Mean of x	$\overline{x}=\frac{1}{n}\sum_{h=1}^{m} x_h F_{x_h}$	$\mu_x=\frac{1}{N}\sum_{h=1}^{M} x_h F_{x_h}$
Variance of x	$s_x^2 = \frac{1}{n-1}\sum_{h=1}^{m}(x_h-\overline{x})^2 F_{x_h}$	$\sigma_x^2=\frac{1}{N}\sum_{h=1}^{M}(x_i-\mu_x)^2 F_{x_h}$

x_h: distinct value of x

m or M: number of distinct values of x in the sample or population

F_{x_h}: Frequency of the value x_h