

Course Outline
Department of Economics
Hong Kong University of Science and Technology

Financial Econometrics
ECON6100W

Spring Semester 2017

Contact Details

Instructor:	Prof. Jin Seo Cho
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Office Hours:	16:00 to 17:00, Thur.

Class Times and Classroom Numbers

Class Times:	15:00 to 17:50, Wed.
Classroom:	LSK G007

Course Objective

ECON6100W covers the analysis of financial econometrics and its applications. Econometrics has been developed to deal with time-series data, and financial data are often provided in the form of time-series data. ECON6100W therefore handles time-series econometrics using financial data. Financial data have many aspects different from the standard cross-sectional data, and the current course focuses on two of them: serial correlation and nonlinearity. In econometrics, serial correlation is often estimated by parametric model specification, and we discuss popular specifications for serial correlation. Furthermore, nonlinearities of financial data are often estimated by nonlinear least squares and maximum likelihood estimation that extend the linear least squares estimation. In the current course, we examine popular econometric models for serial correlation and nonlinearities of financial data in contrast to the standard classical linear model estimation. We also demonstrate its application to financial data analysis using popular statistical packages so that students get familiar with empirical data analysis.

After completing ECON6100W, average students are expected to be able to conduct the following:

- Understanding the different analyses between cross-sectional and time-series data;
- Understanding main issues of financial data analysis;
- Applying suitable and popular econometric analyses for financial data.

Course Plans

We have the following course plans for ECON6100W:

- Cross-Sectional and Serially Correlated Time-Series Data
 - identically and independently distributed (IID) process
 - autoregressive (AR) process
 - moving average (MA) process
 - autoregressive and moving average (ARMA) process
 - martingale difference sequence
- Linear Model Estimation
 - ergodic theorem
 - central limit theorem (CLT)
 - ordinary least squares (OLS) estimation
 - dynamically correct model
 - dynamically misspecified model
 - empirical linear financial model analysis
 - capital asset pricing model estimation
- Nonlinear Model Estimation
 - nonlinear least squares (NLS) estimation
 - uniform law of large numbers (ULLN)
 - consistence
 - asymptotic distribution
 - t -statistic
 - Wald statistic
 - Lagrange multiplier (LM) statistic
 - quasi-likelihood ratio (QLR) statistic
- Correctly Specified Maximum Likelihood Estimation (MLE)
 - MLE estimation
 - consistence
 - asymptotic distribution
 - t -statistic
 - Wald statistic
 - LM statistic
 - likelihood ratio (LR) statistic
 - empirical linear financial model analysis
 - generalized autoregressive conditional heteroskedasticity (GARCH) model estimation
- Quasi-Maximum Likelihood Estimation (QMLE)
 - QMLE estimation
 - consistence
 - asymptotic distribution
 - t -statistic
 - Wald statistic
 - LM statistic
 - quasi-likelihood ratio (QLR) statistic
 - empirical linear financial model analysis
 - autoregressive conditional duration (ACD) model estimation

If time permits, we will further attempt to cover the following topics as well:

- quantile regression analysis
- nonstationary time-series data analysis by cointegration

Also, we demonstrate our data analyses by programming using statistical software GAUSS package whenever they are necessary for our better discussions.

Lecture Notes

The course webpage will provide the lecture notes in PDF format for students' convenience.

Assessment

The following formula will be applied to get your final grade of ECON5300:

$$\text{Final grade} = 0.2 \text{ Attn} + 0.35 \text{ Mid-Ex} + 0.45 \text{ Fin-Ex},$$

where *Attn* is Class participation; *Mid-Ex* is Midterm exam score; and *Fin-Ex* is Final exam score. Please, note that the attendance rate has relatively high portion for the final grade, which emphasizes that class attendance is very important for achieving the course objectives.