ECON 4485 (Section 01) – Econometrics and Analytics (Special Topics in Economics) – 2011
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OFFICE HOURS TBA

TEXT: Introductory Econometrics for Undergraduates by Elia Kacapyr, along with selected readings, videos, and tutorials to be posted via CourseDen.

COURSE DESCRIPTION: The course emphasis is on applications of econometrics and techniques in business analytics. Topics include methods of presenting data, numerical measures and correlation, probability theory and probability distributions, sampling distributions, estimation, hypothesis testing, linear/non-linear regression, limited dependent variables, simultaneous equations/instrumental variables, models of duration, and the use of these models in decision making processes. This course will be held in a computer lab and SAS.

With the use of computers in businesses, firms are now able to accumulate business data on the scale of terabytes and petabytes. These data can contain anything from credit card transactions or movie downloads, providing businesses with unprecedented insight into a person’s behavior in the marketplace. The growing ability to collect data, however, has not always translated into better decisions by those businesses that collect it. The goal of this class is to provide a foundation for analyzing data for the purpose of making decisions for business, as well as other data-informed fields of study.

PREREQUISITES: Survey of Calculus (STRONGLY SUGGESTED), Introduction to Business Statistics (Econ 3402), Business Statistics and Quantitative Methods (Econ 3406), and (STRONGLY SUGGESTED) Economic Forecasting (Econ3460) and a 3.0 minimum GPA.

LEARNING OBJECTIVES:

(1) Use discrete and continuous probability distributions and sampling distributions in a variety of business applications (LG2, LG3, LG6, LG10)
(2) Estimate regression models, evaluate the results of regression models, and use the results for prediction and forecasting (LG2, LG3, LG6, LG10)
(3) Use SAS to generate descriptive statistics, manipulate data, and estimate a variety of different econometric specifications. (LG2, LG3, LG6, LG10)
(4) Produce a research paper on an economics-related topic (LG1).
(6) Make an effective professional, statistically-based presentation. (LG1, LG2, LG8)

COURSE OUTLINE:

Module 1: Economic Questions and Data
Lab 1: (intro to SAS: The user interface, programming, reading data, file formats, merging, Proc Contents & cleaning)
Lil’Project 1: Obtaining & Using Data – Creating SAS datasets from other file formats – Data Files (instructions provided in-class)

Module 2: Review of Probability/Statistics & Bivariate Regression
Lab 2: (intro to SAS: Descriptive statistics, re-coding, & spotting data problems)
Lil’Project 2: Estimating the Marginal Propensity to Consume Using OLS – Country Data, US Data (instructions forthcoming)

Module 3: Review Linear Multiple Regression
Lab 3: (SAS: Menu-driven regressions, Proc Reg, & interpreting regression output)
Lil’Project 3: Determinants of fuel purchases by State? – State Data

Project Proposal: One class period dedicated to helping students organize thoughts, data, and materials for end-of-course project/presentation

Module 4: Linear Regression Violations and Fixes (Non-linearity)
Lab 4: (SAS: re-scaling, linearization, logs, squares & cross products)
Lil’Project 4: Estimating OLS using Log & Interactions: Estimating the Elasticity of Demand (Data & Links to be added)

IN-CLASS MIDTERM

Module 5: Linear Regression Violations and Fixes (Non-constant Variance)
Lab 5: (SAS: Correcting errors and inference, White’s Test, Breusch-Pagan)
Lil’Project 5: Estimating State Per Capita School Expenditures with PCI: Heteroskedastic Errors – State Data (instructions forthcoming)

Module 6: Linear Regression Violations and Fixes (Non-normality and Non-indep. errors)
Lab 6: (SAS: Introduction to other non-OLS estimation techniques)
Lil’Project 6: Data Instructions (links to be added)

Module 7: Regression with a Limited (Binary) Dependent Variable
Lab 7: (SAS: Proc Probit, Proc Logistic)
Lil’Project 7: Does Political Contributions Influence A Politicians Vote? — Vote Data, Data Description (instructions forthcoming)

Module 8: Instrumental Variables Regression (endogeneity)
Lab 8: (SAS: Supply/Demand estimation, Proc Syslin, models, identification, & examples of simultaneous systems)
Lil’Project 8: Data Instructions (links to be added)

If we have time: TBD

Module 9: Duration Models
Module 10: Introduction to Time Series Regression and Forecasting
Optional Proj: Writing simple macros in SAS

Module 11: Student Research & Presentations

IN-CLASS FINAL

GRADE COMPOSITION

IN-CLASS EXAMS 40%
Lil’ Projects 30%
PAPER/PROJECT/PRES. 30%
Things considered for individual project grading

I. TOPIC
   Originality
   Ambition
   Appropriateness

II. DATA
    Initiative in acquisition
    Difficulty in acquisition
    Thoroughness of search

III. STATISTICAL ANALYSIS
    t-tests
    F-test
    Interpretation of adjusted $R^2$
    Test for serial correlation
    Discussion of multicollinearity

IV. MODEL SELECTION
    Major theoretical influences covered
    Selection of final model

V. RESULTS & CONCLUSION
    Reasonableness of fit
    Signs and significance of coefficients

VI. PRESENTATION
    Clarity and depth of discussion
    Appearance and Professionalism
    Feedback from Faculty and Outside Reps.