

Economics 471: Introductory Econometrics

University of Alabama

Department of Economics, Finance and Legal Studies

Fall 2017

Midterm I

The exam consists of three questions on four pages. Each question is of equal value.

1. Consider the model $y_i = \beta x_i + u_i$, $i = 1, 2, \dots, n$. Answer the following questions about the proposed estimator of β :

$$\tilde{\beta} = \frac{\sum_{i=1}^n (y_i - \bar{y})(x_i - \bar{x})}{\sum_{i=1}^n (x_i - \bar{x})^2}$$

- (a) Derive the expected value of $\tilde{\beta}$.
- (b) What is the bias of $\tilde{\beta}$?
- (c) What is the variance of $\tilde{\beta}$?

2. Consider the following nonlinear model

$$y_i = \alpha x_i^\beta e^{u_i},$$

for $i = 1, 2, \dots, n$, where e is the exponential function. Answer the following:

- (a) Using natural logs (\ln) on both sides of the equation, write this equation in a linear form.
- (b) In the equation obtained from part (a), what is the intercept? What is the slope? What is the error?
- (c) Without deriving, what is the formula for the intercept estimator?
- (d) Without deriving, what is the formula for the slope estimator?
- (e) What is the interpretation of the slope estimator?

3. A standard EViews regression table has many pieces of information. For the table attached on the next page, give a very brief explanation (an equation or no more than one sentence) for the following 11 items (each with a dot next to them in the table):

- (a) Dependent variable
- (b) Method
- (c) Sample
- (d) Coefficient on C
- (e) Coefficient on homework
- (f) Standard error on C
- (g) Standard error on homework
- (h) R^2
- (i) Standard error of the regression
- (j) Residual sum of squares
- (k) Standard deviation of the dependent variable

- Dependent Variable: TESTSCORES
- Method: Least Squares
Date: 08/10/08 Time: 10:04
- Sample: 1 3733
Included observations: 3733

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	• 49.83785	• 0.298027	167.2257	0.0000
HOMEWORK	• 4.011346	• 0.393603	10.19134	0.0000
R-squared	• 0.027084	Mean dependent var		52.43538
Adjusted R-squared	0.026823	S.D. dependent var	•	9.566599
S.E. of regression	• 9.437423	Akaike info criterion		7.327779
Sum squared resid	• 332301.3	Schwarz criterion		7.331114
Log likelihood	-13675.30	F-statistic		103.8635
Durbin-Watson stat	1.704769	Prob(F-statistic)		0.000000