ECON 351* Mid-Term Exam: Fall Term 2002

Coverage of exam

Part I: Sections 1-5 on Course Outline; NOTES 1-8.

Format of questions

Part 1: Definitions, Proofs, and Derivations

Part 2: Short Answer Questions (some requiring numerical answers)

Proofs and Derivations to Know

- Derivation of OLS normal equations, the first-order conditions for the OLS coefficient estimators $\hat{\beta}_1$ and $\hat{\beta}_2$
- Proof of unbiasedness of $\hat{\beta}_2$, i.e., proof that $E(\hat{\beta}_2) = \beta_2$
- Derivation of expression (formula) for $\text{Var}(\hat{\beta}_2)$
- Derivation of OLS decomposition equation
- Derivation of t-statistic for $\hat{\beta}_2$
- Derivation of two-sided $100(1-\alpha)$ percent confidence interval for β_2 or β_1

Important Things to Know

- Assumptions A1-A8 of the Classical Linear Regression Model.
- Definition and meaning of the following statistical properties of estimators: (1) unbiasedness; (2) minimum variance; (3) efficiency; and (4) consistency.
- Statistical properties of the OLS coefficient estimators $\hat{\beta}_1$ and $\hat{\beta}_2$.
- Computational properties of the OLS sample regression equation.
- How to compute and interpret OLS coefficient estimates $\hat{\beta}_1$ and $\hat{\beta}_2$.
- How to compute and interpret the coefficient of determination R^2.
- The error normality assumption A9 and its implications for (1) the distribution of the Y_i values and (2) the sampling distributions of $\hat{\beta}_1$ and $\hat{\beta}_2$.
- How to construct and interpret *two-sided* confidence intervals for β_1 and β_2.
- How to perform *two-tail* hypothesis tests for β_1 and β_2.