GY428 - Applied Quantitative Analysis

General Information

This part of the course is specifically designed for the students from the Geography and Environment Department. It consists of 4 Lectures and 12 computer classes. Students will therefore follow MY452 for the first 6 lectures taught by Dr. David Hendry. For the final 4 lectures Dr Ben Groom takes over. Emphasis will be placed on the practical use of empirical tools in use in the field. This applied focus will be complemented by the investigation of assumptions and proofs that can improve the understanding of empirical results. A number of relevant applications making use of computers will be presented and, in doing so, we will make use of interesting and topical data sets. To this end, nine class seminars of one hour each will be provided. During the seminars the students will gain understanding of the software STATA and of the tools of analysis, the estimators, that have been taught in the lectures.

Staff

• Course Managers:

Ben Groom (BG) (Geog. & Env.: G&E), lecturer Weeks 8-11,

David Hendry (DH) (Methodology Department: MY), lecturer Weeks 1-7.

(Week 6 is reading week)

• Class Teachers:

Shaikh Eskender (SE) (G&E): Weeks 2-7, plus David Hendry from the Methodology Department

Steve Gibbons (SG) (G&E) and Shaikh Eskender (SE): Weeks 8-11 and LT week 1.

Preliminary Reading

1. A hard copy of the coursepack for GY428/MY452 (first six lectures) is available for purchase through the LSE e-shop, at the printing price of £12.50. It can be found at the e-shop site (http://eshop.lse.ac.uk/), under Product catalogue / Methodology. You will also be able to download the coursepack file below and on the MY452 Moodle page, free of charge. The GY428 course pack will be available in hard copy and on Moodle later in the term.

2. The main textbook for weeks 1 - 6 is:

    o Alan Agresti and Barbara Finlay (2009), Statistical Methods fo the Social Sciences (4th Edition). Prentice Hall.

3. The main text for weeks 8 - 11 is:
    o Stock and Watson *Introduction to Econometrics 3rd Edition Pearson International* (SW hereafter). We will follow the course hand-out and this book very closely during the course. We are going to refer to SW for notation, examples and tables in this course pack.
    o We will also refer to Angrist J and Pischke J.S. (2009) Mostly Harmless Econometrics, Princeton;

Other useful books for general coverage are: i) Wooldridge J (2006) *Introduction to Econometrics a modern approach; ii) Verbeek A Guide 3rd edition published by Wiley. iii) Mastering 'Metrics: the path from cause to effect. Josh Angrist and Jorn Steffen Pischke. Princeton Press 2014.*

Lectures and Seminars

In weeks 1-7 Lectures take place on Friday between 10 and 12 in the Old Theatre (OT)

Week 6 is reading week

In weeks 8-11 Lectures take place on Friday between 10 and 12 in the Kingsway Building, G.01.

Seminars take place on Fridays between 12 and 1 and Tuesdays between 12.00 and 1300 and between 13.00 and 14.00 in room TW2.4.01.

CHAPTER 1

Course Details

1. General Information

This part of the course is specifically designed for the students from the Geography and Environment Department. It follows on from the teaching by the Department of Methodology MY452 lectures which which made up the first 7 lectures of GY428. This part consists of 4 Lectures and 4 computer classes. Emphasis will be placed on the practical use of empirical tools in use in the field. This applied focus will be complemented by the investigation of assumptions and proofs that can improve the understanding of empirical results. A number of relevant applications making use of computers will be presented and, in doing so, use of a wealth of interesting and topical data sets will be made. To this end, Three class seminars of one hour each will be provided. During the seminars students will gain understanding of the software STATA. Additionally, in some of the seminars, selected papers in quantitative environmental economics will be critically discussed. Again the focus will be on relevant empirical papers published in the area.

Staff.

- Course Managers:
  - Ben Groom (BG), Department of Geography and Environment (G&E) (Lecturer for weeks 8-11)
  - David Hendry (DH), Department of Methodology (DM) (Lecturer for weeks 1-7)
- Class Teachers: Weeks 1-7:
  - Primary: DM teaching assistant
  - Secondary: Shaikh Eskander (SE) (G&E)
- Class Teachers: Weeks 8-11:
  - Primary: Steve Gibbons (SG) (G&E)
  - Secondary: Shaikh Eskander (SE) (G&E)
- Week 6 is reading week

Core Reading.

- Stock and Watson (2012), Introduction to Econometrics 3rd Edition Pearson International (SW): This is the main text.

– We will follow this book very closely during the major part of this course and take our notation, examples and tables in this course pack from this text.

Besides the content of the course pack and the supplement to the course pack, there are several other texts that we will refer to throughout the course of the 3 lectures:

- Wooldridge (2006) Introductory Econometrics: A modern approach, 3rd Edition, Thomson Southwestern. A good introdutory text, helpful for Panel Data and IV.
- Angrist and Pischke (2009). Mostly Harmless Econometrics. Princeton Press. (Good coverage of IV and Difference in Differences. There is a pdf on the web.
- Angrist and Pischke (2014). Mastering Metrics'. Princeton Press. A&P have updated their Mostly Harmless book. It has a slightly different order, and updated examples.

Other texts worth considering include:

- Verbeek (2007) A Guide to Modern Econometrics. 3rd edition published by Wiley.
- Wooldridge (2002/2006b). Econometric Analysis of Cross Section and Panel Data. First and Second editions. (Advanced, for a more technical analysis).

Articles:

- At the end of each chapter there will be a list of suggested references, some of which will be discussed in the lecture itself. Other references may come up in the lectures also.

Teaching: Weeks 8-11.

- **Lectures**: 4 lectures (8 hours in total). Room: KSW.G.01 in the MT. Time: Friday 10-12
- **Classes**: 4 seminars (4 hours in total)

- Session 7: Preliminaries for Lectures 8, 9 and 10.
    – Lecture (BG) (18th November): Gauss Markov Assumptions, Unbiasedness, Consistency, Efficiency and Heteroskedasticity.
    – Class (SG, SE). Exercise 10.2. Pollution Regression Data and question from GY428 Moodle site.
    – Core Reading: GY428 course pack. A&P Chs 1-3 for introduction to causality in the regression framework.

- Session 8: Regression with Panel Data

- Lecture (BG) (25th November): Panel Data: Fixed Effects, First Difference. Random Effects estimators: Definition, estimation and interpretation.
- Class (SG, SE). Exercise 10.2. Data: seatbelt.dta from Stock and Watson Ch. 10, can be downloaded from GY428 Moodle site.
- Core Reading: GY428 course pack Chapter 1 and 2; Stock and Watson Ch. 10. See also Wooldridge (2006) Ch 13 and 14 for an alternative explanation. Angrist and Pischke (2009) Chs 1-3 for introduction to causality in the regression framework.

- Session 9: Instrumental Variables
  - Lecture (BG) (2th December): Instrumental variables: Definition, estimation, interpretation. Testing for endogeneity
  - Class (SG, SE) Exercise 12.2. Data: fertility and smoking panel data used in Stock and Watson Ch 12.
  - Readings: Core: GY428 Coursepack, Chapter 2; Stock and Watson Ch. 12. Additional Reading: Angrist and Piscke (2009) Ch. 4; Wooldridge (2006) Ch 16

- Session 10: Experiments in Econometrics and Policy Evaluation
  - Lecture (BG) (9th December): Experiments and quasi experiments: Definition, estimation, interpretation. Limitations
  - Class (SG, SE) Exercise 12.2. Data: fertility and smoking panel data used in Stock and Watson Ch 12.
  - Readings: GY428 course pack Chapter 3. In particular the Project STAR data examples in main text; Stock and Watson Ch 13; Angrist and Piscke (2009) Ch. 2 and 5;

Computing.

- Students must know their username and password in time for the first class. This information can be obtained from IT Help Desk (Library, 1st floor). The course uses Microsoft Windows-based software. If you are not familiar with the program, you might want to attend introductory courses in Windows during the first two weeks of the term. The statistical package used on the course is Stata. The package is introduced in the first computer class.
- A STATA tutorial can be found here:
- http://wps.aw.com/aw_stock_ie_3/178/45691/11696965.cw/index.html

Software availability.

- Personal copies of STATA can be bought by course participants from IT services. The price is around £160.

Assessment and Feedback.

- Over the Christmas break there will be a **formative assessment exercise** (it will not count towards your final mark). You will be assigned an exam question from the previous year the answer to which should be handed by the end of the first week of the Lent term.
- Towards the end of the Lent term/beginnng of the Summer term there will be a **mock exam**. This will be marked and returned to you before the exams.
- With regard to feedback from you to us, we would welcome any comments you have on the course. If there are any problems that we can assist you with, we will attempt to do so as quickly as possible. Speak to the course manager, any member of the course team, or to your departmental supervisor if you feel that would be easier for you. Also please let us know if you find any errors or omissions in the course pack, so that we can correct them for next year.