EC 572/472 Time Series Analysis and Forecasting

Winter 2013, 6:40-8:30pm TTH (CH-307)
Prof. K.-P. Lin (CH 241G, 725-3931)
Office Hours: 3:30-4:30 TTH & by appointment

This course covers the methodology and applications of econometric time series analysis and forecasting, with focus on issues and problems of predicting the U.S. economy.

Basic understanding of econometric analysis is required (EC 469, 570 or equivalent). Knowledge of calculus, algebra, probability theory and statistics are essential for this course. Familiar with computer programming and econometric packages will be useful. Stata will be used throughout the course.

Texts and Software

- Required:
  - Stata 11 or 12, *StataCorp*, 2011. (Stata software is available in the Economics Lab, CH-230).
    A version of Small Stata may be used for the class. You can order it through Stata Course GradPlan [here](#) (Contact your instructor for the required GradPlan ID).
- Recommended:

Topics

1. Reviews of Basic Econometrics
   a. Simple and Multiple Regression
   b. Model Evaluation
   c. Model Selection Criteria
2. Least Squares Prediction
   a. Forecasting with Classical Regression Models
   b. Forecasting with Autocorrelation
   c. Forecasting with Lagged Dependent Variable
   d. Forecast Error Statistics and Evaluation
3. Time Series Analysis I: Introduction
a. Covariance Stationarity  
   b. Trend in Time Series  
   c. Unit Root Problem: Estimation and Testing  

4. **Time Series Analysis II: ARIMA Models**  
   a. Identification  
   b. Estimation and Diagnostic Checking  
   c. Forecasting  
   d. Extension: Transfer Function Models  

5. **Time Series Analysis III: Advanced Topics**  
   a. ARMA Analysis of Regression Residuals  
   b. ARCH and GARCH Model Estimation  
   c. Multi-Equation Time Series Models  

**Case Study and Homework**

**Expectation**

1. There will be a mid-term (February 14, in class) and a final exam (March 19, 7:30pm). In addition, 3 or 4 homeworks will be assigned periodically (due every 2 weeks in average).

2. A course project is required for graduate students taking this course EC572. The project model constructed must be capable of performing (structural) econometric and time series forecasts. A good source of data is [Economagic.com: Economic Time Series Page](http://example.com). Here are some examples you could consider for the course project:  
   a. Unemployment, inflation, and growth  
   b. Productivity, wage, and employment  
   c. Price indexes (CPI, PPI, etc.)  
   d. NYSE, Dow-Jones, and Standard Poor's indexes  
   e. Term structure of interest rates  
   f. Government deficit  
   g. Trade balance and strong/weak dollars  

3. For graduate students taking EC572, a one-page project proposal is due on or before February 28 for approval. Final report of the project is then due on or before March 19.

4. Grade distribution of this course looks like this:

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<tr>
<th>Course</th>
<th>Mid-Term</th>
<th>Final</th>
<th>Project</th>
<th>Homeworks</th>
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