

Applications in Advanced Quantitative Methods

PPD 709 (51269D)

Thursday, 6:00 ~ 9:20pm, RGL 304

8/20/2007

A. COURSE OVERVIEW

This course offers Ph.D. students empirical skills of applying quantitative analysis tools to conduct research in policy, planning, and development. Many graduate students find it challenging to start their first research project and to apply theories/models they have just learnt to real world projects. This course uses the new “Mobile Computer Lab” in SPPD to offer students real-time hands-on experiences in data compiling, empirical modeling, estimation, simulation and presentation.

By so doing, this course will introduce students to recent applications of state-of-art statistical and econometric models. It covers the topics from unitary reduced-form models to structural models in a cooperative game framework, from static simple choice models to dynamic choice models and mixed models. It will provide examples of analyzing cross-sectional data, spatial and inter-temporal data, event history data, categorical data, and longitudinal data. However, this applications course differs from other statistics or econometrics courses. We will not focus on discussing statistical properties of the econometric models. Instead, the class discussions will lead students to learn how to apply these state-of-art tools to the research projects in the fields of policy, planning and development. At the end of the semester, the students are expected to learn how to build an empirical model as well as how to adjust existing models so as to find an appropriate solution to or strategy for addressing a real world problem as opposed to fitting the real world problem to an existing model.

Students are encouraged to bring their current research projects and data to the labs, so that the labs can effectively help students to develop important empirical skills directly related to their current research work. The course also aims to help graduate students to develop academic presentation and critique skills. At the end of the semester, each student will present her course research project. She will also serve as a discussant for one of her fellow classmates’ presentation in an academic conference environment.

B. COURSE ORGANIZATION AND REQUIREMENTS

The course is a combination of lectures, computer labs, and student presentations and critiques. Students are expected to have read the suggested readings prior to each session so that constructive discussion and hands-on exercises can take place. Students are expected to have the knowledge of basic statistics covered by PPD 525 or similar statistics or econometrics courses.

Students are expected to bring their current research project or select a non-trivial course project of their own at the beginning of the semester. Such project should have a potential to be developed into a research paper publishable in a peer reviewed academic journal, or as a part of the dissertation later on.

In the 6th week of the semester, each student will present an introduction of her project to the class. The presentation should include motivation of the research project, potential contribution to the

literature, expected impacts on industry, society and the policy making process, as well as the progress of data preparation for the project.

At the end of the semester, each student will have 50 minutes to present his final report to the class, which includes a 30-minute Power Point presentation by the author, a 15-minute comments and critiques by a discussant (served by another student in the class), and 5 minutes for Q&A. A draft of the final project report is due three weeks before the end of the semester, so that the rest of the class will have plenty of time to read the paper, and the discussant will have time to prepare for comments and critiques.

After the final presentation, students will have one week to revise their final report. A written discussant report is due in the last week of the semester, and the written final project report is due a week later.

C. FINAL PROJECT REPORT

The final report is typically 15-25 pages, double space. It should contain an introduction section, a data section, a model section, an empirical results section, and a section of conclusion. It may also include a section discussing policy implications. The introduction section should explain what this paper is about and why this is an important topic. It should also contain a brief overview of the relating literature, as well as what contribution the current paper intends to make to the existing literature. The last paragraph of the introduction should explain the organization of the remaining sections. The data section should explain fully the sources of the data, the processes of data cleaning, compiling and re-construction, some descriptive statistics of the data, as well as major characteristics of the data set. The model section should explain why the selected model is appropriate for the current study, and what types of modification and re-development (if any) have been made to adjust the existing model in order to appropriately address the empirical issues you are studying. The empirical results section should explain major findings from your estimation, and the policy implications section should discuss the potential impacts of your findings towards the industry, society and the policy making process. The last section concludes.

The final report should also include a 100-word or less abstract that is readable by the layperson. The abstract should be understandable and independent of the rest of the paper. It should describe the methodology used and highlight the principle results.

Tables and figures should number consecutively and label clearly. Symbols and abbreviations in the tables and figures should be defined clearly. Each table and figure should include an explanatory paragraph which should fully explain the table or figure so that the reader need not refer to the text.

Citation of other work in the text should include both author and date, for example, Cox (2000). A reference page should be placed at the end of the article under the heading **Reference**. Conforming format of the reference examples are:

- **Book:** Merrill, S. R. *Hedonic Indices as a Measure of Housing Quality*. ABT Associates: Cambridge, MA, (1980).
- **Journal article:** Rea, L. M. and D. K. Gupta. "The Rent Control Controversy: A Consideration of the California Experience," *Glendale Law Review* 4, 47-58, (1982).

- **Article in book edited by another:** Walker, M. A. “An Income Supplement Program,” in *Rent Control: A Popular Paradox*, ed. By M. A. Walker. The Fraser Institute: Cambridge, MA, (1975).

D. COURSE GRADING

Assignments	30%
Final Project	60%
Class Participation	<u>10%</u>
	100%

E. TEXTBOOKS

Optional Textbooks:

William Greene (2007) *Econometric Analysis*, 6th Ed. Pearson, Prentice Hall. ISBN: 978-0-13-513245-6.

James P. LeSage (1998) *Spatial Econometrics*, available at <http://www.spatial-econometrics.com/>.

SAS Institute Inc. (1995) *Combining and Modifying SAS Data Sets: Examples*. ISBN: 1-55544-220-X.

F. INSTRUCTOR ACCESS

I will hold office hours on Wednesday, 3:00pm - 5:00pm *or by appointment*. Appointments are recommended even during office hours as meeting schedules may occasionally conflict with office hours. E-mail is a dependable way to communicate with me.

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G. ACADEMIC DISHONESTY

The Use of unauthorized material, communication with fellow students during an examination, attempting to benefit from the work of another student, and similar behavior that defeats the intent of an examination, or other class work is unacceptable to the University. It is often difficult to distinguish between a culpable act and inadvertent behavior resulting from the nervous tensions accompanying examinations. Where a clear violation has occurred, however, the instructor may disqualify the student’s work as unacceptable and assign a failing mark on the paper.

H. DISABILITY STATEMENT

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (or to TA) as early in the semester as possible. DSP is located in STU 301 and is open early 8:30 a.m. - 5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776.
















I. CLASS MEETINGS AND LABS

Date	Topics and Readings
1. Aug. 30	<ul style="list-style-type: none">• Introduction: Course mechanics.• Review of Basic Statistics and Econometrics.
2. Sept. 6	<p>Fundamentals of Empirical Modeling: Set up, Specification, and Data Generating process.</p> <p><i>Hands on exercises:</i></p> <ul style="list-style-type: none">• Introduction to the UNIX Environment: vi Text Editor and Portable Batch System (PBS).• Introduction to SAS: Data Steps and Macro Languages.
3. Sept. 13	<p>Reduced Form Model.</p> <p><i>Reading:</i></p> <ul style="list-style-type: none">• Fryer, Roland G. Jr. and Paul Torelli, “An Empirical Analysis of ‘Acting White’,” NBER working paper, No. W11334, (2006).• Quigley, John M. and Steven Raphael, “Is Housing Unaffordable? Why Isn’t It More Affordable?” <i>Journal of Economic Perspectives</i>, 18 (1), 191-214, (2004).• Blinder, Alan S., “Wage Discrimination: Reduced Form and Structural Estimates,” <i>Journal of Human Resources</i>, 8 (4), 436-455, (1973).• Ashenfelter, Orley, David Ashmore, and Robert LaLonde, “Bordeaux Wine Vintage Quality and the Weather,” Harris School Working Paper Series 04.13, Princeton University, (1995) <p><i>Hands on exercises:</i></p> <ul style="list-style-type: none">• Data Warehousing using SAS: Data Design, Cleaning, Compilation and Re-Construction.• Introduction to MATLAB (I).
4. Sept. 20	<p>Structural Model.</p> <p><i>Reading:</i></p> <ul style="list-style-type: none">• Gentzkow, Matthew, and Jesse M. Shapiro, “Does Television Rot your Brain? New Evidence from the Coleman Study,” NBER working paper, No. W12021, (2006).• Dumais, Guy, Glenn Ellison, and Edward L. Glaeser “Geographic Concentration as a Dynamic Process,” <i>Review of Economics and Statistics</i> 84 (2), 193-204, (2002).• LeSage, James P., Chapter 1 in <i>Spatial Econometrics</i>, 1-28, (1998). <p><i>Hands on exercises:</i></p> <ul style="list-style-type: none">• Introduction to MATLAB (II)
5. Sept. 27	<p>Basic Spatial Econometric Model.</p> <p><i>Reading:</i></p> <ul style="list-style-type: none">• LeSage, James P., Chapter 2 in <i>Spatial Econometrics</i>, 30-81, (1998). <p><i>Hands on exercises:</i></p> <ul style="list-style-type: none">• MATLAB programming of Basic Spatial Econometric Model

6. Oct. 4 **Static Simple Choice Model.**
Reading:
- McFadden, Daniel, “Conditional Logit Analysis of Qualitative Choice Behavior,” in P. Zarembka (ed.), *Frontiers In Econometrics*, 105-142, Academic Press: New York, 1974.
 - Quigley, John M., Steven Raphael and Eugene Smolensky, “Homeless in California, Homeless in America,” *Review of Economics and Statistics*, 83 (1), 37-51, (2001).
- Hands on exercises:*
- SAS programming of Discrete Choice Model
7. Oct. 11 **Nested Logit Model.**
Reading:
- McFadden, Daniel, “Modelling the Choice of Residential Location,” in John M. Quigley (ed.), *The International Library of Critical Writings in Economics: Economics of Housing*, Edward Elgar Pub.: London, (1997).
 - Börsch-Supan, Axel and John Pitkin, “On Discrete Choice of Models of Housing Demand,” *Journal of Urban Economics*, 24, 153-172, (1988).
 - Xudong An, John Clapp and Yongheng Deng, “Omitted Mobility Characteristics and Property Market Dynamics: Application to Mortgage Termination,” forthcoming in *Journal of Real Estate Finance and Economics*, (2007).
- Hands on exercises:*
- SAS programming of Nested Logit Models
8. Oct. 18 **Dynamic Choice Model.**
Reading:
- Rust, John, “Estimation of Dynamic Structural Models, Problems and Prospects: Discrete Decision Processes,” in C. Sims, editor, *Advances in Econometrics Sixth World Congress*, Vol. II. Cambridge University Press, (1994).
 - Börsch-Supan, Axel, “Panel Data Analysis of Housing Choices,” *Regional Science and Urban Economics*,” 20 (1), 65-82, (1990).
 - Berkovec and Stern, “Job Exit Behavior of Older Men,” *Econometrica*, 59 (1), 189-210, (1991).
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9. Oct. 25 **Advanced Spatial Econometric Model.**
Reading:
- McMillen, Daniel P and McDonald, John F, “A Nonparametric Analysis of Employment Density in a Polycentric City”, *Journal of Regional Science*, 37 (4), 591-612, (1997).
 - LeSage, James P., Chapter 4 in *Spatial Econometrics*, 127-185, (1998).
- Hands on exercises:*
- MATLAB programming of Advanced Spatial Econometrics Models.
10. Nov. 1 **Structural Model in a Cooperative Game Framework.**
Reading:
- Michael Ransom, “An Empirical Model of Discrete and Continuous Choice in Family Labor Supply,” *Review of Economics and Statistics*, 46 (3), 465-472, (1987).
 - Arthur van Soest, “Structural Models of Family Labor Supply,” *Journal of Human Recourses*, 30 (1), 63-88, (1995).

11. Nov. 8 **Mixed Models – MNL and Competing Risks Hazard Models.**
Reading:
- McFadden, Daniel and Kenneth Train, “Mixed MNL Models for Discrete Response,” *Journal of Applied Econometrics*, 15 (5), 447-470, (2000).
 - Deng, Yongheng, John M. Quigley and Robert Van Order, “Mortgage Terminations, Heterogeneity and the Exercise of Mortgage Options,” *Econometrica*, 68 (2), 275-307, (2000).
 - Honore, Bo E. and Adriana Lleras-Muney, “Bounds in Competing Risks Models and the War on Cancer,” *Econometrica*, 74 (6), 1675-1698, (2006).
- Hands on exercises:*
- SAS programming of Proportional Hazard Models.
12. Nov. 15 **Presentation of Empirical Results with Simulations.**
Reading:
- Deng, Yongheng, John M. Quigley and Robert Van Order, “Mortgage Default and Low Downpayment Loans: The Costs of Public Subsidy,” in John M. Quigley (ed.), *The International Library of Critical Writings in Economics: Economics of Housing*, Edward Elgar Pub.: London, (1997).
 - Deng, Yongheng and Stuart A. Gabriel, “Risk-Based Pricing and the Enhancement of Mortgage Credit Availability among Underserved and Higher Credit-Risk Populations,” *Journal of Money, Credit and Banking*, 38 (6), 1431-1460, (2006).
- Hands on exercises:*
- Simulation using SAS.
13. Nov. 22 **Thanksgiving. No Class.**
14. Nov. 29 **Student Presentation and Discussion: Final Projects.**
15. Dec. 6 **Student Presentation and Discussion: Final Projects.**

H. USEFUL WEBSITE LINKS

-  *Qualitative Choice Analysis: Theory, Econometrics, and application to Automobile Demand*, Kenneth Train, (1993) (<http://elsa.berkeley.edu/books/choice.html>)
-  *Discrete Choice Methods with Simulation*, Kenneth Train, (2003) (<http://elsa.berkeley.edu/books/choice2.html>)
-  *Spatial Econometrics*, James P. LeSage (1998) (<http://www.spatial-econometrics.com/>)
-  Social Science Research Network (<http://www.ssrn.com>)
-  Real Estate Economics (<http://www.areuea.org/reecon.htm>)
-  Journal of Real Estate Finance and Economics (<http://www.jrefe.org>)
-  Lusk Center for Real Estate (<http://www.usc.edu/schools/sppd/lusk/index.html>)
-  U.S. Census Bureau (<http://www.census.gov/pub/>)
-  Bloomberg Market Rates (<http://www.bloomberg.com/markets/rates.html>)
-  NAHB Economic and Housing Data (<http://www.nahb.org/facts/default.htm>)
-  Financial Services Facts (<http://www.financialservicefacts.org/index.html>)
-  SAS Online Doc, Version 9 (<http://v9doc.sas.com/sasdoc>)
-  SAS Online Doc, Version 8 (<http://www.usc.edu/isd/doc/sw/sasdoc/sashtml/main.htm>)
-  Frequently Asked-for Statistics in SAS (http://support.sas.com/techsup/faq/stat_key/a_j.html)
(http://support.sas.com/techsup/faq/stat_key/k_z.html)
-  Numerical Computing with MATLAB (<http://www.mathworks.com/moler/>)