

Econ 308-05: Econometrics
Department of Economics
College of William and Mary
Fall 2016

Class meets: Mondays, Wednesdays, and Fridays:
12:00–12.50am, Tyler 113

Professor: Peter Savelyev (pasavelyev@wm.edu)
Office Hours: Mondays 3:30–4:30pm, Wednesdays 4.15–5.15pm, or by appointment
Office Location: Tyler 247

TA: Andy Loh (agloh@email.wm.edu)
Cell phone: (571) 246-2338
Office Hours: Wednesdays, 5-5:45pm; Thursdays, 6:15-7:00pm (changes possible)
Office Hours Room: Tyler 121

About the Course: This course is an introduction to econometrics, a collection of statistical methods for analyzing socio-economic data. Students will learn how to both analyze their own data and critically evaluate analysis done by others. Data analysis will include model specification, estimation and interpretation of model parameters, and hypothesis testing. The course will mix statistical intuition, the use of a powerful statistical package called Stata, and mathematical/statistical derivations with the emphasis on practical implications. Overall, this course provides students with essential analytic tools that are highly valued by the job market and by graduate schools.

About me: My primary research interests are in the fields of health economics, applied econometrics, and economics of human development. Prior to coming to William and Mary, I worked with James Heckman and other co-authors at the University of Chicago and taught at Vanderbilt.

Reading: Required reading is *Introductory Econometrics, A Modern Approach* by Jeffrey Wooldridge, 6th edition. (Older editions may work as long as students check page numbers, make sure that similar material is covered, and make sure that they do the right homework questions.)

Software: This course will heavily rely on statistical package Stata, which is available in all campus computers (check Stata 14 program under “statistics”) and can also be installed to your personal computer. You can use earlier versions of Stata than 14 but you may need to find a way to transfer data across different formats. A list of lab locations can be found here:
<http://www.wm.edu/offices/it/services/computerlabs/configuration/index.php>
The College has licenses for 40 concurrent **PACLab** computers. Stata may be accessed from any **PACLab** computer or on or off campus by using ssh to

stat.wm.edu and logging in with your WMuserid and Password. Also, the college is part of the Stata GradPlan which offers discounted versions of Stata. More information on that can be found here: <https://www.wm.edu/offices/it/services/software/licensedsoftware/mathstats/stata/index.php>. (Please, do not leave your empirical work to the last moment, especially if you depend on a public computer.)

Stata users enjoy a wide range of resources online in addition to excellent user-friendly help documentation that comes with Stata. One good and free introduction to Stata is called “[A brief introduction to Stata with 50+ commands.](#)” I will devote some time in class to learning Stata basics. Students are expected to get themselves familiar with the practical use of Stata by using material from class, from Stata help, and from web sources if needed.

Some Useful Data Sources:

1. Integrated Public Use Microdata Series (IPUM): <http://usa.ipums.org/usa/>
Cleaned data here includes the American Community Survey (ACS), Census data, Current Population Survey (CPS), and National Health Interview Survey (NHIS).
2. NBER: <http://www.nber.org/data/>

Team Work: Teamwork is highly beneficial for learning since students learn from each other and get superior motivation. Moreover, teamwork creates social skills that are essential for students’ future careers. I ask students to form teams of 3–4 people to work together on problem sets, and the project.¹ Please, answer the questionnaire on am formation and submit it at the third class. One team member submits the questionnaire for the whole team.

[see next page]

¹ Unless a team chooses to exclude its member for lack of contribution, all members of the team will share the same scores for home assignments and their original research presentation. It is up to the team how they divide the work. I allow teams to regroup if they find such changes productive. Please, report all changes in the team to the TA.

Team Formation Questionnaire (one form per team)
Please, fill and return this form by the third class.

1. *Your name:* _____
 2. *Do you have a team of 3–4 students (including you) enrolled in this class? (Yes/No)*
[If no, please skip to question 5]
 3. *Please list names of your team members (excluding you):*
 - 1) _____
 - 2) _____
 - 3) _____
 4. *Is your team open to admitting more members among those who found no team (to be assigned to your team by the Professor)? (Yes /No)*
[skip to question 6]
 5. *Would you like to be assigned to a team by the Professor? Yes / No*
 6. *Your notes if any:* _____

-

Grading Scale:

Homework, **30%**
Midterm exam, **25%**
Project, **10%**
Cumulative final exam, **35%**

Midterm and final: books, notes, and calculators are allowed. Computers, tablets, smart phones, and any other devices with Web access are not allowed.

If your score for the final exam is higher than your score for the midterm, then I will automatically replace your midterm exam score with the average between the midterm score and the final score. For instance, if you got 95% for the final and 85% for the midterm, I will automatically replace 85% with $90\% = (85+95)/2$. However, if your final is scored worse than your midterm, I will make no such adjustments. The aim of this policy is to encourage academic progress and give students a chance to improve their midterm scores.

Finally, students who provide frequent and relevant contributions to class discussions, ask great questions, and provide answers to questions that I ask to class during lectures will be rewarded by higher grade in marginal cases (e.g, an A- that is almost an A will translate to an A for such student).

Homework: We will have (roughly) weekly homework assignments, the majority of which involve computer work and interpretation of the results.

For questions requiring Stata work, the do and log files must be attached; points will be taken off if they are missing.

Hard copies of homework assignments are due Wednesday at class time unless otherwise notified. Each student is allowed to submit only one late homework (within 48 hours past due) to cover unexpected circumstances. A late homework has to be turned in by email to pasavelyev@wm.edu.

I will drop your lowest homework score to boost your total homework score.

Group work (group size no larger than 4) is encouraged, but each student must independently write up their own homework. Copying answers from your classmates or any other source constitutes honor code violation. Please, mention your group members in addition to your name when you submit your individual homework.

Project

As stated in the course description, the goal of this course is for you to gain the ability to conduct and critique empirical work in economics and related fields. A testimony to whether you have achieved this goal is to implement an empirical project with your team. Therefore, this course requires a project. You will pick one of the datasets from Wooldridge's textbook companion website or another source of your choice, form an interesting economic question, carry out an empirical analysis, and write up a short term paper with other members of your team (one paper from a team).

A short description (abstract) of your project is due on Friday, September 16. Please, limit the abstract to one paragraph. Please motivate your project in your abstract. Mention which methods you plan to use, which data you plan to process, which results you expect, and which policy implications you expect to derive. I will provide a written feedback on your abstract. I encourage students to discuss their topic with me any time when it is productive (before or after the abstract is due). The abstract will not be graded. Students are free to change their topic any time before the paper is due.

A good guide on how to write a research paper in economics is here: <http://faculty.wcas.northwestern.edu/~mdo738/teaching/cochrane.pdf> (it is written for PhD students but the same writing hints can be used by undergraduates).

Your project should contain the following parts:

- 1) Introduction: motivate your question of interest, shortly summarize which methods you used and which results you obtained
- 2) Data: Briefly describe your data. Define the outcome and main explanatory variables. Show a summary statistic table and, if needed, graphs summarizing important variables

- 3) Methodology: How do you answer the question raised in the Introduction? Which econometrics method are you applying? What are the underlying assumptions? (For example, if you use a difference-in-differences estimator, clearly describe your control and treatment groups, and the assumptions which make such estimation valid.) Admit limitations of your methodology. For instance, unless you have data from a randomized experiment, a simple OLS model will unlikely to give you estimates that can be interpreted as causal under realistic assumptions. Estimates based on simple OLS can still be useful but you need to note the limitations. Ideally, you would like to avoid strong assumptions and major limitations.
- 4) Results: Present your results in well-formatted tables and figures. Place notes behind tables and figures to make them self-explanatory. Interpret your results. Discuss both the economic and statistical significance.
- 5) Conclusions: Summarize what the paper is about and your findings. Mention limitations of your results related to limitations of methodology that you discussed above. (For example, if you suspect your analysis suffers from omitted-variable bias but cannot do anything about it, acknowledge it, and, if possible, discuss the direction of the bias. Admitting limitations improves the quality of your project). Discuss policy implication if any. Any next steps you may want to undertake in the future to move this research forward?

The project report should be no more than 10 pages double-spaced using 12-point font (figures and tables excluded). Please form a group of three or four and submit a joint paper.

Important Dates:

- 08/24: the first lecture
- 08/29: group questionnaire due
- 10/19: title and abstract of the term paper due in class
- 10/07: 50-min midterm in class
- 11/21: term paper due in class
- 12/2: the last lecture
- 12/13: 2-hour cumulative final, 9-11am, same class room

Deadlines for home assignments will be announced.

TA: Your TA will hold office hours each week. Please, first take your questions to your TA if the questions are related to the homework or STATA; if your TA cannot answer your questions, see me during my office hours. For questions related to the course materials or the project, it is best to come to see me during my office hours. If you cannot make it to my office hours and need to schedule an appointment outside the office hours, please email me 24-48 hours in advance for an appointment. Please, do not leave voice messages on my office phone: I may miss them. The best way to communicate with me is e-mail, not phone.

Honor Code: The College Honor Code will be observed. In particular, it is not acceptable to copy homework answers from your classmates or from any other sources.

Topics (subject to change):

(Number of chapters refer to Wooldridge's textbook, 6th ed., as the main source for this course. Other sources will supplement the textbook when preparing lectures but Wooldridge is the only required textbook)

1. Nature of Econometrics and Economic Data (Ch. 1)
2. Simple Linear Regressions (Ch. 2)
3. MLR (Multiple Linear Regressions): Estimation & Small Sample Properties (Ch. 3)
4. MLR: Inference (Ch. 4)
5. MLR: Large Sample Properties (Ch. 5)
6. MLR: Heteroskedasticity (Ch. 8)
7. MLR: Dummy Variables, Quadratic Terms, Interaction Terms (Ch. 6, Ch. 7)
8. Limited Dependent Variable Models and Sample Selection Correction (Ch. 7, Ch. 17)
9. Panel Data Estimation (Ch. 13)
10. Instrumental Variable Estimation (if time permits) (Ch. 15)
11. Simultaneous equations models (if time permits) (Ch. 16)
12. Carrying out an empirical project (if time permits) (Ch. 19)

Also, material from appendices A, B, C, D, E, and G will also be used throughout the course.

Computer policy: I allow using laptop computers and other electronic devices in class, but only for course-related purposes such as making notes or reading electronic handouts. Students caught using computers for course-unrelated purposes will lose the privilege of using computers at this class. I do not allow the use of computers and other devices with an access to Internet during the exam.

Feedback: I highly encourage students to provide me with feedback on how to further improve this course. I plan to conduct an informal survey to get feedback.

Disability Service: William & Mary accommodates students with disabilities in accordance with federal laws and university policy. Any student who feels s/he may need an accommodation based on the impact of a learning, psychiatric, physical, or chronic health diagnosis should contact Student Accessibility Services staff at 757-221-2509 or at sas@wm.edu to determine if accommodations are warranted and to obtain an official letter of accommodation. For more information, please see www.wm.edu/sas ."

Required and Suggested Reading:

Notation:

*– required reading

No asterisk – suggested reading (for those who want to learn more than required to pass the course). Some suggested reading may help you with your project.

*All lecture slides (to be available on Blackboard)

*Jeffrey M. Wooldridge. *Introductory Econometrics. A Modern Approach*. Sixth edition. Cengage Learning. 2016.

A Colin Cameron and Pravin Trivedi. Microeconometrics. Methods and Applications. Cambridge University Press, 2005.

A Colin Cameron and Pravin Trivedi. Microeconometrics using Stata. Revised Edition. Stata Press, 2009.

Larry Wasserman. All of Statistics. Springer. 2003.

I reserve the right to alter the form and content of the course in order to adjust to the needs and level of students enrolled in the class.