

**University of California, San Diego**  
**Department of Economics**  
**Fall Quarter 2006**

## **ECON 121: APPLIED ECONOMETRICS**

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Office, Economics Bld. Room # 111  
Office hours: Wed 3:30-4:30pm  
Course webpage at <http://webct6web.ucsd.edu>  
Lectures: MWF 2-2:50  
Teaching Assistant: Jaime Thomas, [jlthomas@ucsd.edu](mailto:jlthomas@ucsd.edu)  
Sequoia Hall 235, Office hours: TBA

PREREQUISITES: ECON120A and ECON120B

### COURSE DESCRIPTION

The course will introduce students to methods of empirical econometric analysis of economic and financial phenomena. Particular emphasis will be placed on modern statistical and econometric techniques necessary for both professional and academic quantitative research in finance.

### COURSE OBJECTIVE

At the end of the course, students should be able to:

- develop and analyze models for economic and financial time series.
- model changes in volatility.
- extend their knowledge of econometrics through independent study.

### REQUIRED TEXTBOOK

Taylor, Stephen J. *Asset Price Dynamics, Volatility, and Prediction*, Princeton University Press, 2005.

### ADDITIONAL MATERIAL (for your reference only)

Brooks, C. *Introductory Econometrics for Finance*, Cambridge University Press, 2002. Selected chapters may be useful for a very background introductory reading.  
Tsay Ruey S. *Analysis of Financial Time Series*, Wiley-Interscience; 2 edition (2005) or 1st edition (2001). This book is for more mathematically inclined students.

### REQUIRED SOFTWARE

The software for this course is STATA ([www.stata.com](http://www.stata.com)). Students can use STATA in the computer laboratory in Econ 100. Students may also use Eviews.

### GRADING

Midterm1	25%
Midterm2 (cumulative)	25%
Final	35%
Homework	15%

Homework will be graded in the following way. You will get full credit for handing it in a complete form. Partial credit will be given if some steps or points are missing. Teams for up to 3 people are allowed.

The midterms will take place during lecture time on Monday Oct, 16 and Monday Nov, 6 (Exact dates subject to confirmation). There will be no makeup exams. If you miss the midterm for a medical or another university approved reason, the weight will be allocated to the remaining exams.

All exams will be closed book, but you are allowed to bring one hand-written formula page. Photo reducing is not permitted. The page may not be larger than 8.5in by 11in but can be two-sided. You may bring a calculator.

## COURSE OUTLINE

### RANDOM CHARACTER OF ASSET PRICES

- Stylized characteristics of financial data. Returns in financial modeling.
- Random character of asset prices vs. predictability.
- A short review of MA and AR processes.
- Estimation of MA and AR processes.

### PREDICTABILITY OF VOLATILITY

- Predicting volatility. Popular volatility forecasting methods: historical volatility, EWMA, implied volatility, range. ARCH models.
- GARCH models. ML Estimation.
- Extensions of the basic GARCH models.
- Evaluation of volatility forecasts. Volatility proxies. Diebold and Mariano test.
- Value at Risk estimation (time permitting)

### ECONOMETRICS OF TRANSACTION LEVEL DATA

- Periodicity in high frequency data. High frequency volatility.
- RV models.
- Short introduction to quote-driven vs order driven markets. Bid-ask spread.
- Modeling irregularly spaced data. Calendar time and trading time. Bid-ask bounce.
- Predicting trade durations. Hazard functions. (time permitting)

### OTHER TOPICS (time permitting)

- Discussion of evidence on long horizon predictability
- Stock market anomalies.

Final exam 12/8/06