PADM-GP 2902 001 & 002
Regression and Introduction to Econometrics
Spring 2024

FACULTY INFORMATION

Professor:
Leanna Stiefel   Office Hours: By appointment; please email
Email: leanna.stiefel@nyu.edu

Teaching Colleagues:
Jo Alkhafaji-King   Penelope Wang
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COURSE DESCRIPTION

Multiple regression is the core econometric technique used by policy and financial analysts. In this course, you 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 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.

COURSE LEARNING OBJECTIVES

• 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 and regression techniques to suggest answers to important policy and finance questions.
• Think critically about the assumptions underlying your (or another analyst'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.

• Understand the statistics that underlie research in your field of interest.

LECTURES

Sec 1: Tuesday, 10–11:40   Sec 2: Tuesday, 4:55 pm –6:35 pm

60 Fifth Avenue, 110   Bobst, LL150

VIRTUAL RECITATIONS (PADM-GP 290), through week 11

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

Section 3**:** Mondays, 12:30-1:30 pm via Zoom, Penelope Wang

Section 4: Thursdays, 8:35-9:35 pm via Zoom, Jo Al Khafaji-King

VIRTUAL TUTORING

We also offer free optional tutoring and a Stata review session from the teaching colleagues, by Zoom (see times below):

Jo Al Khafaji-King: Mondays, 10:45-11:45am; Sign up here

    Stata Review Session: Wednesday, January 24th, 5-6:00 pm via Zoom
    Join URL

Penelope Wang: Mondays, 3:00-4:00 pm via Zoom; Sign up here

    Stata Review Session: Thursday, January 25th, 10:00-11:00 am via Zoom
    Join URL

PREREQUISITE:

CORE-GP 1011 or equivalent

NYU Brightspace

You need to have access to the NYU Brightspace found under "Academics" on your NYU Home site. All announcements and class-related documents (answers to problem sets and computer exercises, lecture PowerPoints, project datasets, Stata learning materials) will be posted here. Required submissions (such as your answers to problem sets and computer exercises, project preferences, team evaluations, and final papers are to be submitted via the Assignments tab.)

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. This includes **any use of AI**. 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 and click on the Reasonable Accommodations and How to Register tab or call or e-mail CSD at (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 on line through Brightspace (Assignments tab) by the beginning of the class for which they are listed in the course schedule below**. No late assignments will be accepted.

   e) **For Stata outpu**t, submit only the last "run" of the analysis. Submit the log file as a **pdf.**

      For Stata exercise answers, submit answers as **Microsoft Office Word file**.

      For problem sets, submit your answers on the answer sheet provided for each set (as **Microsoft Office Word file**.)

   f) Solutions will be posted to Brightspace, after the due date and time.

2. **(35%) In-person Exam (100 possible points)**

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

3. *(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) **Fill out the Project Data Preference Form** on the **Assignment Tab by Saturday February 3 at 6:00 pm** with your rankings of preferred data sets and you will be put in groups. See datasets and their descriptions in Brightspace, Project Descriptions and Datasets.
b) **Contact me** via email 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) **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, contact me to go over your results as you go along if you want or need feedback.
e) Present your results during one of the last three class sessions to get feedback before writing. **Note:** All students must attend each day of presentations.
f) 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 good, descriptive title): Descriptive statistics of all the variables in your model(s).
ii)   Table 2 (with good, descriptive 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/SE**. You can purchase this and install it on your personal computer or use it from NYU's virtual lab.

     Purchase: Use this link to obtain a student discount. The least expensive option is a 6-month license. If you are planning to take Estimating Impact, Advanced Empirical Methods, or the Research Capstone you may want to consider an annual or perpetual license.

     Virtual Lab: You can log into NYU's virtual computer lab (VCL)

     Review here on how to use STATA on the VCL

Stata is not platform-dependent and will run on either Windows or Mac operating systems.

The Data Services Studio in Bobst offers short courses (tutorials) and on-site help if you need a brush-up.

3. **Required: Computer Exercises and Data Set** to download from Brightspace, Assignment tab. See the course schedule below for when assignments are due.

By the first week of class, **download** from Brightspace, Assignment tab, Computer Exercises Class 3, saving them to a folder on your computer reserved for PADM-GP 2902 work**:**

     Class 3 Computer Exercise_new.do;
     newschools9816.dta;
     Computer Exercises ALL_new.pdf.

Then, if you need or want some review of Stata, **watch the video** on using Stata, **read** "Using Stata Chapter 1 from Stud text" (both on Brightspace, Stata Learning Materials), and **read** Stud. Appendix 1.7, pp. 30-34.

CLASS PPTs

Before each class, PowerPoints or lecture material will be available on Brightspace. You can **download** these from Brightspace, Powerpoint Slides, Multiple Reg_Class 1 filled in before 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)

CLASS	Tues	READING	DUE to Brightspace, before class, 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	3/5	S Ch. 10	Problem Set Class 7 Computer Exercise Class 7	Problem Set 8
8	3/12	S Ch. 16	Problem Set Class 8 Computer Exercise Class 8	Problem Set 9
3/18		**NYU Spring Break, No class**	**No tutoring**	**No recitation**
9	3/26	S Ch. 13	Problem Set Class 9 Computer Exercise Class 9	Problem Set 9 and computer exercise
10	4/2	S Ch. 14 & Tables 11-2 and 11-3 (354-356)	Computer Exercise Class 10	Exam Review
11*	4/9	**IN-CLASS EXAMINATION**		
12	4/16	(Presentations Week)	Friendly, helpful critique	None
13	4/23	(Presentations Week)	Friendly, helpful critique	None
14	4/30	(Presentations Week)	Friendly, helpful critique	None
	5/9	Thursday, by 5 pm	Regression Project Papers and Team evaluation forms in Assignments, Brightspace	None

*Fill out the Project Data Preference Form, on the Assignments tab, by **Sat. Feb. 3 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 Brightspace, Assignment tab, Computer Exercises Class 3:
  Class 3 Exercise_new.do,
  newschools9816.dta,
  Computer Exercises ALL_new.pdf. .
- If you need review of Stata, watch the video on using Stata and read "Using Stata Chapter 1 from Stud text," both on NYU Brightspace, Stata learning materials
- Read Stata materials from textbook (Appendix 1.7)
- Download for class: ppts Multiple Reg_Class 1 before class students

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 9: Papers and Team Evaluation Form due on assignment tab in Brightspace by 5 pm