

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

**PADM-GP 2902: REGRESSION AND INTRODUCTION TO ECONOMETRICS
Spring 2018: Sections 1 and 2
Final**

FACULTY INFORMATION*Professor:*

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316E

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Office Hours: Tuesdays, 2:30 – 3:30, 246 Greene,

Teaching Colleagues:

Anu Gupta

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Matthew Bender

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Multiple regression is the core econometric technique used by policy and financial analysts. In this course, you will learn how to use and interpret this critical statistical method. Specifically, you learn how to build and estimate multiple regression models, 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, employing one consistent dataset for all your computer exercises, you will perform statistical analyses discussed in class using Stata, an econometric statistical package, and you see how the results reflect econometric concepts. Finally, with a group of your classmates and project datasets provided by your professor, you do a project that involves estimating your own regression model and applying the techniques we learn in class.

By the end of the course, you should be able to:

- Understand what an Ordinary Least Squares (OLS) regression does and why it is useful
- Write and interpret mathematical equations representing various regression models
- Interpret regression results as they are typically represented in statistical software packages, policy and finance papers, and academic articles
- Use Stata to run your own regressions to suggest answers to interesting policy questions
- Think critically about the assumptions underlying your (or another researcher's) interpretation of regression output and test whether these assumptions are likely to hold
- Conduct a research project in which you formulate, estimate, write about, and present an econometric model
- Have a better understanding of the statistics that underlie research in your field of interest

LECTURES

Sec 1: Tuesday, 11–12:40
Waverly, Room 567

Sec 2: Tuesday, 4:55 pm –6:35 pm
238 Thompson St (Global Center), Room 383

RECITATIONS (PADM-GP 290), through week 10

You are required to register for recitation. Attendance is optional but highly recommended. In these sessions you will discuss the learning objective of the problem set (as well as some specific questions) that is due the following week. As time allows, TCs will also answer follow-up questions from the week's lecture and Stata.

Section 3: Thursdays, 8:35-9:35 pm, 25 W. 4th, C-20, Anu Gupta
Section 4: Fridays, 12:30 – 1:30 pm, 45W4 B06, Matthew Bender

STATA TUTORIALS

In addition to a video tutorial posted to *NYU Classes*, there is a *highly recommended* in-person tutorial (choose one time or go to both!) This is the way to learn enough Stata to do your homework assignments.

1. Monday January 29, 8:30 pm to 10:30 pm, Waverly, Room 367
2. Saturday February 3, 11:30 am to 1:30 pm, Waverly, Room 367

We recommend that you bring a laptop with Stata installed.

TUTORING

We also offer free optional tutoring from the teaching colleagues at Puck (see locations and times below)

Wednesdays, 6:00 to 7:00 p.m., Anu Gupta, doctoral students' area, 3rd Floor, Puck
(to the right of stairs)

Fridays, 2:30-3:30 p.m., Matthew Bender, 3rd Floor, Puck, study.

PREREQUISITE: CORE-GP 1011 or equivalent

NYU CLASSES

You will need to have access to the 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.

Academic Integrity

Academic integrity is a vital component of Wagner and NYU. Each student is required to sign and abide by Wagner's Academic Code. Plagiarism of any form will not be tolerated since you have all signed an Academic Oath and are bound by the academic code of the school. Every student is expected to maintain academic integrity and is expected to report violations to me. If you are unsure about what is expected of you should *ask*.

Henry and Lucy Moses Center for Students with Disabilities at NYU

Academic accommodations are available for students with disabilities. Please visit the Moses Center for Students with Disabilities (CSD) website at www.nyu.edu/csd and click on the Reasonable Accommodations and How to Register tab or call or e-mail CSD at [\(212-998-4980\)](tel:212-998-4980) or mosescsd@nyu.edu for information. Students who are requesting academic accommodations are strongly advised to reach out to the Moses Center as early as possible in the semester for assistance.

NYU's Calendar Policy on Religious Holidays

NYU's Calendar Policy on Religious Holidays states that members of any religious group may, without penalty, absent themselves from classes when required in compliance with their religious obligations. Please notify me in advance of religious holidays that might coincide with exams to schedule mutually acceptable alternatives.

COURSE REQUIREMENTS AND GRADING*SUMMARY*

1. 20% Problem Sets and Computer Exercises
2. 35% Midterm Exam
3. 45% Regression Project

DETAILS

1. **(20%) Fifteen problem sets and computer exercises. There are 100 possible points for each problem set (PS) and for each computer exercise (CE).**
 - a) Thus the grades on all your problem sets and computer exercises will be added, divided by 15 (or 13 after two are dropped – see c. below) and multiplied by 0.2.
 - b) Problem Sets and Computer exercises will be graded for completion of the entire exercise. You should try to obtain correct answers, however, as this will help you on the midterm. **Copying others or previous semesters will result in a zero.**
 - c) **I will drop the two lowest grades.**
 - d) Answers to problem sets and computer exercises **must be submitted at the beginning of the class for which they are listed in the course schedule below and in hard (printed) copy.**¹ No late assignments or emailed assignments will be accepted.
 - e) For Stata output, submit only the last “run” of the analysis.
For problem sets, submit your answers on the answer sheet provided for each set.
Write your mailbox number on your submissions.
Graded assignments will be returned to your student mailbox.
 - f) Solutions will be posted to *NYU Classes* by Tuesday evenings.

2. **(35%) Exam (100 possible points)**

An in-class exam will be given during **Class 11** (see Course Schedule below). You may bring a non-graphing calculator and two pages (single-sided) of notes.

¹ A new [NYU Print Service](#) feature makes it easy to print from any device that can send email and attach files, including tablets, smartphones, and Chromebooks. Simply send the file to mobileprint@nyu.edu (for black & white) or mobileprint+color@nyu.edu (for color) and pick up the printout at any NYU Print Service station in New York.

2. (45%) Group Project (100 possible points)

In groups of four to five, you will conduct a regression analysis, present your results, and write a paper. (**Note:** All group members will complete peer evaluations that will factor into grades.)

- a) **As a PDF (and not a word document)**, email me your 2902 project form by Saturday January 27 at 6:00 pm with your rankings of preferred data sets and you will be put in groups. See datasets and their descriptions in *NYU Classes, Resources, Project Descriptions and Datasets*. **The project form is at the end of the syllabus but when you fill it out you will then have to make it a pdf before sending it.**
- b) Contact me to meet with your group the week of **Class 3 or 4** 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) See me during office hours or after class for quick check-ins on your work.
- e) Contact me **by the week of class 11 or beginning week 12**, to go over your two tables (descriptive statistics and results) with your group. In addition, see me about your results as you go along if you want or need feedback.
- f) Present your results during one of the last three class sessions to get feedback before writing. **Note:** All students are expected to attend each day of presentations.
- g) Write an 8-10 page paper, including two tables, organized into five sections as follows below, under *Paper Outline*. Tables do not count in page limit.

Paper Outline

- I. Introduction: What is the goal of your 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 that are presented in Table 1.
- III. Model and Empirical Strategy: What is your model (equation), and how does it achieve 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 coefficients? How will you estimate this model? (Usually OLS with fixed effects.)
- IV. Results: Discuss the results that are presented in Table 2.
- V. Conclusions: What does your model say about your goal or issue? What is the next step in this research?

Appended at end of paper:

- i) Table 1 (with title): Descriptive statistics of all the variables in your model(s).
- ii) Table 2 (with title): Results of your models, presented in four or five columns.
- iii) Final cleaned up, annotated Stata log file of your results.

COURSE MATERIALS

1. **Required: A. H. Studenmund, *Using Econometrics: A Practical Guide*, 7th ed, cited as S. ISBN: 9780134182742**

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

You should purchase this software here in order to obtain a student discount:

<https://www.stata.com/order/new/edu/gradplans/campus-gradplan/>

Purchase Stata/IC (**not** Small Stata). The least-cost option is an annual license. If you are planning to take Estimating Impacts, Advanced Empirical Methods, or the Research Capstone, you may want to consider a perpetual license. Stata/IC 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 through the problem sets and computer exercises and in class, the Data Services Studio in Bobst (<http://library.nyu.edu/dataservice/>) offers short courses (tutorials) and on-site help.

3. **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, resources, problem sets, computer exercises and solutions by class due, assignments by class due, class three*, saving them to a folder on your computer reserved for PADM-GP 2902 work:

Computer Exercises all one file.doc;
newschools9810.dta;
Class 3 Exercise 2014.do;

Then, **watch the video** on using Stata, **read** “Using Stata Chapter 1 from Stud text” (both on *NYU Classes, Stata Learning Materials*), and **read** S. Appendix 1.7, pp. 30-34.

CLASS NOTES

Before each class, class notes will be available on *NYU Classes*. You should **print** them, bring them to class, and use them to organize your notes. **Download** from *NYU classes, resources, class notes for fall 2016*, “Class 1 Handout new.”

Note: See two articles on classes site regarding the power of taking notes by hand in class!

SUMMARY OF COURSE GRADING AND DUE DATES

1. 20% Problem Sets and Computer Exercises
2. 35% Midterm Exam
3. 45% Regression Project

COURSE SCHEDULE (S= Studenmund text)

CLAS S	Tues .	READING	DUE IN CLASS (Hard copy, no late assignments)	COVERED IN RECITATON
1	1/23	S Chs. 1 & 2 (35-40 & 47-57)	See "Class Topics," next page	Problem Set 2
2*	1/30	S Chs. 2 (40-47) & 4	Problem Set Class 2 (due class 2 and so on in this column)	Problem Set 3
3**	2/6	S Chs. 3 (65- 79) & 5	Problem Set Class 3 Computer Exercise Class 3	Problem Set 4
4**	2/13	S Chs. 6 (Appendix IX optional), 3 (79-83) & 7 (189-194, 199-201)	Problem Set Class 4	Problem Set 5
5	2/20	S Ch. 7 (194-199, 201-209)	Problem Set Class 5 Computer Exercise Class 5	Problem Set 6
6	2/27	S Chs. 8 & 9	Problem Set Class 6 Computer Exercise Class 6	Problem Set 7
7	3/6	S Ch. 10	Problem Set Class 7 Computer Exercise Class 7	Problem Set 8
	3/13	SPRING BREAK, NO CLASSES OR TC SECTIONS OR TUTORING		
8	3/20	S Ch. 16	Problem Set Class 8 Computer Exercise Class 8	Problem Set 9
9	3/27	S Ch. 13	Problem Set Class 9 Computer Exercise Class 9	Problem Set 9 and computer exercise
10	4/3	S Ch. 14 & Tables 11-2 and 11-3 (354-356)	Computer Exercise Class 10	Exam Review
11***	4/10	EXAMINATION		
12	4/17	(Presentations Week)		None
13	4/24	(Presentations Week)		None
14	5/1	(Presentations Week)		None
	5/10	Thursday	Regression Project Papers In mailbox at Puck	None

* email professor **2902 project form as PDF** (at the end of syllabus) by **Sat. Jan. 27 at 6:00 pm.**

** schedule meeting with professor week of **class 3 or 4** to discuss regression analysis and one equation.

*** schedule a meeting with professor week of **class 11** Thursday or Friday or following week to go over Tables 1 and 2 of projects.

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;
- Download and save, from NYU Classes:
newschools9810.dta,
Class 3 Exercise 2014.do,
Computer Exercises all one file.doc.
- Watch the video on using Stata and read “Using Stata Chapter 1 from Stud text,” both on NYU Classes.
- Read Stata materials from textbook (Appendix 1.7)
- Print and bring to class: *Class 1 Handout new.doc*

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; R^2 ; Adjusted R^2 ; 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

Class 10: Qualitative Dependent Variables; Simultaneous Equation Models

Class 11: Exam

Class 12-14: Presentations: Attendance is required and will be taken. Be prepared to give feedback to improve classmates' work.

Thurs. May 10: Papers Due in Professor's Mailbox (Puck, 3rd Floor) by 5 p.m.

PROJECT DATA SET PREFERENCE FORM

SEND TO PROFESSOR BY EMAIL IN *PDF FORM*

OR BRING TO FIRST CLASS

2902: Spring 2018

Due by Saturday, January 27 at 6:00 pm (otherwise you will be put into group by professor)

NAME: _____

Section: 11:00 am _____

4:55 pm _____

Please number the project data sets from your first (1) to last (6) choice. You can rank as many as you like as your first or second choice etc. *and, importantly*, if you are willing to be put into any group, please check that box. Willingness to go with any group is very helpful!

Rank

_____ *Willing to be put in any group*

_____ *School District Finances in Three States Data Set*

_____ *Early Childhood Longitudinal Survey Data*

_____ *International (Country) Data Set*

_____ *State Demographics and Finances Data Set*

_____ *Health Research Survey Data Set*

_____ *National Neighborhood Data Set*