

AAEC6311 - Applied Econometrics II

Spring 2009

Instructor: Eric Belasco

Final Exam

Name: _____

You have two hours and 30 minutes to complete the exam. There are six questions. Point values will sum to 95, with points associated with each question indicated accordingly. **USE YOUR TIME WISELY.** Also, I will address clarifying questions, but not substantive questions. You are allowed to use two 3x5 note sheets (front and back), a calculator, and a pencil/pen. Use the back of each sheet of paper if you need additional room, making such a move clear to me. Good luck!

Question 1 (25 points). In this question assume you are interested in the autoregressive (AR) relationship of Y over time, expressed below as:

$$Y_t = \Phi_1 Y_{t-1} + \varepsilon_t$$

where ε_t is a stochastic error term with constant variance and a mean of zero.

(a) (5 points) Assume Y can be characterized as a unit root process. Plot a time series graph against time that demonstrates some unit root process. Also, specifically describe a procedure that can be used to statistically validate whether or not Y has a unit root.

(b) (5 points) Explain, in words, what it means for a series to exhibit weak stationarity. What can be said about the autocorrelation function when a series is weakly stationary? Is this important? Explain why or why not.

(c) (5 points) Assume the residuals exhibit negative autocorrelation. Plot a time series graph against time that demonstrates this type of serial correlation. Specially describe a test to statistically validate negative autocorrelation in your residuals.

(d) (10 points) It is suggested to you that you should explore a higher order AR model. Explain a systematic procedure to determine the appropriate number of lags contained in your new equation. What is the problem with including too many lags? What about too few lags?

Question 2 (40 points). An important issue in labor economics is the responsiveness of labor supply to wages. Consider the following regression model based on 532 male workers over 10 years:

$$\ln hrs_{it} = \alpha_i + \ln w_{it} \beta + \epsilon_{it},$$

where $\ln hrs_{it}$ is the log of hours worked by individual i in time t . Also, $\ln w_{it}$ is the log of wages received (in \$) and β corresponds to the wage elasticity of labor supply. The error term, ϵ_{it} , is assumed to be independent over i , but may be correlated over t for a given i .

- (a) (5 points) Give a practical explanation for α_i . What might this coefficient capture in this regression?
- (b) (15 points) If there is an individual effect in the above specification, then show the circumstances under which you are better off using the **fixed effects** ("within") model than POLS. Under which circumstances are you better off using the **random effects** model? Which major assumption is violated in each case? Show why POLS estimates are either inconsistent or inefficient in each case.

- (c) (5 points) Derive the “within” and “between” fixed effects estimators. How are the two different?

You decide to estimate the specified model using POLS, Between(FE), Within (FE), and random effects specification, which are shown below with standard errors in parenthesis.

	β
POLS	0.083 (0.009)
Between (FE)	0.067 (0.020)
Within (FE)	0.168 (0.019)
RE	0.119 (0.014)

- (d) (5 points) You notice that the Within (FE) and RE parameter estimates are statistically different from one another. Without conducting a Hausman test, explain why the two estimates might be different from one another and which model you are likely to choose.

(e) (5 points) How many degrees of freedom do you have in the case of the Within (FE) estimator? Between (FE) estimator? First Difference estimator?

(f) (5 points) Carefully interpret the parameter estimates for the Within (FE) and RE models.

Question 3 (10 points). Discuss the Independence of Irrelevant Alternatives (IIA) assumption within the context of discrete choice models. What is this assumption? Provide a brief example that would likely violate the IIA assumption.

Question 4 (10 points). The Likelihood Ratio test is often used when using Maximum Likelihood Estimation to test a joint hypothesis. Explain why the log likelihood value associated with the unrestricted model is always greater than the restricted version. (*Hint: A graph may be helpful to illustrate your point.*)

Question 5 (5 points). Explain and/or show the difference between data with censored observations and truncated observations.

Question 6 (5 points). Identify **two** Nobel Prize recipients that we've discussed as part of this class and explain their contribution within this course.