NEW YORK UNIVERSITY

ROBERT F. WAGER GRADUATE SCHOOL OF PUBLIC SERVICE

PADM-GP 2902: MULTIPLE REGRESSION AND INTRODUCTION TO ECONMETRICS FALL 2023

# INSTRUCTOR INFORMATION

**Matias Morales**

Email: [mim313@nyu.edu](mailto:mim313@nyu.edu)

Office Hours: By Appointment, please email

LECTURES: Tuesday, 6:45PM-8:25PM

LOCATION: 194 Mercer, Room 206

# TEACHING COLLEAGUES (TC)

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| Jo Alkhafaji-King  Email: [jk7317@nyu.edu](mailto:jk7317@nyu.edu)  Recitation: Mondays 20:35 - 21:35 hrs Office Hours: Mondays 11:00 - 12:00 hrs [calendly.com/jk7317/office-hours](https://calendly.com/jk7317/office-hours) | Penelope Wang  Email: [jw7983@nyu.edu](mailto:jw7983@nyu.edu)  Recitation: Thursdays 20:35 - 21:35 hrs Office Hours: Wednesdays 18:00-19:00 hrs [calendly.com/jw7983/multiple-regression-](https://calendly.com/jw7983/multiple-regression-office-hours?month=2023-09) [office-hours?month=2023-09](https://calendly.com/jw7983/multiple-regression-office-hours?month=2023-09) |

TC-led recitations and office hours are virtual. Each TC will be in charge of a recitation and OH every other week, starting with Penelope.

# 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.

**PREREQUISITE:** CORE-GP 1011 or equivalent

# 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 questions.
* Think critically about the assumptions underlying your (or another analyst’s)

interpretation of regression output and test whether these assumptions 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.

# RECITATIONS (Virtual):

Attendance is optional by highly recommended. In these sessions you:

* review the answers to the problem set and computer exercises due the previous week
* discuss the learning objectives of the problem set and computer exercises due the following class

The TCs also offer one hour of office hours per week (see course schedule).

*There are no problem sets or computer exercises due in the first week of class, so the first week of classes there will be a STATA tutorial/refresher during the recitation.*

# COURSE MATERIALS

REQUIRED: A.H. Studenmund, *Using Econometrics: A Practical Guide.* ISBN: 9780134182742

* Unfortunately, the text is not available electronically from NYU Libraries (though you can ask them to scan a limited number of pages/chapters for you).
* Two other introductory books that are available through NYU Libraries are (i) Introductory Econometrics: Intuition, Proof, and Practice by Jeffrey Zax and (ii) Introductory Econometrics : A Practical Approach by Hamid Seddighi.
* One that I highly recommend but it is not available is Basic Econometrics by Damodar N. Gujarati

REQUIRED: STATA/BE. 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. <https://www.stata.com/order/new/edu/profplus/student-pricing/>
* Virtual Lab: You can log into NYU’s virtual computer lab (VCL) here: [https://www.nyu.edu/life/information-technology/instructional-technology-](https://www.nyu.edu/life/information-technology/instructional-technology-support/instructional-technology-tools-and-services/virtual-computer-lab.html) [support/instructional-technology-tools-and-services/virtual-computer-lab.html](https://www.nyu.edu/life/information-technology/instructional-technology-support/instructional-technology-tools-and-services/virtual-computer-lab.html)
  + Here’s a review on how to use STATA on the VCL:

<https://nyu.app.box.com/s/zp39zryd56u1rbnxxit61ylpqiez3yuq>

REQUIRED: [NYU BRIGHTSPACE](https://brightspace.nyu.edu/). All announcements and class-related documents (lecture power points, datasets for the final project, problem sets, computer exercises, assignment solutions, STATA review materials, and exam review materials) are available on Brightspace. Problem sets and computer exercises are to be submitted via Assignments in Brightspace.

# COURSE REQUIREMENTS AND GRADING

* 20% Problem Sets and Computer Exercises
* 35% Midterm Exam
* 45% Regression Project

*Students are expected to attend all of the lectures and actively participate. Please email your instructor if you are unable to attend class due to extenuating circumstances.*

## PROBLEM SETS AND COMPUTER EXERCISES (20%)

There are 15 total problem sets (PS) and computer exercises (CE), named for the class in which they’re due. We will drop the lowest two from your grade. Due to this flexibility we will not accept late assignments; please contact me if you have extenuating circumstances. **You must complete PS 9 and CE 9; these cannot be dropped from your grade.**

Problem sets/computer exercises are graded for completion, not correctness. Students should

take these assignments seriously as they’re good preparation for the exam and final project.

For the STATA code and output for computer exercises, submit the log file with the last “run” of the analysis as a PDF. Please submit written answers to computer exercises and problems sets as a Word file.

## MIDTERM EXAM (35%)

An exam will be given during Class 11 on November 21th (see course schedule on the following page).

## GROUP PROJECT (45%)

In groups of 4-5 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.

* Fill out Project Data Preference Form by EOD Tuesday, **September 12th**.
* Read Chapter 11, “Running Your Own Regression Project”, in the course text.
* Teams must email me the question you propose to answer and at least one specification that will be estimated by **September 26th.**
* Once groups have been assigned, meet with your group as soon as possible to plan the paper. Please email me to arrange a meeting during the week of **October 10th** to discuss the question you propose to answer and at least one specification that will be estimated.
* Present your results during class **November 28th** or **December 5th** to get feedback.
* Write an 8–10-page paper, including at least two tables, organized as follows (tables do not count in the page limit). **DUE THURSDAY December 12**. Students must also submit a group evaluation form, to help ensure that all group members participate equally in the final project.

## FINAL PROJECT OUTLINE

* 1. 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.)
  2. Data: Describe your sources and discuss the descriptive statistics in Table 1.
  3. 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 the model? (Usually OLS with fixed effects.)
  4. Results: Discuss the Results presented in Table 2.
  5. Conclusions: What does your model say about your goal or issue? What is the next step in this research?
  6. Appendix:
     1. Table 1 (with good, descriptive title): Descriptive statistics of all the variables in your model(s).
     2. Table 2 (with good, descriptive title): Results of your models, presented in 4-5 columns.
     3. Final annotated Stata log file of your results (note this should be “clean”, i.e.

contain no errors).

# ACADEMIC INTEGRITY

Academic integrity is a vital component of Wagner and NYU. Each student is required to abide by Wagner’s Academic Code. Plagiarism of any form will not be tolerated. Every student is expected to maintain academic integrity and is expected to report violations to us. If you are unsure about what is expected of you, please ask.

# WRITING CENTER

NYU Wagner provides writing tutors free of charge to assist students—in person or online—with their writing assignments. Beyond a general expertise in writing skills, NYU Wagner Writing

Tutors specialize in public policy-specific formats and can assist students at any point in their writing process—from initial concept brainstorming and mid-paper writer’s block, to first draft clarity and coherence checks and final draft line edits. Email appointments are a fantastic way to get extensive feedback on a deep read of your paper. In-person and video chat appointments are best used as a way to talk through a writing block, an organizational issue or something else. To learn more about Wagner's writing tutors and to make an appointment, visit the [Wagner Writing](https://sites.google.com/nyu.edu/wagner-writing-center/home/meet-our-tutors) [Center site](https://sites.google.com/nyu.edu/wagner-writing-center/home/meet-our-tutors).

# 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](http://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 or [mosescsd@nyu.edu](mailto:mosescsd@nyu.edu) for information. Students requesting academic accommodations are strongly advised to reach out to the Moses Center as early as possible in the semester.

# 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 us in advance of religious holidays that might coincide with exams to schedule mutually acceptable alternatives.

# WELLNESS EXCHANGE

The Wellness Exchange is your greatest mental health resource at NYU. Call the 24-hour hotline at (212) 443-9999, chat via the Wellness Exchange app anytime, make an appointment, or arrange a same-day Urgent Counseling session to speak with a certified counselor about any day- to-day challenges or health concerns, including medical issues, stress, depression, sexual assault, anxiety, alcohol or drug dependence, and eating disorders. No concern is too big or too small. Worried about a friend? Our counselors are here for that too — in person, over the phone, or through chat. The Wellness Exchange is here for you, whatever the reason. Not sure which option is right for you? Call or chat with our counselors to discuss your options and find the right fit. Not interested in phone, chat or Urgent Counseling? Email [wellness.exchange@nyu.edu](mailto:wellness.exchange@nyu.edu)

**Readings and HW Due Before Class**

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| --- | --- | --- | --- | --- | --- | --- |
| **Class** | **Date** |  | **Lecture** | **Reading** | **HW** | **Recitation** |
| **1** | Tu | 9/5 | OLS Bivariate Regression Model with Error Term | Ch.1  Ch. 2.1, 2.3-2.6 |  | Th 9/7 |
| **2** | Tu | 9/12 | OLS Multiple Regression and  Assumptions about Error Term | Ch. 2.2  Ch. 4 | PS2  Project Form | M 9/11 |
| **3** | Tu | 9/19 | Hypothesis Testing in Multiple  Regression Context | Ch. 3.1, 3.2  Ch. 5 | PS3  CE3 | Th 9/21 |
| **4** | Tu | 9/26 | Functional Form Part I: Polynomials  and Indicator Variables | Ch. 6; Ch. 3.3  Ch. 7.1, 7.2, 7.4 | PS4 | M 9/25 |
| **5** | Tu | 10/3 | Functional Form Part II: Interactions  and Logarithmic Transformations | Ch. 7.2, 7.3, 7.5, 7.6 | PS5  CE5 | Th 10/5 |
|  | Week | 10/2-  10/6 | Group meetings |  | Project Check-in |  |
| **6** | Tu | 10/17 | Multicollinearity and  Autocorrelation | Ch. 8  Ch. 9 | PS6  CE6 | M 10/16 |
| **7** | Tu | 10/24 | Heteroskedasticity | Ch. 10 | PS7  CE7 | Th 10/26 |
| **8** | Tu | 10/31 | Panel Data Estimation Part I | Ch. 16 | PS8  CE8 | M 10/30 |
| **9** | Tu | 11/7 | Panel Data Estimation Part II; Linear  Probability Models | Ch. 13 | PS9  CE9 | Th 11/9 |
| **10** | Tu | 11/14 | Intro. to Experimental & Quasi-  Experimental Methods | TBD | CE 10 | M 11/13 |
| **11** | Tu | 11/21 | EXAM |  |  |  |
| **12** | Tu | 11/28 | Group Presentations |  | Presentation |  |
| **13** | Tu | 12/5 | Group Presentations |  | Presentation |  |
|  | Tu | 12/12 | No class - Final Paper Due |  | Final Paper &  Group Eval. Form |  |