

## **EC252 Introduction to Econometric Methods**

### **Module Outline and Reading List**

Details of assessment and submission deadlines are contained in the Undergraduate Economics Handbook, available from room 5B.211.

Further information about the module is contained in the University's *module directory*, see: <http://www.essex.ac.uk/courses/>

### **Module Description**

This module provides an introduction to the econometric methods commonly used to analyse economic data. The focus of the module is on linear regression and the ordinary least squares (OLS) estimation procedure. This is introduced after a review of basic probability, random variables, simple descriptive statistics and the concept of the null hypothesis. Students will then be taught about how  $t$ -tests and  $F$ -tests can be used to make inferences about the estimated parameters and what diagnostic tests are available to test some of the assumptions of the simple OLS model. Then the module will move onto the question of identification and model specification, the concepts and implications of consistency and efficiency. The module will be taught throughout using the Stata software package and always using economic examples using real data.

Upon successful completion of this module students will have learned how to carry out simple statistical and econometric calculations. In addition they will possess the ability to understand and assess critically empirical findings reported in the applied economics literature. In addition, they should be able to use the linear regression model and the econometric methods developed for the linear regression model in order to conduct a simple econometric investigation of an empirical issue of interest. In completing tests/assignments, students will demonstrate their problem-solving analytical and deductive skills.

This module delivers key employability skills of adoption of new techniques and project management (Career Development), and reflection and evaluation (Personal Development Planning). The key academic skills delivered by the module are detailed in the [Key Skills](#) table.

### **Textbook**

Jeffrey M. Wooldridge (2009): *‘Introductory Econometrics. A Modern Approach’*, 4th edition, South-Western.

### **Course materials**

Course materials (lecture slides, class exercises and solutions) will be made available online in the Course Materials Repository.

## Teaching

There are two lectures and one class per week in the Spring term.

## Assessment

Whichever is the Greater: EITHER 50 percent Coursework Mark, 50 percent Exam Mark OR 100 percent Exam Mark.

The coursework mark has two elements:

1. The EC252 test on Friday 9 March 2012, 17:00.
2. The EC252 econometrics exercise, for which the submission deadline is Wednesday, 21 March 2012, 12:00 mid-day.

The coursework mark is an equally weighted average of the test mark and of the econometrics exercise mark. Further information about assessment and submission deadlines are contained in the Undergraduate Economics Handbook.

## Module outline

### 1. Review of Probability (Week beginning 16 January 2012 (University week: 16))

Random Variables and Their Probability Distributions. Joint Distributions, Conditional Distributions, and Independence. Features of Probability Distributions. Features of Joint and Conditional Distributions. The Normal and Related Distributions.

*Reading:* Wooldridge, Appendix B.

### 2. Review of Statistics (Week beginning 23 January 2012 (University week: 17))

Populations, Parameters and Random Sampling. Finite Sample Properties of Estimators. Asymptotic or Larger Sample Properties of Estimators. General Approaches to Parameter Estimation. Interval Estimation and Confidence Intervals. Hypothesis Testing.

*Reading:* Wooldridge, Appendix C.

### 3. The Simple Regression Model (Week beginning 30 January 2012 (University week: 18))

The Nature of Econometrics and Economic Data. Causality and the Notion of Ceteris Paribus in Econometric Analysis. Definition of the Simple Regression Model. Deriving the Ordinary Least Squares Estimates. Properties of OLS on Any Sample of Data. Units of Measurement and Functional Form. Expected Values and Variances of the OLS Estimators. Regression through the Origin.

*Reading:* Wooldridge, Chapter 1 and Chapter 2.

**4. Multiple Regression Analysis: Estimation I** (Week beginning 6 February 2012  
(University week: 19))

Motivation for Multiple Regression. Mechanics and Interpretation of Ordinary Least Squares.

Reading: Wooldridge, Chapter 3, Sections 3.1-3.2.

**5. Multiple Regression Analysis: Estimation II** (Week beginning 13 February 2012  
(University week: 20))

The Expected Value of the OLS Estimators. The Variance of the OLS Estimators. Efficiency of OLS: The Gauss-Markov Theorem.

Reading: Wooldridge, Chapter 3, Sections 3.3-3.5.

**6. Multiple Regression Analysis: Inference I** (Week beginning 20 February 2012  
(University week: 21))

Sampling Distributions of the OLS Estimators. Testing Hypotheses about a Single Population Parameter: The  $t$ -test. Confidence Intervals.

Reading: Wooldridge, Chapter 4, Sections 4.1-4.3.

**7. Multiple Regression Analysis: Inference II & OLS Asymptotics** (Week beginning 27 February 2012 (University week: 22))

Testing Hypotheses about a Single Linear Combination of the Parameters. Testing Multiple Linear Restrictions: the  $F$ -test. Reporting Regression Results. Consistency. Asymptotic Normality and Large Sample Inference. Asymptotic Efficiency of OLS.

Reading: Wooldridge, Chapter 4, Sections 4.4-4.6, and Chapter 5.

**8. Multiple Regression Analysis: Further Issues** (Week beginning 5 March 2012  
(University week: 23))

Effects of Data Scaling on OLS Statistics. More on Functional Form. More on Goodness-of-Fit and Selection of Regressors. Prediction and Residual Analysis.

Reading: Wooldridge, Chapter 6.

**9. Multiple Regression Analysis with Qualitative Information: Binary (or Dummy) Variables** (Week beginning 12 March 2012 (University week: 24))

Describing Qualitative Information. A Single Dummy Independent Variable. Using Dummy Variables for Multiple Categories. Interactions Involving Dummy Variables. A Binary Dependent Variable: The Linear Probability Model.

*Reading:* Wooldridge, Chapter 7.

**10. Further Topics: Programme Evaluation. Heteroskedasticity** (Week beginning 19 March 2012 (University week: 25))

More on Policy Analysis and Program Evaluation. Heteroskedasticity. Weighted Least Squares Estimation.

*Reading:* Wooldridge, Chapter 7.5 and Chapter 8.

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