



北京大學  
汇丰商学院

Peking University HSBC Business School

# ECON530

## Advanced Econometrics I

### Module 2, 2017

#### Course Information

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Office Hour: Mon & Thu 14:30-15:20

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**Classes:**

Lectures: Mon & THU: 15:30-17:20

Venue: PHBS Building, Room 311

## 1. Course Description

### 1.1 Context

Course overview: This course focus on the concepts and theories in econometrics theory within the framework of time series regression.

Prerequisites: Matrix algebra, Calculus and Statistics.

### 1.2 Textbooks and Reading Materials

Stock, James and Mark Watson: *Introduction to Econometrics*, 3<sup>rd</sup> ed.

Baltagi, Badi : *Econometrics*, Springer.

Hamilton, James: *Time Series Analysis*, Princeton University Press.

## 2. Learning Outcomes

### 2.1 Intended Learning Outcomes

Learning Goals	Objectives	Assessment
1. Our graduates will be effective communicators.	1.1. Our students will produce quality business and research-oriented documents.	YES
	1.2. Students are able to professionally present their ideas and also logically explain and defend their argument.	YES
2. Our graduates will be skilled in team work and leadership.	2.1. Students will be able to lead and participate in group for projects, discussion, and presentation.	NA

	2.2. Students will be able to apply leadership theories and related skills.	NA
3. Our graduates will be trained in ethics.	3.1. In a case setting, students will use appropriate techniques to analyze business problems and identify the ethical aspects, provide a solution and defend it.	NA
	3.2. Our students will practice ethics in the duration of the program.	YES
4. Our graduates will have a global perspective.	4.1. Students will have an international exposure.	NA
5. Our graduates will be skilled in problem-solving and critical thinking.	5.1. Our students will have a good understanding of fundamental theories in their fields.	YES
	5.2. Our students will be prepared to face problems in various business settings and find solutions.	YES
	5.3. Our students will demonstrate competency in critical thinking.	YES

## **2.2 Course specific objectives**

Learn rigorous econometrics.

## **2.3 Assessment/Grading Details**

Midterm (Dec 25, 40%), Problem sets (20%) and a final exam (40%).

## **2.4 Academic Honesty and Plagiarism**

It is important for a student's effort and credit to be recognized through class assessment. Credits earned for a student work due to efforts done by others are clearly unfair. Deliberate dishonesty is considered academic misconducts, which include plagiarism; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honours, awards, or professional endorsement; or altering, forging, or misusing a University academic record; or fabricating or falsifying of data, research procedures, or data analysis.

All assessments are subject to academic misconduct check. Misconduct check may include reproducing the assessment, providing a copy to another member of faculty, and/or communicate a copy of this assignment to the PHBS Discipline Committee. A suspected plagiarized document/assignment submitted to a plagiarism checking service may be kept in its database for future reference purpose.

Where violation is suspected, penalties will be implemented. The penalties for academic misconduct may include: deduction of honour points, a mark of zero on the assessment, a fail grade for the whole course, and reference of the matter to the Peking University Registrar.

For more information of plagiarism, please refer to *PHBS Student Handbook*.

## **3. Topics, Teaching and Assessment Schedule**

### **3.1 Classical Linear Model (Stock and Watson Chapter 17 and 18)**

a Ordinary Least squares

b Statistical Inference under normality (*t* and F test)

c Prediction

d Dummy variable and Interaction term

e Generalized Least Squares

3.2: *Asymptotic Theory of OLSE (Class Note/Hamilton Chapter 7)*

a Convergence in Probability and Law of Large Number

b Convergence in distribution and Central Limit Theorem

c OLS consistency

d OLS asymptotic normality

e Heteroskedasticity and autocorrelation consistent estimator (HACE)

Andrews, D. (1991): "Heteroskedasticity and Autocorrelation Consistent Covariance matrix estimation," *Econometrica* 59, 817-854.

3.3 *Maximum Likelihood Estimation (Hamilton 5.8 Baltagi Chapter 9)*

a Asymptotic Theorem of MLE: Uniform LLN and Central Limit Theorem

b Information matrix equality

c Wald, LM and LR tests. (Chow test, Omitted Variable)

3.4 *Model Diagnostic Tests*

a Durbin Watson Test and LM test for serial correlation (Baltagi 5.6)

b LM test for Heteroskedasticity and White's Test (Baltagi 5.5)

c Recursive Residuals and the CUSUM test. (Baltagi 8.2)

3.5 *Univariate Time Series Models (Baltagi 14.1-14.3/Stock and Watson Chapter 14)*

a White noise, autocovariance and weak stationarity

b Autoregressive Models vs Time Series Regression

c Moving average model and invertibility.

d ARMA model and Model selection statistics

e Unit root process and Spurious Regression

f Dickey Fuller test, Augmented DF test and PP tests.

3.6 *Autoregressive Distributed Lag (Baltagi Chapter 6/Stock and Watson Chapter 15)*

3.7 *Multi-equation Models*

a Seemingly Unrelated Regression (Baltagi 10.1 and 10.2)

b Simultaneous Equations model and Reduced form.

c Stationary Vector Autoregression (Hamilton Chapter 11)

d Cointegration and Error correction model (Hamilton Chapter 19)

#### **4. Miscellaneous**

Skill in software EVIEW, STATA or Matlab is required.