ECON 220B / 221B
Statistics and Econometrics II

Fall, 2012

SYLLABUS

Time and Location: ECON 220B (Lecture) meets Tuesday and Thursday, 11:00am - 12:20pm, in SSPA 3132. ECON 221B (Laboratory) is scheduled to meet Friday, 11:00am - 12:20pm in SSPA 3132. The teaching assistant is M. Arshad Rahman (marshad@uci.edu). His office hours are 3:00-5:00pm in SSPA 3161.

Office Hours: W: 9:30am - 11:30am; SSPA 4175; telephone: (949) 824-3186; e-mail: dpoirier@uci.edu.

Course Description: This course takes up where ECON 220A leaves off. Continuing in the likelihood perspective, it begins with Bayesian point estimation. Then interval estimation and hypothesis testing are covered from both frequentist and Bayesian perspectives. This is followed by a general discussion of prediction. Finally, all these techniques are applied to the standard linear regression model. While potential complications in the standard linear model are noted, the analysis concentrates on the linear model under ideal conditions. This course is primarily theoretically oriented, however, empirical implementation is addressed in computer homework assignments directed toward applied economic problems.

Pre-requisite: Graduate standing or consent of the instructor.

Grading: There are two open-book exams worth 1/3 and 2/3, respectively. Homework problems from class notes are covered in weekly laboratory sessions. Although homework assignments are not collected, their mastery is essential for satisfactory completion of the exams.

Course Materials:


Articles listed in the syllabus are all available on JSTOR or the course web page.

Supplementary Course Materials: The following books may be helpful.


Overview: ECON 220B/221B is the second quarter of the econometrics sequence for Ph.D. candidates. It is aimed primarily at non-specialists in econometrics, but together with out-of-class counseling, it also serves the needs of specialists in econometrics. ECON 220A/221A - ECON 220D/221D provide a minimal coverage of econometrics for Ph.D. candidates in economics.

Advice: ECON 220B is not overly demanding in terms of mathematical technique. Only elementary matrix algebra and standard calculus concepts are employed. ECON 220B, however, does demand conceptual thinking and abstraction. Students are exposed to many new statistical concepts and mastery of such concepts requires effort on the student's part in two areas. Firstly, required readings must be done before lectures. The text was developed precisely for this type course, and it will be followed verbatim. Thus a minimum of note taking is required and students are expected to ask questions in lectures to clarify areas of confusion. Secondly, statistical concepts cannot be grasped without engaging in extensive problem solving. Numerous exercises are assigned to stimulate discussion among students both inside and outside class. In the past students have found the formation of study groups to be a valuable experience, and the numerous assigned exercises are provided is designed in part to encourage such formation.
CLASS TOPICS, READINGS, AND HOMEWORK PROBLEMS

Notation: T = Tuesday, Th = Thursday. Exercises in bold are most important.

I. Bayesian Point Estimation

Th Sep. 27 Bayesian inference
Poirier: Section 6.7
(http://ba.stat.cmu.edu/journal/2006/vol01/issue04/poirier.pdf
Koop: Chapter 1
Lancaster: Chapter 1
Jackman (2009, Appendix C)

F Sep. 28 Review ECON 220A final exam

Tu Oct. 2 Bayesian inference (continued)

Th Oct. 4 Choice of prior
Poirier: Section 6.8

F Oct. 5 Laboratory: Review 220A final exam; Exercises 6.7.2, 6.7.3, 6.7.4, 6.7.5, 6.7.10, 6.7.11, 6.7.16, 6.7.18

II. Frequentist and Bayesian Interval Estimation

Tu Oct. 9 Frequentist and Bayesian interval estimation, reflections on conditioning
Poirier: Sections 6.9-6.10

III. Testing

Th Oct. 11 Frequentist hypothesis testing
Poirier: Sections 7.1-7.3

F Oct. 12 Laboratory: Exercises 6.7.22, 6.7.26, 6.8.2, 6.8.3, 6.8.6, 6.9.6, 6.9.8

Tu Oct. 16 Bayesian hypothesis testing
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>References</th>
<th>Assignments</th>
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<tbody>
<tr>
<td>Oct. 19</td>
<td>Laboratory: Exercises 7.2.1, 7.2.2, 7.2.3, 7.3.1, 7.4.1, 7.4.4, 7.4.5</td>
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<td>F Oct. 19, Exercises 7.2.1, 7.2.2, 7.2.3, 7.3.1, 7.4.1, 7.4.4, 7.4.5</td>
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<tr>
<td>Oct. 23</td>
<td>Bayesian Computation: Laplace expansions, Monte Carlo integration</td>
<td>Appendix C.2</td>
<td>Tu Oct. 23, Bayesian Computation: Laplace expansions, Monte Carlo integration</td>
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<td>Handouts, exercises. Koop, Poirier and Tobias (2007, Chapters 9 and 11)</td>
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<td>Oct. 25</td>
<td>Bayesian Computation: Gibbs sampling; Metropolis-Hastings</td>
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<td>Th Oct. 25, Bayesian Computation: Gibbs sampling; Metropolis-Hastings</td>
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<td>Oct. 26</td>
<td>Laboratory: computer assignment; review old midterm exams</td>
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<td>F Oct. 26, Laboratory: computer assignment; review old midterm exams</td>
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<td>Oct. 30</td>
<td>MIDTERM EXAM (open-book, ⅓ of final grade)</td>
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<td>Tu Oct. 30, MIDTERM EXAM (open-book, ⅓ of final grade)</td>
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**IV. Regression Analysis**

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<th>Date</th>
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<th>References</th>
<th>Assignments</th>
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<tbody>
<tr>
<td>Nov. 1</td>
<td>Tale of two regressions</td>
<td>Poirier: Sections 9.1</td>
<td>Th Nov. 1, Tale of two regressions</td>
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<td>Nov. 2</td>
<td>Laboratory: Review midterm exam</td>
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<td>F Nov. 2, Laboratory: Review midterm exam</td>
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<td>Nov. 6</td>
<td>OLS and RLS</td>
<td>Poirier: Sections 9.2-9.3</td>
<td>Tu Nov. 6, OLS and RLS</td>
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<td>Nov. 8</td>
<td>Distribution theory, MLE, confidence intervals, frequentist hypothesis testing</td>
<td>Poirier: Sections 9.4-9.5</td>
<td>Th Nov. 8, Distribution theory, MLE, confidence intervals, frequentist hypothesis testing</td>
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<td>Nov. 9</td>
<td>Laboratory: Exercises 9.1.2, 9.1.7, 9.2.8, 9.2.13, 9.2.16, 9.2.18, 9.2.20, 9.3.4, 9.3.9</td>
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<td>F Nov. 9, Laboratory: Exercises 9.1.2, 9.1.7, 9.2.8, 9.2.13, 9.2.16, 9.2.20, 9.3.4, 9.3.9</td>
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<td>Nov. 13</td>
<td>Dummy variables, pretesting</td>
<td>Poirier: Sections 9.6-9.8</td>
<td>Tu Nov. 13, Dummy variables, pretesting</td>
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<td>Nov. 15</td>
<td>Bayesian estimation in the standard linear model</td>
<td>Poirier: Section 9.9</td>
<td>Th Nov. 15, Bayesian estimation in the standard linear model</td>
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<td>Koop, Poirier and Tobias (2007, Chapter 10)</td>
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<td>Bauwens, Lubrano, and Richard (1999, Chapter 4)</td>
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<td>Nov. 16</td>
<td>Laboratory: Exercises 9.4.1, 9.5.2, 9.6.3, 9.6.5, 9.6.9, 9.6.13, 9.7.1, 9.7.9, 9.8.3, 9.9.4</td>
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<td>F Nov. 16, Laboratory: Exercises 9.4.1, 9.5.2, 9.6.3, 9.6.5, 9.6.9, 9.6.13, 9.7.1, 9.7.9, 9.8.3, 9.9.4</td>
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9.9.8, **9.9.12,**

**Tu Nov. 20**  Bayesian estimation in the standard linear model (continued), Bayesian testing  
Poirier: Section 9.10  
Bauwens, Lubrano, and Richard: Chapters 2, 4  
Koop: Chapters 2-4  
Lancaster: Chapter 3

**Th Nov. 22**  Thanksgiving: no class

**F Nov. 23**  No lab.

**Tu Nov. 27**  Prediction, goodness-of-fit, sample partial correlation  

**Th Nov. 29**  Multicollinearity, model building  
Poirier: Sections 9.14, 10.1-10.3; Exercises 10.3.6, 10.3.12


**V. Generalized Linear Model**

**Tu Dec. 4**  Model building (continued), GLM  
Greene (2012, Chapters 5 and 9)  
Koop: Chapter 6 (pp. 117-144).

**Th Dec. 6**  GLM (continued)  
Bauwens, Lubrano and Richard: Sections 7.1-7.2  
Koop, Poirier and Tobias (2007, Chapter 13)

**F Dec. 7**  Laboratory: Koop, Exercises **6.1**, 7.2, 7.3; review old final exams.

**Tu Dec. 11**  **FINAL EXAM** (open-book, bring computer homework output, ½ of final grade), 10:30am - 12:30pm.