Course Objectives

The objective of this course is to familiarize you with econometric theories and techniques that can be applied to a variety of settings. Econometrics is a collection of statistical tools particularly well suited for (1) describing economic relationships, (2) testing hypotheses formulated from economic models, and (3) forecasting micro- or macroeconomic activity. We will review some basic statistical concepts and extend the Classical Linear Regression Model (CLMR) you studied in your statistics course. And early focus will be on estimating and interpreting the CLRM. We will then address each of the assumptions of the CLRM, exploring implications of violating such assumptions, testing for whether assumptions hold, and alternative techniques to deal with violations.

A good econometrician combines strong technical skills with the art of building a model based on theory and intuition. This course will involve a modest degree of mathematical rigor to build the necessary theoretical foundation. In addition, hands-on exercises will require students to master the application and interpretation of econometric techniques. The use of R allows for practical experience with econometric estimation that will complement lecture material.
Course Expectations

Be prepared to work hard and learn something new.

Students are expected to take an active part in this course, including being prepared to discuss textbook material in class and take part in class exercises. This requires keeping up with assigned reading, homework, and practice problems. To be successful in this course you should expect to devote no less than 10 to 14 hours each week, including lectures, studying, and preparing assignments.

This course will focus on both theory and application. Both are important. You must be ready to think about abstract concepts, pay attention to nuanced technical details, and apply what you learn in an original way. We will also spend time learning basic coding (in R) to implement econometric techniques. I expect no prior knowledge of or experience with writing code.

The building-block nature of this course requires consistent study habits. For that reason I expect you to attend all lectures, ON TIME, and to have read the text assignment before class. If you are having trouble with material covered in previous classes, please do not hesitate to come to me for help. In the extreme, an absence rate of 25% will result in a failing grade. Please see the University’s official attendance policy at

http://registrar.richmond.edu/services/policies/attendance.html

Grading

Grades for this course will be determined through a combination of homework, problems sets, quizzes, and exams. Homework will be assigned consistently throughout the semester in addition to problem sets that involve applications in R. There will be a short quiz at the beginning of class very Tuesday (except exam days). Components of the course grade are weighted as follows:

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Component</th>
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<tbody>
<tr>
<td>10%</td>
<td>Homework</td>
</tr>
<tr>
<td>16%</td>
<td>Problem Sets</td>
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<tr>
<td>6%</td>
<td>Class Participation</td>
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<tr>
<td>6%</td>
<td>Quizzes</td>
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<tr>
<td>40%</td>
<td>Equally divided between two Exams</td>
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<tr>
<td>22%</td>
<td>COMPREHENSIVE Final Exam</td>
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Tentative exam dates are listed below. Any changes will be announced at least 2 classes ahead of time. Only serious reasons will be considered for a makeup quiz or examination and I will only consider allowing a makeup for planned activities if I am notified in advance. I will not accept any homework after the due date without prior approval. Exams, quizzes and homework that are missed without approval will result in a score of zero.

Honor Policy

Students are expected to abide by the University of Richmond's Honor Code:

http://studentdevelopment.richmond.edu/student-handbook/honor/the-honor-code.html

Other Resources

Blackboard Course: http://blackboard.richmond.edu

Academic Skills Center: http://asc.richmond.edu
### COURSE OUTLINE:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Gujarati</th>
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<tbody>
<tr>
<td><strong>I. Preface</strong></td>
<td>pp. 1-12, Appendix A.7-A.8</td>
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</table>

#### Estimation of Coefficients in Simple and Multiple Regression

- Basic Ideas
- Ordinary Least Squares (OLS) Estimators in Simple Regression
- OLS Estimators in Multiple Regression
- Wrap-up

#### Goodness of Fit for the Regression Equation

- Coefficient of Determination: $R^2$ and Adjusted $R^2$
- Standard Error of the Regression

#### CLRM Assumptions and Properties

- Assumption of the Model and the Gauss-Markov Theorem

#### The Classical Normal Linear Regression Model (CNLRM) and Statistical Inference

- A Review of Statistical Concepts (Inference)
- The CNLRM
- Simple Regression: Inference
- Multiple Regression: Inference

#### III. Model Specification

- Function Form of the Regression Model
  - Regression Through the Origin
  - Scaling and Standardized Variables
  - Dummy Variable Regression Models
  - Polynomial Regression Models
  - Log Models
  - Reciprocal Models

- The Generalized F-test: Testing Model Restrictions Involving Multiple Coefficients
  - Tests of Linear Relationships
  - Test for Linear versus Log-Linear Alternatives

- Choosing the X Variables
  - Econometric Modeling: Model Specification and Diagnostic Testing

#### IV. Assumptions of the Classical Model

- Relaxing Model Assumptions
  - Multicollinearity: Correlated Regressors
  - Heteroskedasticity: Non-constant Error Variance
  - Autocorrelation: Correlated Errors
Exam Dates:

Midterm I: Tuesday, October 3
Midterm II: Tuesday, November 7

Final Exam

    Section 1: Monday, December 11, 2:00-5:00pm
    Section 2: Thursday, December 14, 2:00-5:00pm