

ECON 4304
Time Series Econometrics and Business Forecasting
Spring, 2017

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Office Hours: by appointment.

Time and Location:

Monday and Wednesday 10:30 - 11:50 at room LSK-1034.

Tutorial sessions: Teaching Assistant: WAN, Wilson (ecwilsonwan@ust.hk).

Thursday 11:30-12:20 at room LSK-G007.

Course Description: This course will introduce students to econometric techniques and their applications in economic time series analysis. We will first review key concepts in multiple regression using time series data. We then introduce the test for structural change. We will walk through both the theory and applications of ARMA models for forecasting, estimation of dynamic causal effects using vector autoregression, unit root and cointegration, conditional heteroskedasticity through the lens of (G)ARCH models. Emphasis will be put on special features of economic time series data and the associated statistical tools. Microsoft Excel and Gretl will be used for computer-based estimation and forecasting exercises.

Learning Outcomes in a nutshell: By the end of the course, students will be able to:

1. Understand key concepts in time series econometrics and acquire basic analytical skills in time series analysis.
2. Provide a proper understanding of articles in empirical macroeconomics and finance using the core techniques of time series econometrics.
3. Select an appropriate regression model and use Gretl to analyze a given time-series economic data set, and then conduct forecasting and statistical inference and interpret the results.
4. Collect their own data set to conduct empirical analysis, and provide answers to economic questions.
5. Present their understanding of certain economic problems, and use empirical results to justify their explanation.

Prerequisites: Econ 3334 or consent of instructor.

Textbook: [Main textbook] Chris Brooks (2008): “*Introductory Econometrics for Finance*.” Second Edition, Cambridge University Press.

[Supplementary textbook] Walter Enders (2010): “*Applied Econometric Time Series*.” Third Edition, John Wiley and Sons, Inc.

Course Web Site: <http://canvas.ust.hk>

Students should be able to access the course website for ECON 4304 in the Canvas using their ITSC accounts. I will post the teaching material before each class. You shall also check the course website for instructions on assignments and other information.

Course Requirements (please read carefully):

Homework (25%): There will be about 5 problem sets, assigned during the semester. These problem sets focus on computational and analytical exercises. Each student must work independently and submit his/her own solution. **Students submit their solutions through the Canvas.** Main solution files must be read by Microsoft Word[®] or Acrobat Reader[®]. Data files must be read by Microsoft Excel[®]. The due dates will be specified in each assignment. **Do double-check that you have clicked the “submit” button after you upload your solutions.** Note that **email submissions will not be accepted.** The due time is usually the beginning of one lecture. Late submission will be not be accepted unless you have a verifiable medical reason.

Midterm (25%): Time and Location: Mar 15, same as class. Closed books and notes. A formula sheet will be provided. Non-programmable calculators may be used.

Final (50%): Time and Location: TBA. Same rule as the midterm. The final exam will be cumulative and cover all course materials.

Important exam policy: There will be no make-up exams for the midterm. If you miss the midterm, you will receive zero for that exam. The only exception is a verifiable medical reason, in which case the weight of the midterm will be moved to the final exam. If you miss the final exam, you will receive an ”F”(fail) for the course. The only exception is that you successfully apply a make-up exam formally through the school. In such a case, I will allow you to do a make-up exam. There is absolute zero tolerance of cheating in the exam. The case of cheating will be reported to both the department and the school level. We will also check your school ID cards during all exams.

Feedback: Please feel free to let me know if you find any typo in this syllabus, or if there is anything unclear to you. Any suggestion is welcome.

Course-specific learning objectives

Economic question :

- Identify the underlying economic question: dynamic causality, forecasting.
- Use economic theory and intuition to conduct preliminary qualitative analysis of the dynamic economic relationship.

Economic data :

- Collect and format economic time series data set in a spread sheet (Excel or EViews worksheet).
- Calculate main summary statistics: mean, variance, auto-correlation, etc.
- Interpret the implications of summary statistics.

Econometric model :

- Design a model to describe a dynamic economic relation or make forecast: randomized controlled experiment, autoregressions, autoregressive distributed lag models, trend regression, structural breaks, ARMA models, VAR, error-correction model, ARCH.
- Identify the testable assumptions: establish the null hypothesis v.s. the alternative.
- Analyze the validity of assumptions behind your model: random sampling, omitted variables, exogeneity, multi-collinearity, breaks.
- Estimate the model and conduct hypothesis testing: OLS, t-statistic, p-value, level of significance, power of a test, HAC standard error, F-test, Wald test, AIC, BIC, break test, cointegration test.

Econometric analysis :

- Build a table to summarize the regression/forecasting results.
- Interpret the empirical results based on key estimates and test statistics.
- Compare and choose among different models: use R-squared, p-value, t-statistic, F-test, Wald test, AIC, BIC, economic significance.
- Argue the limitations of the current model and analyze the source of the limitations.

Connecting the objectives :

- Economic question motivates the econometric model.
- Economic data imposes constraint on what the econometric model can and cannot do. (For example, you do not have data on a lot of omitted variables.)
- Econometric model is a quantitative description of the economic question.
- Econometric model makes feasible the quantitative economic analysis.
- Econometric analysis justifies/answers the economic question.