

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

Applied Econometrics
ECON5280

Fall Semester 2016

Contact Details

Instructor:	Prof. Jin Seo Cho
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Office Hours:	14:00 to 15:00, Mon and Wed

Class Times and Classroom Numbers

Class Times:	L1: 9:00 to 10:50, Mon and Wed; L2: 12:00 to 13:50, Mon and Wed
Classroom:	L1: LSK1033 L2: 6573

Course Objective

The goal of ECON5280 is in obtaining the popular skills for writing empirical research papers. We attempt to achieve this by getting familiar with the well-known econometric analyses and linking this to the knowledge on the numerical outputs generated by standard statistical packages. Another goal is to bridge the current course topics to the upper level econometrics courses, which are devoted to mainly the frontier econometrics researches. More weights will be given to the first goal of this course.

In attaining these goals, our interests will be focused more on cross-sectional data and their slight extensions. There are two reasons for this focus. First, analysis of cross-sectional data is a building bloc for the analysis of many other data sets. For example, stationary time-series data can be analyzed in a parallel manner to the analyses of cross-sectional data if their own inherent dependence features of observations can be removed. Thus, it becomes necessary to understand cross-sectional data analyses before examining time-series data. Other data sets can be similarly analyzed as for stationary time-series data. Second, the analysis of cross-sectional data is easier than analyzing other data sets as they do not involve too much complication that comes from the variation assumptions. Eventually, by these, studying cross-sectional data becomes a good starting point for achieving the specified objectives, even though their applicability is not so limited.

After completing ECON5280, average students are expected to be able to conduct the following:

- Applying suitable and popular econometric analyses for cross-sectional data;

- Understanding the implicit assumptions behind economic data analysis;
- Interpreting the numerical outputs generated by standard statistical packages;

Course Plans

We have the following course plans for ECON5280:

- Review of Probability Theory
 - Univariate random variable
 - Multivariate random variable
 - Conditional distribution
- Classical Linear Models
 - Ordinary Least Squares (OLS) estimation
 - Best Linear Unbiased Estimator (BLUE)
 - t -statistic
 - Wald statistic
- Tools for Asymptotic Analysis
 - Law of Large Numbers (LLN)
 - Central Limit Theorem (CLT)
- Standard Linear Models without Classical Linear Model Conditions
 - OLS estimation
 - Consistence
 - Asymptotic distribution
 - t -statistic
 - Wald statistic
- Linear Models with Conditionally Heteroskedastic or Serially Correlated Errors
 - OLS estimation
 - Consistence
 - Asymptotic distribution
 - t -statistic
 - Wald statistic
- Linear Models with Endogenous Errors
 - IV estimation
 - Consistence
 - Asymptotic distribution
 - t -statistic
 - Wald statistic
- Linear Models for Panel Data
 - Random effect model
 - Fixed effect model
 - Asymptotic distribution of the estimators
 - t -statistic
 - Wald statistic

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

- Generalized Method of Moments (GMM) estimation
- Maximum Likelihood (ML) estimation

- Quasi- Maximum Likelihood (QML) estimation
- Econometric analyses for time series data

In case we do not have much time to cover all the topics in our course plan, we will continue our discussions at the upper level econometrics courses.

In addition to these course contents, we demonstrate our data analyses by illustrating EVIEWS packages whenever they are necessary for our discussions.

Finally, there will be assignments from time to time, which may contain the same problems as the mid-term or final exam questions. Students have the freedom to discuss these questions during office hours even before assignment due days.

Readings

There are a number of textbooks dealing with the course contents of ECON5280. Students may refer to the following textbooks:

- Hayashi, F. (2000). *Econometrics*. Princeton University Press
- Green, W. (2008). *Econometric Analysis*. Prentice Hall
- Johnston, J. and DiNardo, J. (1997). *Econometric Methods*. McGraw Hill
- Wooldridge, J. (2010). *Econometric Analysis of Cross Section and Panel Data*. MIT Press.
- Hand-Outs.

Finally, in terms of methodological issues associated with asymptotic analysis, we will refer to the following reference:

- White, H. (2001). *Asymptotic Theory for Econometricians*. Academic Press

In dealing with all these readings, a good idea is to start from the hand-outs that will be distributed from time to time. After reading first the hand-outs, students are encouraged to get more from other textbooks.

Assessment

The following formula will be applied to get your final grade of ECON5280:

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

where *Attn* is Class participation; *Mid-Ex* is Midterm exam score; and *Fin-Ex* is Final exam score. Please, note that the portion of attendance rate is relatively high for the final grade. This high portion is given because the course objectives cannot be achieved without making continual efforts from students.