



HUL315: ECONOMETRIC METHODS

Minor 2 Exam: 24.3.2014

Duration: 60 mins, Total Points: 20

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NOTE: This is a closed book exam. Unauthorized use of any electronic device, talking during exams or leaving the classroom without permission, showing (whether unintentional or not) answer to others, possession of notes or books are considered as academic dishonesty. Good luck!

1. Explain the following terminologies.

- (a) Chow statistic
- (b) Pseudo R-squared

(2 x 2.5 points)

2. Explain true or false.

“Linear Probability Model does not violate any Gauss-Markov assumptions.”

(4 points)

3. Multiple choice questions (-0.5 for each wrong answer)

(9 x 1)

(i) A regression model in which β_1 represents the expected percentage change in Y in response to a 1% increase in X_1 is

(a) $Y = \beta_0 + \beta_1 X_1 + u.$

(b) $\ln(Y) = \beta_0 + \beta_1 X_1 + u.$

(c) $Y = \beta_0 + \beta_1 \ln(X_1) + u.$

(d) $\ln(Y) = \beta_0 + \beta_1 \ln(X_1) + u.$

(ii) Simultaneous causality bias

(a) leads to regression coefficients that are too small in absolute value.

(b) can be avoided by using accurate measurements of Y and X .

(c) arises because at least one of the regressors is correlated with the regression error.

(d) is uncommon in economics, because causality is usually from one variable to another.

(iii) Lagrange multiplier test is commonly used

(a) to test asymptotic normality of error in regression model.

(b) to test for joint significance of several coefficients in regression model in a large sample.

- (c) to find optimality of log-likelihood function.
- (d) to test for joint significance of several coefficients in regression model in a small sample.
- (iv) Over controlling is a situation
- (a) when we have small R-squared despite small p-values.
- (b) tight confidence band around co-efficients.
- (c) when we include too many variables as regressors.
- (d) all the above.
- (v) *Self-selection* problem
- (a) is generally not important in economics because we have random sample.
- (b) does not affect estimates but it increases standard errors of estimates.
- (c) generally arises when a binary indicator of participation might be systematically related to unobserved factors.
- (d) arises when predicted probability of a binary dependent variable is greater than 1, thus having perfect chance of being selected in a sample.
- (vi) If we wish to allow for difference in slopes for two groups in a regression model,
- (a) we have to use likelihood estimation because it is no longer linear.
- (b) two dummy variables should be included.
- (c) only one dummy should be included.
- (d) one dummy and the interaction with the dummy should be included.

Answer the following questions using the problem given below.

An equation explaining chief executive officer salary is

$$\ln(\widehat{\text{salary}}) = 4.59 + 0.257 \ln(\text{sales}) + 0.011 \text{roe} + 0.158 \text{finance} + 0.181 \text{consprod} - 0.283 \text{utility} \quad (1)$$

(0.30) (0.032) (0.004) (0.089) (0.085)

(0.099)

$n = 209, R^2 = 0.357.$

where *sales* is total sales, *roe* is return on equity, and *finance*, *consprod*, and *utility* are dummy variables indicating the financial, consumers products, and utility industries respectively. The omitted industry is transportation. The numbers in parenthesis are standard errors.

- (vii) The exact percentage difference in estimated salary between the utility and transportation industries, holding others fixed is
- (a) $100(e^{4.59-0.283} - 1)$.
- (b) $100e^{-0.283}$.
- (c) $100(e^{-0.283} - 1)$.
- (d) Can not be calculated because transportation industry is omitted.
- (viii) The percentage difference in estimated salary between the consumer products and finance industries is

(a) 2.3%.

(b) 15.8%.

(c) 18.1%.

(d) $100 \frac{(0.181 - 0.158)}{\sqrt{(209 - 6)}}\%$.

(ix) The test statistic for statistical significance of the above difference (between consumer products and finance industries) is

(a) $\frac{(0.181 - 0.158)}{\sqrt{(0.085 - 0.089)}}$.

(b) $\frac{(0.181 - 0.158)}{(0.085 - 0.089)\sqrt{209}}$.

(c) $\frac{(0.181 - 0.158)}{\sqrt{(0.085 - 0.089)\sqrt{(209 - 6)}}$.

(d) Can not be calculated from the above equation.

4. Can you specify an alternative to model 1 to estimate and test the statistical significance of the difference in salary between consumer products and finance industries? (2)

END OF EXAM