**Econometrics: Election Year Special!**

**Overview:** This course is your introduction to the fundamentals of statistical data analysis as generally practiced by economists. In this course, we will learn how to: (1) quantify functional relationships among economic variables, and (2) test economic hypotheses. Both of these exercises are often central to understanding important economic issues and to formulating correct policies.

Equally heavy emphasis will be placed on econometric theory and actual data analysis. This is not a cookbook course in data analysis: to do well, you must understand the underlying statistical theory. At the same you must always keep in mind what it all means economically. This means being able to justify the economic assumptions being made, and to interpret results using coherent economic theory. Econo-metrics as a tool for understanding is only as good as the theory we use it to analyze. Throughout the course, we will stress the connection between economic theory and econometric practice.

**Textbook and Readings:** Our textbook for the term will be *Basic Econometrics* (5th Ed.), by Damodar Gujarati and Dawn Porter. In addition, we will be examining a number of actual econometric studies to see practitioners at work. Copies of these articles will be made available to you.

**Course Requirements:** Your grade for the course will be based upon your performance on an in-class midterm exam (25%), an in-class final exam (40%), problem sets (20%), and one group assignment (15%). The midterm exam will be given during the regularly scheduled class time on Friday, October 12th. The final exam will be given on the scheduled date and time during finals week. ***There IS a self-scheduled final exam option for this course.*** I am happy to make individual arrangements for taking the midterm and/or final for anyone with special testing needs, if supported by a letter from the Dean’s office confirming those special testing needs.

In addition, you will be regularly assigned exercises/problem sets during the term, in which you will “get your hands dirty” in data using either Excel, S-Plus or STATA. Some of the assignments will involve data collection.

Finally, you will also be given a short group assignment, in which you will be asked to perform an econometric analysis to answer a particular economic question. Since this is a presidential election year, the group assignment this term will be to predict the winner of this fall’s presidential election. This assignment will be due Monday, November 5th, the day before the election. More details to follow.

**Late Policy:** Extensions on assignment deadlines are possible but to obtain an extension, you need to have a reasonably compelling reason for being unable to meet the deadline. In addition, you need to clear it with me by no later than 5pm THE DAY BEFORE an assignment is due. All negotiations regarding extensions must be handled in person or by phone. E-mail cannot be used for this purpose. If you think you need an extension, the BEST thing you can do is to come talk to me or call me, well in advance of the deadline. The SECOND WORST thing you can do is to come to me the day an assignment is due and tell me you need an extension. The WORST thing you can do is to not communicate with me at all.
Examples of compelling reasons include: unexpected illness, family emergency, other assorted unexpected crises.

Example of non-compelling reason: “I have a lot of other work to do.” {IDEA: Planning Ahead is a valuable life skill!}

***This is obviously not a comprehensive list. If you are unclear whether your reason is compelling, just ask me.***

**Office Hours, Contact Info:** My office (Willis 308) hours this term will be Mondays 2:00-4:00pm; Thursdays, 10:00-12:00pm; and by appointment. You may contact me using E-mail at mkanazaw@carleton.edu. My phone numbers are: 222-4106 (office) and 645-5688 (home).

**COURSE OUTLINE**

**I: WHY WE CARE, HOW WE LEARN**

0: Why Econometrics?

Reading: G&P, Introduction (pages 1-12).

**II: PRELIMINARIES**

1: Some Tools of Probability and Statistics You Have Probably Forgotten (Prob = .95).

Reading: G&P, Appendix A.

a. The World is a Random Place! Modelling Randomness: Random Variables, Sample Spaces, Probability Density Functions.
c. Estimation!
e. IMPORTANT, IMPORTANT, IMPORTANT (Did I mention these are important?) Statistical Inference Procedures: Confidence Intervals, Hypothesis Testing.
III: REGRESSION ANALYSIS: PRINCIPLES AND APPLICATIONS

2: Fundamentals of Two-Variable Regression Analysis: What does the data say?

Reading: G&P, Chapters 1, 2, 3(pp. 55-61).

a. From Theory into Practice.
b. Populations vs. Samples.
c. Inferring from Samples to Populations.
d. Establishing the Relation between/among the variables:
   1. The Principle of Ordinary Least Squares.

3: Why Ordinary Least Squares?

Reading: G&P, Chapter 3(pp. 61-85).

   1. Unbiasedness.
   2. Efficiency.
b. What does it take? Conditions of the Classical Linear Regression Model
c. The Gauss-Markov Theorem.
d. On the Importance of the Sum of Squared Residuals.
   1. Variance of the OLS estimators.
   2. True and estimated standard errors.

4: Functional Specification(Not really a digression)

Reading: G&P, Chapter 6.

a. Linearity? You gotta be kidding! (No, I’m not).
b. Fun with other functional relationships.

5: Statistical Inference: Do we REALLY believe these results?

Reading: G&P, Chapters 4 - 5.

a. Normality and other nice assumptions.
b. Interval Estimation: Learning to say "I don't know" WITH PRECISION.
c. Hypothesis Testing: THE CRUX: Do we believe this model, or don't we?
6: Introduction to Multiple Regression Analysis: What else matters?

Reading: G&P, Chapters 9, 7 (Notice the order!).

   a. Interpretation of Multiple Regression.
   c. Continuous Structural Changes: Not Everything is So Easy, But That's All Right.

7: Applications of Multiple Regression Analysis

Reading: G&P, Chapter 8.
http://www.macroadvisers.com/content/Fair%20Model.pdf

   a. Model Selection Generally.
   b. To include or not to include an explanatory variable? That is the question.
      1. Adjusted $R^2$.
      2. F-Test.
   c. Love Those F-Tests: Model Selection Via Restrictions on Coefficient Values.

IV: PROBLEMS WITH REGRESSION ANALYSIS

8: Non-Constant Variance (Alias Heteroscedasticity)

Reading: G&P, Chapter 11.

   a. Who Cares And Why.
   b. How Do You Know You've Got A Problem?
      1. Park Test.
      2. White Test.
   c. Remedies.
      1. Weighted Least Squares
      2. White Robust Standard Errors.

9: Non-Independence of Error Terms (Alias Autocorrelation)

Reading: G&P, Chapter 12.

   b. More How Do You Know You've Got A Problem?
      1. Durbin-Watson Statistic.
   c. More Remedies.
      2. Cochrane-Orcutt procedure.
IV: PROBLEMS WITH DATA

10: Multicollinearity: The data is terrible! (Yes, it is)

Reading: G&P, Chapter 10.

b. Still More How Do You Know You've Got A Problem?
c. Still More Remedies.
   2. What Do We Know Already? (It's always good to ask yourself this every now
      and then.)
   3. "If Thy Eye Offends You ..." (Actually, Better not.)

VI: ADVANCED TOPICS (If Time Permits)

11: Specification Errors

Reading: G&P, Chapter 13.

a. Yet Still More Who Cares and Why. (Almighty, When Will It End?)
b. Yet Still More How Do You Know You’ve Got A Problem?
c. Yet Still More Remedies.

12: Qualitative Dependent Variables

Reading: G&P, Chapter 15.

a. Linear Probability Models.
b. No, I'd Rather Not Have to Explain Negative Probabilities.
   1. Logit and Probit Models.