NEW YORK UNIVERSITY
ROBERT F. WAGNER GRADUATE SCHOOL OF PUBLIC SERVICE

PADM-GP. 2902 MULTIPLE REGRESSION AND INTRODUCTION TO ECONOMETRICS
Summer 2014

Faculty
Sarah Cordes
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Time: Wednesday, 5:30 p.m. – 6:30 pm

Teaching Assistant
Agustina Laurito
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Recitation/Tutoring: TISC LC19
Time: Tuesday 6:00 p.m. – 8:00 p.m.

LECTURE
Location: 25W4 C-20
Time: Monday and Wednesday 6:45p.m. – 8:25 p.m.

RECITATIONS (PADM-GP 290)
You are required to register for recitation. Attendance at the first two sessions is required, and attendance thereafter is optional but recommended. The recitation prior to the exam will serve as a review session. In other recitations you will go over answers to problem sets (for assignments already submitted), and you will have a chance to ask questions about any topic in the course.

PREREQUISITE: CORE-GP 1011 or equivalent

COURSE DESCRIPTION
Multiple regression (econometrics) is the core statistical technique used by policy and finance analysts in their work. In this course, you learn the theory and practice of econometric analysis. Specifically you will learn how to evaluate whether regression coefficients are biased, whether standard errors (and thus t-statistics) are valid, and whether regressions used in policy and finance studies support causal arguments.

In addition, you will use one dataset throughout the course to compute the statistics discussed in class using Stata, an econometric statistical computer package. In these assignments, you will reflect on how results reflect econometric concepts. Finally, you will complete a group project in which you use a dataset provided by the professors and employ techniques learned in class to estimate your own regression model.
OTHER CLASS INFORMATION

- **NYU Classes:** You will need to have access to NYU Classes found under “Academics” on your NYU Home site (https://home.nyu.edu/). All announcements and class-related documents (problem sets, computer exercises, databases, solutions, optional exercises, class notes, etc.) will be posted here.

- **Class notes / PowerPoint:** Lecture notes (in PowerPoint) will be posted on NYU Classes by the night before class. You should print these notes and bring them with you to class, as they will serve as a template for you to take notes during class. After each class, completed versions of the notes (e.g., with graphs filled in) will be posted.

- **Absences:** Please see us immediately if you have any conflicts with scheduled assignments and/or exams, or if you anticipate being absent due to religious observances.

- **Academic integrity:** NYU Wagner policies on academic integrity will be strictly enforced in this class. You can find the school’s official statement on academic integrity [here](https://www.nyu.edu/csd). You are encouraged to study and work together on problem sets, but all submitted work must be that of the individual student. Any plagiarized work will be given a zero and will not be dropped from the final grade. Additionally, we will notify Wagner administration, and there may be additional action taken.

- **Accommodations:** Any student requiring an accommodation due to a chronic psychological, visual, mobility and/or learning disability, or who is Deaf or Hard of Hearing, should register with and consult with the Moses Center for Students with Disabilities at 212-998-4980, 726 Broadway, 2nd floor ([www.nyu.edu/csd](http://www.nyu.edu/csd)). Of course, we are happy to provide any and all accommodations recommended by the Moses Center.

COURSE REQUIREMENTS AND GRADING

1. **Assignments (20%)**

Throughout this course, you will complete eight problem sets and seven computer exercises.

Problem sets and computer exercises must be submitted in class on the Monday following the associated lecture, as noted in the course schedule below. Assignments must be submitted at the beginning of class and in hard copy. No late assignments or emailed assignments will be accepted. At the end of the semester, the lowest two problem set grades will be dropped (but note that a grade of zero will not be dropped). The remaining 6 problem set grades will be averaged along with the computer exercise grades, and this score will contribute 20% to your final course grade.

Solutions will be posted to NYU Classes on the Wednesday after the problem sets and computer exercises are due. Please write your Wagner mailbox number on your submissions, and indicate if you do not have a mailbox. For problem sets, submit your answers on the answer sheet provided for each set, and make sure your answers are legible. For Stata problems, please submit your last (most correct) run, not all the erroneous ones that might precede that one! Graded assignments will be returned to you in class by the following Wednesday after they are due.
2. **Exam (35%)**
   An in-class exam will be given on **July 14** (see course schedule below). You may bring a non-graphing calculator and two pages (single-sided) of notes. Note, however, that being overly dependent on your notes will not serve you well on the exam.

3. **Project (45%)**
   In a group of four or five students, conduct a regression analysis, present your results, and write a paper. (NOTE: All group members will complete peer evaluations that will factor into grades.)

*Process steps and requirements:*
   a) Email both professors by **Tuesday, June 3** with your rankings of preferred data sets, and we will put you in groups. See datasets and their descriptions in *NYU Classes > Resources > Project Descriptions and Datasets*.

   b) Contact us to meet with your group the week of **June 9** to discuss the project, including at least one specification that will be estimated.

   c) Read chapter 11, “Running Your Own Regression Project,” in the course text.

   d) Present your results during class to get feedback before writing.

   e) Write an 8-10 page paper (double spaced), including two tables, organized into the five sections described below (Note: tables do not count in the page limit).

   f) Schedule a time to meet with professors after the exam but before presentations (**July 15** – **July 22**) to go over your two tables (descriptive statistics and results). You are also welcome to meet with us more regularly if you would like additional feedback.

   g) Optional - Submit a draft of your final paper if you would like feedback (**July 21**).

*Paper outline*

I. Introduction: What is the goal of your statistical regression study? Why is it interesting; why do we care? (This does not have to be momentous, but you should explain why the results could be interesting or valuable to someone.)

II. Data: Describe your sources and discuss the descriptive statistics presented in Table 1.

III. Model and Empirical Strategy: What is your model (equation), and how does it address the goal of your analysis? Why are the specific variables used and measured as they are? Do you have any prior expectations about the signs of the coefficients? How will you estimate this model (usually OLS with fixed effects)?

IV. Results: Discuss the results presented in Table 2.

V. Conclusions: What does your model say about your goal or issue? What is the next step in this research?

*At the end of your paper, include an appendix with the following:*

1. Table 1 (with title): Descriptive statistics of all the variables in your model(s)
2. Table 2 (with title): Results of your models, presented in four or five columns
3. Final clean Stata log file of your results
COURSE MATERIALS


   This is available at the NYU bookstore, on Amazon.com and on other websites.

2. Required: Stata/IC 12, purchased and loaded onto your computer by week one.

   You should purchase this software through NYU’s Direct-ship GradPlan in order to obtain a student discount: [http://www.stata.com/order/new/edu/gradplans/gp-direct.html](http://www.stata.com/order/new/edu/gradplans/gp-direct.html)

   Purchase Stata/IC 12 (not Small Stata). The least-cost option is a 6-month license ($65) but if you are planning to take Estimating Impacts or the research capstone, you may want to consider a one-year or perpetual license. Stata 12 is not platform-dependent and will run on either Windows or Mac operating systems.

   No previous knowledge of Stata is necessary. In addition to learning Stata in class, through the problem sets, and by performing computer exercises, the Data Services Studio in Bobst ([http://library.nyu.edu.dataservice/](http://library.nyu.edu.dataservice/)) offers short courses (tutorials) and on-site help. Finally, recitations during the first week of class will serve as Stata tutorials. If you have a laptop, please bring it with Stata already installed.


4. Required: Computer Exercises and Data Set to download from NYU Classes. See the course schedule below for when assignments are due in class.

   By the first week of class, download from NYU Classes, saving them to a folder of your computer reserved for PADM-GP 2902 work:
   - Computer Exercises all one file.doc;
   - Newschools9810.dta;
   - Class 3 Exercise 2012.do;

   The exercises are in one file under Assignments. The answers will be posted under the class when they are assigned (and due), after class.

   Then, watch video one (and video two if you have time) on using Stata (also on NYU Classes, Stata Learning Materials).
## Course Schedule: (S= Studenmund text)

<table>
<thead>
<tr>
<th>DATE</th>
<th>MATERIAL</th>
<th>READING</th>
<th>DUE IN CLASS</th>
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<tbody>
<tr>
<td>May 28</td>
<td>Class 1</td>
<td>S Chs. 1 &amp; 2 (34-38 and 46-57)</td>
<td>Student information sheet</td>
</tr>
<tr>
<td>June 2</td>
<td>Class 2</td>
<td>S Chs. 2 (39-45) &amp; 4</td>
<td>Problem Set 1</td>
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<tr>
<td>June 4</td>
<td>Class 3</td>
<td>S Chs. 3 &amp; 5 <em>(not including appendix)</em></td>
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<tr>
<td>June 9</td>
<td>Class 4</td>
<td>S Chs. 6 &amp; 7 (207 –213, 218 -220, 223-226); Appendix Ch. 5</td>
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| June 11  | Instructors Available | Instructors will be available to answer questions about projects. | ▪ Problem Set 2  
▪ Computer Exercise 1  
▪ Problem Set 3 |
| June 16  | Class 5  | S Ch. 7 (213 –218, 220-223, 226-232)         |                                       |
| June 18  | Review   | We will use this time to review material from the first five lectures. | ▪ Problem Set 4  
▪ Computer Exercise 2 |
| June 23  | Class 6  | S Chs. 8 & 9                                 |                                       |
| June 25  | Class 7  | S Ch. 10                                     | ▪ Problem Set 5  
▪ Computer Exercise 3 |
| June 30  | Class 8  | S Ch. 16                                     | ▪ Problem Set 6  
▪ Computer Exercise 4  
▪ Problem Set 7  
▪ Computer Exercise 5 |
| July 2   | NO CLASS |                                              | ▪ Problem Set 8  
▪ Computer Exercise 6 |
| July 7   | Class 9  | Panel data review, computer exercise 9        |                                       |
| July 9   | Exam Review | We will use this time to review for the exam |                                       |
| July 14  | Exam     |                                              |                                       |
| July 16  | Instructors Available | Instructors will be available to answer questions about projects. |                                       |
| July 21  | Class 10 | S Ch. 14, (396-97) & Table 11-2 B Ch. 10 through 10.1.3 | Draft of final project (optional) |
| July 23  | Presentations |                                              |                                       |
| July 28  | NO CLASS |                                              | Computer Exercise 7                   |
| July 31  | PROJECT PAPERS DUE – ONE PER GROUP            |                                       |
CLASS TOPICS

Class 1: OLS Bivariate Regression Model with Error Term
Theoretical regression line; deterministic versus stochastic relationships; population versus sample regression line; error and residual; OLS estimators

Note: Purchase and install Stata/IC 12; download and save newschools97043.dta, Class 3 Exercise 2012.do, and Exercises Computer 2012.doc from Blackboard. Watch video on using Stata. Print and bring Class 1 Handout.doc to class.

Class 2: OLS Multiple Regression and Assumptions about Error Term
Reducing bias; interpretation of coefficients; BLUE assumptions

Class 3: Hypothesis Testing in Multiple Regression Context
Significance tests; confidence intervals; F test; R²; Adjusted R²; interpretation of computer output

Class 4: Functional Form Part I: Polynomials and Dummy Variables
Functional form; using qualitative data (dummies); joint tests of significance; curvilinear relationships

Class 5: Functional Form Part II: Interactions and Logarithmic Transformations
Interactions of dummies; interactions of continuous and dummy variables; continuous by continuous interactions; logarithmic transformations (percent change or elasticity transformations)

Class 6: Multicollinearity and Autocorrelation

Class 7: Heteroskedasticity

Class 8: Panel Data Estimation Part I
Pooled cross-sectional and time series data; panel data; fixed effects estimation.

Class 9: Panel Data Estimation Part II; Introduction to Linear Probability Models

Exam

Class 10: Qualitative Dependent Variables; Simultaneous Equation Models

Presentations
STUDENT INFORMATION SHEET

Name____________________________________________________________________

Name of undergraduate institution and year of graduation:

Previous experience in statistics? When?

Previous professor for statistics if Wagner?___________________________________

Program (circle one) Health Public and Nonprofit Urban Planning International Other

Expected specialization (circle) Finance Policy Management International Other

Brief description of work experience (if any): Fulltime Part time

Specific areas of interest in public policy, finance, planning or international:

What do you hope to learn or gain from taking this course?

Other information of interest, especially to help me get to know you faster.