ECN 102: Analysis of Economics Data

Final Exam Formula Sheet – Beauregard

Univariate Data

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i \quad s_x^2 = \frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2 \quad se_x = \frac{s_x}{\sqrt{n}}$$

$$\bar{x} \pm t^*_{\alpha/2;n-1} \times (s_x/\sqrt{n}) \quad t = \frac{\bar{x} - \mu_0}{s_x/\sqrt{n}}$$

$$ttail(df, t) = P[T > t] \quad invttail(df, p) \rightarrow t^* : P[T > t^*] = p$$

Bivariate Data

$$r_{xy} = \frac{s_{xy}}{s_x s_y} \quad \hat{y} = b_1 + b_2 x \quad b_1 = \bar{y} - b_2\bar{x} \quad b_2 = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sum_{i=1}^{n}(x_i - \bar{x})^2} = r_{xy}\frac{s_y}{s_x}$$

$$TSS = \sum(y_i - \bar{y})^2 \quad ResSS = \sum(y_i - \hat{y}_i)^2 \quad R^2 = 1 - \frac{ResSS}{TSS}$$

$$b_2 \pm t^*_{\alpha/2;n-2} \times s_{b_2} \quad t = \frac{b_2 - \beta_2}{s_{b_2}} \quad s_{b_2} = \frac{s_e}{\sqrt{\sum(x_i - \bar{x})^2}} \quad s_e = \sqrt{\frac{ResSS}{n-2}}$$

Multivariate Data

$$\hat{y} = b_1 + b_2 x_2 + ... + b_k x_k \quad b_j = \frac{\sum_{i=1}^{n}\tilde{x}_{ji}(y_i - \bar{y})}{\sum_{i=1}^{n}\tilde{x}_{ji}^2}$$

$$b_j \pm t^*_{\alpha/2,n-k} \times s_{b_j} \quad t = \frac{b_j - \beta_j}{s_{b_j}} \quad s_{b_j} = \frac{s_e}{\sqrt{\sum_{i=1}^{n}\tilde{x}_{ji}^2}} \quad s_e = \sqrt{\frac{ResSS}{n-k}}$$

$$\bar{R}^2 = 1 - \frac{ResSS/(n-k)}{TSS/(n-1)} \quad F_{q,n-k} = \frac{(ResSS_r - ResSS_u)/q}{ResSS_u/(n-k)}$$

$$invFtail(q, n-k, p) \rightarrow F^* : P[F > F^*] = p$$