

## **Fulbright Economics Teaching Program**

Academic Year 2011-2012

### **Fall semester**

(03/10/2011 - 13/01/2012)

## **Quantitative Methods**

### **Teaching team**

Instructors: Cao Hao Thi, Dinh Cong Khai  
Co-instructors: Nguyen Khanh Duy  
Teaching Assisstant: Nguyen Thi Phuong Thao

### **Class Meeting Time**

Monday, Wednesday 10:30 to 11:45  
Friday 13:30 to 15:00

### **Office hours**

Cao Hao Thi: Tuesday 17:15 – 19:15  
Dinh Cong Khai: Friday 15:00 – 18:00  
Nguyen Khanh Duy: Friday: 15:00 – 18:00  
Nguyen Thi Phuong Thao: Monday, Wednesday 16:00 – 17:30

Office hours are for groups of students or individuals to ask questions, discuss course materials, and recieve help from the instructors and TA. Office hours are sometimes rescheduled to help students before exams or assignment due dates.

If the above schedule of office hours is not convenient, please feel free to make an appointment at other times with members of the teaching team.

## Course Objectives and Description

The Quantitative Methods course has two objectives. The first is to provide participants with the ability to critically analyze quantitative and empirical analysis done by others and to use that analysis in the design of public policy. The second is to provide students with skills necessary to perform quantitative policy analysis on their own.

The course includes two main parts:

- Applied statistics
- Econometrics

The applied statistics module will review fundamental concepts of statistics, including descriptive statistics, basic probability, probability distributions, sampling and sample distribution, estimation and hypothesis testing. This module provides the foundation for participants to study econometric analysis.

The second half of the course is devoted to discussing the fundamental tools of econometrics. The module introduces standard methods for estimating relationships among observed social and economic variables and for testing hypotheses about their relationships. Participants will learn how to use models, data, and appropriate analysis to describe the real world and to contribute to policy discussions. Participants will be introduced to the power of econometric methods while also becoming aware of their limitations. The focus will be on formulation, estimation, testing of econometric models, and discussing policy implications from econometric findings. In addition, participants will also learn how to carry out an empirical study through a term project. The course will require the use of specialized software packages such as Eviews, SPSS, and Stata.

Given its technical nature, the Quantitative Methods course is a very challenging subject for participants. It is absolutely critical that participants have to maintain a steady pace of study. Simple memorization or last-minute studying will not help to understand materials well. Therefore, if participants encounter any problems or have any questions, make sure to seek help from the teaching team as early as possible. It is important to understand concepts and develop the ability to apply them to the solutions of various problems. This needs practice. Lectures, textbooks, handouts, problem sets, and a term project are all designed to help our participants develop these skills.

## Course Requirements

Participants are required to read assigned readings before the class. During the course participants will have to complete problem sets, a term project, and two exams associated with the two parts of the course.

The term project must be done by groups of five to six participants. A one-page project proposal must be submitted to the teaching team for approval on **December 2<sup>nd</sup>, 2011**. A draft project report must be submitted on **December 16<sup>th</sup>, 2011** and the final report on **January 6<sup>th</sup>, 2012**. Groups will meet the teaching team on **January 10<sup>th</sup>, 2012** to defend their projects.

Participants are encouraged to form study groups on their own to discuss the lessons, problem sets and reviews together. However, each student has to complete his/her assignments using his/her own writings.

## Grading

Applied statistics:	40%
Problem sets:	15%
Exam:	25%
Econometrics:	60%
Problem sets:	15%
Term project:	20%
Exam:	25%

## Readings

### Statistics

1. Mendenhall, Beaver, and Beaver, *A Brief Course in Business Statistics*, 2<sup>nd</sup> Edition, Thompson South-Western, 2001. (Abbreviation: MBB2)
2. Cao Hào Thi, *Thống Kê Ứng Dụng trong Kinh Doanh (Applied Statistics in Business)*, 1998.

### Econometrics

#### • Required readings

**Main Textbooks.** Lectures will be drawn mostly from two textbooks, both of which are available in English and Vietnamese. Specific chapter references are given in the course outline. Additional material will be distributed at appropriate times. This material will also be part of required readings.

1. *Introductory Econometrics with Applications*, 5<sup>th</sup> edition, by Ramu Ramanathan, Harcourt College Publishers, 2003. This textbook has been selected because it has a strong orientation towards applications and a clear exposition of modern econometric practice. The textbook has a good website at: <http://econ.ucsd.edu/~rramanat/embook5.htm>. (Abbreviation: RR5)

2. *Basic Econometrics*, 3<sup>rd</sup> edition, by Damodar Gujarati, McGraw-Hill, 1995. This book also has a useful website at: <http://www.mhhe.com/econometrics/gujarati4> (Please note that this website is associated with the 4<sup>th</sup> edition of the book.) ((Abbreviation: DG3))

**Exercises.** Several exercises and illustrative examples will be assigned and/or discussed in class at the appropriate time. The purpose is to familiarize yourself with the various ways in which econometric techniques have been used to investigate “real world” problems and policy issues. These exercises will be drawn from the two main textbooks plus some case studies developed from the real context of Vietnam.

- **Optional readings**

The following optional readings are available in the FETP library.

*Econometrics and Data Analysis for Developing Countries* by Chandan Mukherjee, Howard White, and Marc Wuyts. This is very basic and applied.

*Econometric Models and Economic Forecasts*, third edition, by Robert S. Pindyck and Daniel L. Rubinfeld. This is somewhat out of date but the level is accessible. It is available in English and Vietnamese.

*Econometric Methods*, third edition, by J. Johnston. This is one of the classic texts for advanced undergraduates and beginning graduate participants.

**Software**

*Eviews* by Quantitative Micro Systems. *Eviews Learning Scripts* will be translated into Vietnamese and distributed.

*Data Analysis with SPSS (Statistical Package for Social Sciences)* for Windows by Hoang trong anh Chu Nguyen Mong Ngoc, 2008.

## Schedule

### APPLIED STATISTICS

#### *Week 1*

☐ **Monday 03/10/2011** **Cao Hao Thi**

**Descriptive Statistics**

Measures of central tendency: mean, median, and mode

- MBB2, Chapter 2

*Problem Set 1 Distributed*

☐ **Wednesday 05/10/2011** **Cao Hao Thi**

**Descriptive Statistics**

Measures of variability and correlation: variance, standard deviation, covariance and correlation

- MBB2, Chapter 2

#### *Week 2*

☐ **Monday 10/10/2011** **Cao Hao Thi**

**Basic Probability**

Probability concepts

Probability properties

- MBB2, Chapter 3, Sections 3.1-3.3

*Problem set 1 Due; Problem set 2 Distributed*

☐ **Wednesday 12/10/2011** **Cao Hao Thi**

**Conditional Probability**

Conditional probability

Bayes' rule

- MBB2, Chapter 3, Sections 3.4-3.5

☐ **Friday 14/10/2011** **Nguyen Khanh Duy**

**Review**

#### *Week 3*

☐ **Monday 17/10/2011** **Cao Hao Thi**

**Probability Distributions: Discrete Distributions**

Binomial distribution  
Poisson distribution

- MBB2, Chapter 3, Sections 3.6
- MBB2, Chapter 4

*Problem set 2 Due; Problem set 3 Distributed*

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☐ **Wednesday 19/10/2011**

**Cao Hao Thi**

**Probability Distributions: Continuous Distributions**

Uniform distribution  
Normal distribution

- MBB2, Chapter 5

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☐ **Friday 21/10/2011**

**Nguyen Khanh Duy**

**Review**

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**Week 4**

☐ **Monday 24/10/2011**

**Cao Hao Thi**

**Sampling**

Sampling distribution  
The central limit theorem

- MBB2, Chapter 6

*Problem set 3 Due; Problem set 4 Distributed*

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☐ **Wednesday 26/10/2011**

**Dinh Cong Khai**

**Statistical Estimation**

Point estimation  
Confidence Intervals

- MBB2, Chapter 7

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☐ **Friday 29/10/2011**

**Nguyen Khanh Duy**

**Review**

## **Week 5**

☐ **Monday 31/10/2011**

**Dinh Cong Khai**

### **Hypothesis Testing**

Tests of Hypotheses for Population Means

Tests of Hypotheses for the Difference between Two Population Means

- MBB2, Chapter 8, Sections 8.1-8.5

*Problem set 4 Due; Problem set 5 Distributed*

☐ **Wednesday 02/11/2011**

**Dinh Cong Khai**

### **Hypothesis Testing**

Tests of Hypotheses for Population Proportions

Tests of Hypotheses for the Difference between Two Population Proportions

- MBB2, Chapter 8, Sections 8.7-8.8

☐ **Friday 04/11/2011**

**Nguyen Khanh Duy**

**Review**

## **Week 6**

☐ **Monday 07/11/2011**

**Cao Hao Thi**

**Lab Practice: Introduction to Statistical Software Packages**

*Problem set 5 Due*

☐ **Wednesday 09/11/2011**

**Cao Hao Thi**

**Introduction to the Term Project**

☐ **Friday 11/11/2011**

**Cao Hao Thi**

**Review for Mid-term Exam**

## **Week 7**

☐ **Monday 14/11/2011**

**Midterm Exam (Morning)**

**Exam for the Economic Degree Conversion Program (Afternoon)**

## ECONOMETRICS

### Week 8

☐ **Monday 21/11/2011**

**Dinh Cong Khai**

**Introduction to Econometrics**  
**Simple Regression: The Basic Model and OLS**

- RR5 Chapter 3, Sections 3.1 and 3.2; 3.A.3
- DG3 Chapter 2 and Chapter 3, Sections 3.1 and 3.2

*Problem set 6 Distributed*

☐ **Wednesday 23/11/2011**

**Dinh Cong Khai**

**Simple Regression: Properties of Estimators and Fitted Values**

- RR5 Chapter 3, Sections 3.3 and 3.4; 3.A.4, 3.A.6

☐ **Friday 25/11/2011**

**Nguyễn Khánh Duy**

**Review**

### Week 9

☐ **Monday 28/11/2011**

**Dinh Cong Khai**

**Simple Regression: Hypothesis Tests & Confidence Intervals**

- RR5 Chapter 3, Sections 3.5, 3.6, 3.8, 3.9, 3.10;
- DG3 Chapter 3, Section 3.5. Sections 3.6 - 3.8 optional.
- DG3 Chapter 5, Sections 5.1 - 5.8

*Problem set 6 Due; Problem set 7 Distributed*

☐ **Wednesday 30/11/2011**

**Cao Hao Thi**

**Introduction to Eviews (Class Demo)**

☐ **Friday 02/12/2011**

**Nguyen Khanh Duy**

**Review**

**Proposal of Term Project Due**



## **Week 10**

☐ **Monday 05/12/2011**

**Dinh Cong Khai**

### **Multiple Regression: Introduction & Estimation**

- RR5 Chapter 4, Sections 4.1 and 4.2
- DG3 Chapter 7, Sections 7.1 - 7.5

*Problem set 7 Due; Problem set 8 Distributed*

☐ **Wednesday 07/12/2011**

**Dinh Cong Khai**

### **Multiple Regression: Estimation (Continued)**

- RR5 Chapter 4, Sections 4.1 and 4.2
- DG3 Chapter 7, Sections 7.1 - 7.5

☐ **Friday 09/12/2011**

**Nguyen Khanh Duy**

### **Review**

## **Week 11**

☐ **Monday 12/12/2011**

**Dinh Cong Khai**

### **Multiple Regression: Model Selection and Hypothesis Testing**

- RR5 Chapter 4, Sections 4.3 and 4.4
- DG3 Chapter 8, Sections 8.1 - 8.5

*Problem set 8 Due; Problem set 9 Distributed*

☐ **Wednesday 14/12/2011**

**Dinh Cong Khai**

### **Multiple Regression: Model Selection and Hypothesis Testing (continued)**

- RR5 Chapter 4, Sections 4.3 and 4.4
- DG3 Chapter 8, Sections 8.1 - 8.5

☐ **Friday 16/12/2011**

**Nguyen Khanh Duy**

### **Review**

**First Draft of Term Project Due**

## **Week 12**

☐ **Monday 19/12/2011**

**Dinh Cong Khai**

**Specification Error:**

**Omission of Relevant Variables and Inclusion of Irrelevant Ones**

- RR5, Section 4.5
- DG3, Chapter 13

*Problem set 9 Due; Problem set 10 Distributed*

☐ **Wednesday 21/12/2011**

**Dinh Cong Khai**

**Functional Form**

- RR5, Sections 6.1 - 6.12
- DG3, Sections 6.3, 7.10, 7.11

☐ **Friday 23/12/2011**

**Cao Hao Thi**

**Empirical Study**

## **Week 13**

☐ **Monday 26/12/2011**

**Dinh Cong Khai**

**Qualitative Independent Variables (Dummy Variables)**

- RR5, Chapter 7
- DG3, Chapter 15

*Problem set 10 Due; Problem set 11 Distributed*

☐ **Wednesday 28/12/2011**

**Dinh Cong Khai**

**Limited Dependent Variable**

- DG3, Chapter 16

☐ **Friday 30/12/2011**

**Nguyen Khanh Duy**

**Review**

## **Week 14**

☐ **Monday 02/01/2012**

**Tet Holiday**

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☐ **Wednesday 04/01/2012**  
**Empirical Study**

**Nguyen Trong Hoai**

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☐ **Friday 06/01/2012**

**Cao Hao Thi**

**Final Review**

*Problem set 11 Due*

**Final Draft of Term Project Due**

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***Week 15***

☐ **Tuesday 10/01/2012**

**Cao Hao Thi & Dinh Cong Khai**

**Term project Presentation**

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☐ **Friday 13/01/2012**

**Final exam**