

$$Z_{stat} = \frac{(\bar{x} - \mu_0)\sqrt{n}}{\sigma} \text{ or } T_{stat} = \frac{(\bar{x} - \mu_0)\sqrt{n}}{s}$$

$$Z_{stat} = \frac{\hat{p} - \pi_0}{\sqrt{\frac{\pi_0(1-\pi_0)}{n}}} \text{ where } \hat{p} = \frac{x}{n} \quad \chi^2_{stat} = \frac{(n-1)s^2}{\sigma_0^2}$$

$$\text{And } F_{stat} = \frac{s_i^2}{s_j^2} \text{ where } fd_1 = n_i - 1$$

$$\text{The } d_i = x_{1i} - x_{2i} \text{ with } T_{stat} = \frac{(\bar{d} - \mu_0)\sqrt{n}}{s_d}$$

$$\text{Where } \bar{d} = \frac{\sum d}{n} \text{ \& } s_d = \sqrt{\frac{\sum d^2 - n\bar{d}^2}{n-1}}$$

$$Z_{stat} = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} \text{ or } Z_{stat} = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

$$T_{stat} = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{s_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \text{ where } s_p = \sqrt{\frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1 + n_2 - 2}}$$

$$T_{stat} = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} \text{ where } df = \frac{\left(\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}\right)^2}{\left(\frac{s_1^2}{n_1}\right)^2 + \left(\frac{s_2^2}{n_2}\right)^2}$$

$$Z_{stat} = \frac{(\hat{p}_1 - \hat{p}_2) - \pi_0}{\sqrt{\hat{p}(1-\hat{p})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

$$\text{where } \hat{p} = \frac{x_1 + x_2}{n_1 + n_2} \text{ \& } \hat{p}_1 = \frac{x_1}{n_1} \quad \hat{p}_2 = \frac{x_2}{n_2}$$

$$\chi^2_{stat} = \sum \frac{(f_o - f_e)^2}{f_e}, \quad df = (c-1)(r-1)$$

$$|p_i - p_j| > \sqrt{\chi^2_{\alpha} \left[\frac{p_i(1-p_i)}{n_i} + \frac{p_j(1-p_j)}{n_j} \right]}$$

$$r = \frac{S_{xy}}{\sqrt{S_{xx} \cdot S_{yy}}} \text{ where } S_{xx} = \sum (x - \bar{x})^2$$

$$S_{yy} = \sum (y - \bar{y})^2 \text{ and } S_{xy} = \sum (x - \bar{x})(y - \bar{y})$$

$$T_{stat} = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} \text{ \& } df = n - 2$$

$$\hat{y} = b_0 + b_1x \text{ where } b_1 = \frac{S_{xy}}{S_{xx}} \text{ \& } b_0 = \bar{y} - b_1\bar{x}$$

$$SST = S_{yy} = \sum y^2 - n\bar{y}^2,$$

$$SSR = b_1 S_{xy} = \frac{S_{xy}^2}{S_{xx}} \text{ \& } SSE = SST - SSR$$

$$R^2 = \frac{SSR}{SST} \text{ and } R^2_{adj} = 1 - (1 - R^2) \left(\frac{n-1}{n-k-1} \right)$$

$$\text{And } S_{\epsilon} = S_{y.x} = \sqrt{\frac{SSE}{n-k-1}} \text{ with } S_{b_1} = \frac{S_{\epsilon}}{\sqrt{S_{xx}}}$$

$$T_{stat} = \frac{b_1 - \beta_{10}}{S_{b_1}} \text{ and } b_1 \pm t_{\frac{\alpha}{2}, df} S_{b_1} \text{ where } df = n - k - 1$$

$$\hat{y} \pm t_{\frac{\alpha}{2}, df} S_{\epsilon} \sqrt{\frac{1}{n} + \frac{(x_p - \bar{x})^2}{S_{xx}}} \text{ \& } \hat{y} \pm t_{\frac{\alpha}{2}, df} S_{\epsilon} \sqrt{1 + \frac{1}{n} + \frac{(x_p - \bar{x})^2}{S_{xx}}}$$

$$F_{stat} = \frac{MSR}{MSE} \text{ where } df_1 = k$$

$$df_2 = n - k - 1$$

$$SSR(X_j | \text{all other } X's) = SSR_{Full} - SSR_{(X_j)}$$

$$r^2_{Y2.1} = \frac{SSR(X_j | \text{all other } X's)}{SST_{Full} - SSR_{Full} + SSR(X_j | \text{all other } X's)}$$

$$F_{stat} = \frac{SSR(X_j | \text{all other } X's)}{MSE_{Full}} \text{ \& } df_1 = 1$$

$$df_2 = n - k - 1$$

$$F_{stat} = \frac{SSR_{Full} - SSR_{Others}}{MSE_{Full}} \text{ , } df_1 = m$$

$$df_2 = n - k - 1$$

$$VIF_j = \frac{1}{1 - R_j^2} \text{ \& } C_p = \frac{(1 - R_k^2)(n - T)}{1 - R_k^2} - (n - 2k - 2)$$

$$I_t = \frac{y_t}{y_0}, \quad I_t = \frac{\sum p_t}{\sum p_0} (100) \text{ \& } E_{t+1} = wy_t + (1 - w)E_t$$

$$IP_t = \frac{\sum p_t q_t}{\sum p_0 q_t} (100) \quad IL_t = \frac{\sum p_t q_0}{\sum p_0 q_0} (100)$$

$$y_t = \beta_0 \beta_1^{x_t} \epsilon_t \text{ then}$$

$$\log(y_t) = \log(\beta_0) + x_t \log(\beta_1) + \log(\epsilon_t)$$

$$y_t = \beta_0 \beta_1^{x_t} \beta_2^{Q_1} \beta_3^{Q_2} \beta_4^{Q_3} \epsilon_t$$

$$y_t = A_0 + A_1 y_{t-1} + A_2 y_{t-2} + \dots + A_p y_{t-p} + \epsilon$$