L1: Introduction to AQIM:

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AQIM
Wednesday, 7 June 2006

9.00	COFFEE (outside T316, Adam Smith Building)
9.30	ADVANCED QUANTS LECTURES (2 Hrs) Gwilym Pryce (T316, Adam Smith Building)
11.30	COFFEE (outside T316, Adam Smith Building)
11.45	ADVANCED QUANTS TUTORIALS (1½ Hrs) Gwilym Pryce (T316, Adam Smith Building)
1.15	FINISH DAY

Revised Schedule:

- 09.30am   Introduction to AQIM
- 10.00am   L1: Reverse Causation
- 11.30am   Coffee
- 11.50am   Problems, Innovations, News
- 12.20pm   L2: Intro to Event-History Models
- 13.00pm   Finish

Plan:

- 1. Aims
- 2. Learning objectives
- 3. Assessment
- 4. Teaching staff
- 5. Course summary
- 6. Recommended Reading

Aims of the Course:

- Primary aim is to provide a framework for supporting students in the use of quantitative methods in years two, three and four of their PhD.

- There is clearly a need to consolidate the skills and techniques learnt in Quantitative Methods training provided in the first year of the 1+3 programme,
  - skills quickly lost if not in frequent use.

- Also open to 1 year Masters students.

The course aims to:

- *a.* develop students' <u>knowledge</u> of a number of advanced quantitative techniques appropriate to postgraduate research in social science.

- *b.* supplement and enhance the continued <u>support</u> currently provided by supervisors and informal advise offered by the Faculty Methodologist.

- *c.* provide a <u>framework</u> for training in advanced quantitative techniques above and beyond those provided in Quantitative Methods Modules I & II.

- *d.* help students learn how to <u>articulate</u> quantitative issues.

The language of statistics can be arcane.

one thing to understand a statistics lecture, it's another to discuss or write about statistics in one's own words.

Yet this is what PhD students are required to do:

when they write up their thesis and defend it to an external examiner.

By encouraging students to participate in discussions of statistical issues and methods on a regular basis we hope to greatly increase their capacity to articulate and critically evaluate quantitative methods.

- e. Encourage:
  - *innovation* in the application of quantitative methods,
  - *dissemination* of new research ideas
  - *enthusiasm* for using quantitative methods.

2. Learning Outcomes:

- At the end of the course students should be able to:
  - a.   understand and explain intuitively the statistical theory behind the advanced techniques taught on the course;
  - b.   know the properties and limitations of those techniques;
  - c.   know when, and when not to, apply those techniques;
  - d.   understand the practical steps involved in implementing those techniques;

Learning Outcomes (cont'd):

- e. know which statistical software package(s) are most appropriate for the application of those techniques and the associated basic syntax (if any);

- f. discuss and ask questions about statistical issues and appreciate the benefit of discussing statistical problems with peers;

- g. work effectively with others to solve statistical problems;

- h. critically analyze statistical methods and applications;

Learning Outcomes (cont'd):

– i.   further extend their knowledge of statistics and find answers to particular statistical questions by being able to:

- (i)   effectively search for additional statistical information,
- (ii)   know who, how and when to ask advice; and
- (iii)   know how to obtain additional training.

Learning Outcomes (cont'd):

– j.attempt innovation in the application of statistical techniques by appreciating the benefits and means of:

- (i)   spotting opportunities for applying existing techniques in new ways,

- (ii)   combining more than one technique or data in an innovative way,

- (iii)   drawing on expertise and techniques from other disciplines,

- (iv)   spotting opportunities for gathering new data or combining data in innovative ways,

- (v)   thinking creatively about research methodology.

3. Assessment

- There is no formal assessment, as this course is not credit bearing.

- However, a student will receive an AQIM Certificate if he/she:
  - attends all eight taught sessions and at least eight of the others over three years, and
  - by the end of the three years, completes a 1,000 reflective essay describing how they have applied a particular quantitative method in their research demonstrating awareness of limitations and alternative interpretation (plus output and syntax appendices as evidence of work done).

4. Teaching Staff:

- The course is taught and co-ordinated by Prof Gwilym Pryce.

- Student participation is expected to be a key feature of the course.

- Guest lecturers will utilised as required.

5. Course Summary:

- The course comprises of 18 sessions over a three-year rolling cycle.

- Though there will be a degree of flexibility, it is anticipated that each 3 year cycle will comprise:
  - 8 Taught sessions (i.e. lectures),
  - 6 Problem Led sessions (i.e. tutorials), and
  - 4 Innovation Led sessions (i.e. tutorials – see below).

Possible Taught Topics:

- Simultaneous equations (2SLS)
- Maps, GIS and spatial regression analysis
- Time-to-event modeling (also known as "Duration" or "Survival" analysis)
- Cluster Analysis
- Factor Analysis
- Introduction to using Stata
- Introduction to using Matlab
- Sample selection bias ("Heckman Correction")
- Ordered and multinomial logit
- Introduction to Time series analysis

- ***Others?***

Survey Results (2006):
(Based on 15 replies)

															Total
Reverse causation	1	1		1			1		1	1	1				**7**
Maps, GIS and spatial regression analysis			1			1									**2**
Time-to-event modelling		1			1	1	1		1	1		1	1		**8**
Cluster Analysis			1	1						1					**3**
Factor Analysis			1										1	1	**3**
Introduction to using Stata	1	1	1						1						**4**
Introduction to using Matlab									1						**1**
Sample selection bias		1	1	1											**3**
Ordered and multinomial logit regression			1		1		1	1		1	1				**6**
Introduction to Time series analysis			1												**1**

Today:

- Reverse causation

- Intro to duration analysis
    – Advanced topic
    – Do you know what it means?

- Problem Led Sessions:
  - PhD Students and/or research staff will be encouraged to bring specific research questions and problems to the table.
  - The group can then bring their collective knowledge to bear on the problem.

- Innovation Led Sessions:
  - The workshops will also provide a forum for students and staff to present innovations in methods,
    - either that they themselves have developed,
    - or that they have recently become aware of.

- Virtual Discussion Board:
  - A virtual forum will be set up which will allow students and staff to:
    - raise questions
    - voice ideas related to applied quantitative issues and methods.

Recommended Reading:

- Peter Kennedy (1994) A Guide to Econometrics (Cambridge, MA: MIT Press).
  - Good overview of the literature.
- Andy Field (2005) "Discovering statistics using SPSS for Windows : advanced techniques for the beginner", 2nd Edition, Sage: London.
  - Limited depth but useful coverage of SPSS

- Long, J. S.(1997) "Regression models for Categorical and Limited Dependent Variables", Sage: Thousand Oaks California.
  - Theoretical book that introduces logit, multinomial logit, ordered logit.
  - Excellent if you work through it carefully
  - Quite mathematical in places, but don't be put off.

- Bartholomew, D.J., Steele, F., Moustaki, I., and Galbraith, J.I. (2000) The Analysis and Interpretation of Multivariate Data for Social Scientists, Texts in Statistical Science, Chapman and Hall/CRC: Florida.
  - Excellent coverage of cluster analysis and factor analysis.
  - Clearly written, aimed at social scientists.
  - Expert judgements on the pros and cons of different methods.