Econ 527
Econometric Methods
2011-12 Winter Session

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Time and Location: Tuesdays and Thursdays 12:30 - 2:00, Buchanan B213

Office Hours: Tuesdays 11:15 - 12:15

Course web-page: http://faculty.arts.ubc.ca/vmarmer/econ527

Discussion group: Fridays 10:30 - 12:00 Angus 343 (except during the 2nd and 3rd weeks of the semester; see the computer lab schedule below)

TAs: Alix Duhaime-Ross, alixdr@interchange.ubc.ca,
Yawen Liang, wenyu_0318@hotmail.com
Office hours: Fridays 12:00 - 1:00, Angus 343.

Textbook: Davidson, R., and J. G. MacKinnon (2004): *Econometric Theory and Methods*, Oxford University Press, New York **(required)**; see also http://qed.econ.queensu.ca/ETM/

Course Description: This course is an introduction to the theory and practice of econometrics. The static linear regression model is the main focus of the course although extensions to dynamic and nonlinear models and simultaneous equations are pursued as well. Estimation and testing methods discussed will include those based on ordinary least squares (OLS), generalized least squares (GLS), generalized method of moments (GMM) and instrumental variables (IV), and maximum likelihood (ML). Small sample results will be discussed, however, the main focus will be placed on the large sample theory.

The students are assumed to be familiar with the basic concepts of linear algebra, multivariate calculus and statistics. The requisite linear algebra and statistics results will be reviewed at the beginning of the course. Interested students can find the following two books very useful for improving their knowledge of linear algebra: *Matrix Differential Calculus with Applications in Statistics and Econometrics* by J. R. Magnus and H. Neudecker and *Matrix Algebra* by K. M. Abadir and J. R. Magnus (Volume 1 in Econometric Exercises). The second book is a collection of exercises in linear algebra with detailed solutions.

There will be weekly problem sets including analytical and practical questions. The practical questions will require handling and analyzing data. Students are free to use any statistical package that they are familiar and comfortable with (R, Stata, Eviews, Matlab, Octave, Gauss, SAS, SPSS, and etc.). Students are *not* allowed to use Excel and other spreadsheet applications for the purpose of *statistical computations*.

The recommended statistical package for this course is Stata. Stata is available at the Economics computer lab (BuTo 1097, when it re-opens) and other university's computer labs. Stata is also available for purchase at special GradPlan pricing (student-pricing), see the following link: http://www.stata.com/order/new/edu/gradplans/cgpcampus-order.html. Many useful Stata tutorials can be found online. See, for example, http://data.princeton.edu/stata/ and http://stataproject.blogspot.com/.

During the second and third weeks of the semester, there will be two Stata training sessions (instead of the regular TA discussion group meetings). The sessions will take place at **Buchanan B126** computer lab on the following dates:

- Monday, September 12, 10:30-12:00 (for students whose last name begins with A-L);
- Monday, September 19, 10:30-12:00 (for students whose last name begins with M-Z).

Grading: Assignments (20% of the final grade), midterm exam (30%), final exam (50%).

Topics:

1. **Linear regression model.** Multiple linear regression, OLS and its small sample properties, geometry of LS, partitioned regression, goodness of fit.
2. **Hypothesis testing and confidence intervals (small sample).**
3. **Large sample theory.** Convergence in probability, convergence in distribution, delta method, laws of large numbers, central limit theorems.
4. **Large sample regression theory.** Consistency and asymptotic normality of the LS, hypothesis testing and confidence intervals.
5. **GLS.**
6. **Instrumental Variables estimation.**
7. **GMM.**
8. **Simultaneous equations.**
9. **Maximum Likelihood.**
10. **Discrete choice models.**
11. **Time-series models.** Autocorrelation and OLS under serial correlation.