SINGAPORE MANAGEMENT UNIVERSITY  
SCHOOL OF ECONOMICS  

ECO207 INTERMEDIATE ECONOMETRICS  

Instructor  Anthony Tay, SOE/SS 05-49, 6828-0850, anthonytay@smu.edu.sg  
Consultation hours: TBA (to be announced)  

Teaching Assistant  TBA  

Time and Venue  TBA  

Course Overview  
We (i) go deeper into simple and multiple linear regression models in the classical case; (ii) introduce alternative estimation techniques (Generalized Least Squares, Instrumental Variable estimation) to deal with problems of heteroskedasticity, endogeneity, measurement error, limited dependent variables, (iii) discuss rudimentary panel data methods, (iv) discuss issues pertaining to regressions using time-series data, (v) treat the mathematics of OLS in matrix algebra. There will be equal emphasis on theory and application.  

Prerequisites: Intermediate Mathematics for Economics, Applied Econometrics.  

Students are expected to be familiar with elementary concepts in statistics and probability, calculus and optimization, and matrix algebra. This course and ECON233 Economic Forecasting are complementary, although I do recommend that you take ECON207 prior to ECON233.  

Course webpage:  http://www.mysmu.edu/faculty/anthonytay/econ207.htm  

Class Sessions  Two 1.5-hour sessions per week.  

Assessment & Evaluation  
Assignments 40 %;  Final Examination 40 %;  Class Participation 10 %;  Forum Participation 10 %  
Exam is 2 hr closed book examination; no project.  

Readings  
Required: Instructors Notes (available on course webpage) plus additional readings as  
Supplementary: (you should read thoroughly at least one of the first two books listed)  
For the time series portion  

Software  
Eviews 8.0 recommended, Gretl Instructions on coursepage  

**Academic Integrity**  All acts of academic dishonesty (including, but not limited to, plagiarism, cheating, fabrication, facilitation of acts of academic dishonesty by others, unauthorized possession of exam questions, or tampering with the academic work of other students) are serious offences. All work (whether oral or written) submitted for purposes of assessment must be the student’s own work. Penalties for violation of the policy range from zero marks for the component assessment to expulsion, depending on the nature of the offense. When in doubt, students should consult the instructors of the course. Details on the SMU Code of Academic Integrity may be accessed at  http://www.smu.edu/resources.html.
Course Schedule (subject to change!)

You should always read the Instructors notes prior to coming for class. The classes will not cover everything in the notes.

1. Review of Probability and Statistics
   Readings  Instructor’s Notes Chapter 1
   Wooldridge, Chapter 1, Appendices A, B and C
   Dougherty, Review Chapter
   Additional Readings: Instructor’s Notes on Summation Notation (must read before next class)

2. The Simple Linear Regression Model
   Readings  Instructor’s Notes Chapter 2
   Wooldridge, Chapter 2
   Dougherty, Chapter 1 and 2
   Instructor’s notes on matrix algebra, chapter 3

3. The Simple Linear Regression Model (continued)
   Readings  Instructor’s Notes Chapter 2
   Wooldridge, Chapter 2
   Dougherty, Chapter 1 and 2
   Instructor’s notes on matrix algebra, chapter 4 and 5

4. The Multiple Linear Regression Model
   Readings  Instructor’s Notes Chapter 3
   Wooldridge, Chapter 3 and 4
   Dougherty Chapter 3
   Instructor’s notes on matrix algebra, chapter 6 and 7

5. The Multiple Linear Regression Model (continued)
   Readings  Instructor’s Notes Chapter 3
   Wooldridge, Chapters 5, 6, 7, 9
   Dougherty, Chapters 4, 5, and 6
   Instructor’s notes on matrix algebra, chapter 8 and 9

6. Heteroskedasticity
   Readings  Instructor’s Notes Chapter 4
   Wooldridge, Chapter 8
   Dougherty, Chapter 7
   Instructor’s notes on matrix algebra, chapter 10

7. Endogeneity and Instrumental Variable Estimation
   Readings  Instructor’s Notes Chapter 5
   Wooldridge, Chapter 15, 16
   Dougherty, Chapter 8, 9
   Instructor’s notes on matrix algebra, chapter 11
Remarks on the course

Econometrics is all about tools for measuring economic relationships, the proper application of those tools, and the interpretation of the results. The set of tools used by econometricians is large and always growing. In this course, we focus on a small subset of these tools, centered on the linear regression model, and the use of ordinary least squares and its extensions (weighted least squares, instrumental least squares...) for estimating the parameters of the linear regression model.

Econometricians have to draw on many skills: writing down an appropriate model for a given application requires the skills of an economist; taking the model to data requires mathematical and statistical skill; and interpreting the results require you to draw on further economics and statistical sensibilities. Every step in a given application requires the econometrician to make decisions – writing down the most appropriate model, choosing the appropriate estimation and testing methods, interpreting and responding to the results in the face of noisy, often conflicting results. Making the best decisions at each stage requires that the econometrician understand the models and the associated statistical concepts well, and we will make every effort to understand the models and methods as fully as we can (this is a mathematics alert, by the way).

Then there is implementation, which requires another set of skills, including the ability to use software. There are many econometric software packages available to the econometrician, some free (often these are slightly harder to learn and use), some awkward for econometrics but easily available (such as excel – many
of the more advanced routines cannot be implemented there), others easy to use but expensive. Sometimes advanced methods require the econometrician to write computer code, so the econometrician has to add computer programming to her set of skills! (We won’t have to go that far in this course.)

We will use Eviews (designed for the econometrician and very easy to use! but not free once you leave SMU). We will also use Gretl (free, but slightly harder to use). You are encouraged to explore (and use!) other software packages, but the course will focus on Eviews and Gretl.

**Remarks on Assessment and Evaluation**

Class participation: Class participation points are given for good questions, answers to questions, and constructive remarks made in class – anything that contributes positively to the learning environment. That said, the best way to handle this is to participate as naturally as fully as you can, and let me take care of the points for this.

Forum Participation: On the eLearn coursepage, you will find a discussion board (under Collaborate > Discussions). You will see a Discussion Forum with topics matching chapters of my notes. You are to post questions / comments on topics where you have questions and difficulties, and you are to also try and answer other students queries. You will be given points for posts and constructive comments.

*Trivial alternatives to solutions are discouraged. Trivial comments (such as “v.good!””, “nice handwriting!””) will be frowned upon; uncivil comments will be frowned upon twice, and may result in deduction of points. You may also post what you think are typos (typing errors) and thinkos (thinking errors) that you find in my notes. This is not frowned upon, but heartily encouraged. If you think there is an error in an exercise question, you can also make a post on this (perhaps supplying the answer to what you think the question should have been).*

Assignments: I am moving away from “traditional” assignments. Instead, I am trying a new system with the following objectives in mind:

1. to encourage all of you to start practicing early;
2. to encourage discussion;
3. to give you access to *proposed* answers to the exercises.

On the eLearn coursepage, you will also see a forum with your names listed.

a. **Do the exercises in my notes, and post your answers under your name (as though it was a journal).**

b. Check out your other students answers and make constructive comments, such as offering alternative methods for solving the problem; pointing out errors; and so on.

The work is mathematical, so you will have to either write out your answers and scan it, or you’ll have to type it out and attach a .doc or .pdf file to your post.

In general, I will stay out of the forum pages, though I will monitor the pages. The forum discussions and assignments pages will be administered and monitored closely by the TA, who may also make remarks. The TA will also monitor however, ‘final answers’ will not be posted.

The final exam is a two-hour closed-book examination.