# FINANCE
# Advanced Econometrics I
# Module 3, 2024

## Course Information

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***Classes:***
Lectures: Session F3 Tue & Fri 8.30-10.20, Session F2 Tue & Fri 1.30-3.20
Venue: PHBS Building, Room TBA

***Course Website:***

## 1. Course Description

### 1.1 Context

Course overview: First course in graduate econometrics.

Prerequisites: Statistics and Linear algebra

### 1.2 Textbooks and Reading Materials
*Introduction to Econometrics Stock J. and Mark Watson, 3rd edition*

## 2. Learning Outcomes

### 2.1 Intended Learning Outcomes

| Learning Goals | Objectives | Assessment (YES with details or NO) |
|---|---|---|
| 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*
To be an econometric thinker, not software operator.

## *2.3 Assessment/Grading Details*
Midterm 1: March 15 (30%); Midterm 2: Apr. 12 (30%) and the Final Exam (40%). Combined grades of two sessions will be curved.

## *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, honors, 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

Part I: Linear Regression/Single equation model

A Econometric Modelling: Regression/Conditional Mean; Top-down vs Bottom-up; Data Mining. *Ex 2.27; Ex 14.5.*

B Standard assumptions and possible violations (5.4;6.5,18.1)

C Parameter Estimation: OLS, Measures of fit (4.3; 6.2-6.4,18.1, Apdx 6.3, 18.7), properties of OLS (Apdx 18.5;5.5).

*EX 4.4, 4.12, 17.6, 18.4, 18.7, 18.17, 6.1-6.5*

D Sampling distribution of OLS: Finite sample (5.6; Apdx 18.4), Large sample (18.2; Apdx 18.3;6.6;4.5), HSK robust standard error (18.2); HAC standard error (15.4). *Ex 17.4*

E Hypothesis Testing: Test for individual coefficients (5.1;7.1); Test for several coefficients jointly (7.2;7.3;18.3;18.4).

*EX 5.5; 5.8; 5.9; 7.1-7.6;7.8(ignore part c),7.9,7.11,18.2;18.13;*

F Model Misspecifications: Omitting variable bias (6.1;9.2); Sample selection bias; Simultaneous equation bias (9.2); Inconsistent beta due to endogeneity; inconsistent standard error dur to non-spherical error (9.2, p368-9).

G Some Modelling Strategy: Nonlinear X (8.2); interaction term (8.3); control variables (7.5; Apdx 7.2); *Ex 18.9; 6.6-6.8*

H Generalized least squares (18.6): weighted least squares (17.5); quasi-differencing (15.5).

*Ex 17.8, 17.13*.

## Part II IV Regression (Chapter 12 and 18.7, p762-768)

A IV and Two-stage least squares (12.1;18.7)

B IV Asymptotics (18.7)

C IV relevance and IV exogeneity (12.2;12.3)

*Ex 12.6; 12.7; 12.9; 12.10.*

## Part III Time series Models/Time series Regression

A Univariate Time series model: ARMA(p,q) (14.2,14.3, Apdx 14.2; Apdx 14.3; Apdx 14.4)

*Ex 14.1; 14.7; 14.9; 14.11*

B Stationary time series vs Nonstationary time series characterized by unit roots (16.3); Spurious regression (14.6)

*Ex 14.6; 14.3.*

C Time series Regressions: Distributed Lag Models (15.1-15.5); ADL models; first look at VAR (16.1). Granger Causality test (14.4).

*Ex 14.4; EX 15.1; 15.2; 15.4; 15.10;*

D Nonstationarity due to break: QLR test (14.7). *Ex 14.2*;

E. GARCH Process: Volatility clustering (16.5). *Ex 16.3; 16.9*

## PART IV Panel Regression

A Introduction to panel models (10.1; 10.2)

B Least squares Estimation with Individual fixed effect and time fixed effect (10.3;10.4)

*Ex 10.5; 10.7; 10.8; 10.10*.

C Key assumption: strict exogeneity (10.5;15.1)

D Least squares Asymptotics and cluster standard error (Apdx 10.2)

## 4. Miscellaneous

*Classroom discipline*: **No laptop computer, No mutter. Cheating in any form will result in F. Every absence without permission will receive one step downgrade. For example, once, from B+ to B, twice from B+ to B- etc.**