

# Economics 326 – Methods of Empirical Research in Economics

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This course is an introduction to econometrics. The main topic of the course is the linear regression model, its estimation and inference. Other topics include heteroskedasticity, endogeneity, instrumental variable estimation, and simultaneous equations.

Econ 325 is prerequisite for this course. Students are expected to be familiar with basic concepts in probability and statistics.

In addition to analytical exercises, the students will receive practical questions requiring handling and analyzing data using R (or some other statistical software).<sup>1</sup> Some R training will be given during the TA sessions.

Notes and assignments will be posted on the main course web page at <http://faculty.arts.ubc.ca/pschrimpf/326/326.html>. UBC Canvas will be used to post grades and assignment solutions.

The TA for this course is TBA.

## 1 Schedule

	Day(s)	Time	Location
Lecture	Tuesday & Thursday	12:30pm-1:50pm	Buchanan B215
Discussion L05	Tuesday	5:00pm-6:00pm	Buchanan B208
Discussion L06	Thursday	5:00pm-6:00pm	Buchanan B310
Office hours	Thursday	2:00pm-3:00pm	Iona 107
Midterm	February 15	12:30-1:50pm	Buchanan B215
Last Lecture	Thursday, April 5th		
Final	TBA		

Office hours are subject to change. Any changes in office hours will be posted on the course web page. If you cannot come to my office hours, feel free to drop by anytime or email me to schedule an appointment.

## 2 Course Work

Course work will consist of 6-8 problem sets due approximately weekly, a midterm, and a final.

### 2.1 Problem Sets

Problem sets will be due approximately weekly at the start of lecture on the specified due date. Students may work together on problem sets, but each student should write their own solutions.

### 2.2 Exams

An in-class midterm will be given on Thursday, February 16th and the final will be during the exam period in April. If a student misses the midterm due to an objectively verifiable, unavoidable emergency situation, the student's grade will be determined by setting his first exam's grade equal to his second exam's grade. If a student misses the first exam for any other reasons, the student receives zero points for the first exam.

### 2.3 Grading

The grade for this course will be 10% problem sets, 37.5% midterm, and 52.5% final. If a student finds an error in the grading of a problem set or exam, the student should contact the teaching assistant (for problem sets) or me (for an exam) within one week of the day the graded problem sets or exams were made available. We will then regrade the entire problem set or exam, and your total score may increase or decrease as a result.

## 3 Reading

Lecture notes and slides will be posted on the course web page. These are partly based on a combination of past versions of this course taught by [Vadim Marmer](#) and [Hiro Kasahara](#), and a similar course taught by [Josh Angrist](#).

No textbook is required for this course, but you may find one useful.

<sup>1</sup>In class examples and assignment solutions will use R. Students who are already familiar with another statistical package, such as Stata, SAS, or SPSS, may continue to use it, but no help will be provided.

I strongly recommend Angrist and Pischke's *Mastering 'Metrics*. It gives a useful perspective about how to use the tools that we will learn about this course to credibly answer empirical questions. It is inexpensive, fairly entertaining, and contains many great examples.

Wooldridge's *Introductory Econometrics: A Modern Approach* is a more typical textbook. The course notes were originally based on this book. The most recent edition is available in the UBC bookstore. An older edition would also be fine.

Stock & Watson's *Introduction to Econometrics* is another typical textbook. It is slightly less technical and more readable than Wooldridge.

The lecture notes contain a list of additional references for each topic. I tried to include some freely available references whenever possible.

Various papers will be used as examples in lectures and problem sets. You should read some, preferably all, of these papers.

## 4 Course Outline

The topics of the course and related readings are listed below. We may not cover all these topics (especially the last two). The order of the later topics may be changed depending on class interest.

### 1. Introduction

- Wooldridge (2013) chapter 1, Angrist and Pischke (2014) introduction, Stock and Watson (2009) chapter 1, Burtless (1985)

### 2. Review of probability

- Wooldridge (2013) appendix B, Stock and Watson (2009) chapter 2, Menzel (2009)

### 3. Review of statistical inference

- Wooldridge (2013) appendix C, Stock and Watson (2009) chapter 3, Menzel (2009), Woodbury and Spiegelman (1987), Angrist and Pischke (2014) chapter 1

### 4. Simple linear regression

- Wooldridge (2013) chapter 2, Stock and Watson (2009) chapter 4-5, 17, Angrist and Pischke (2014) chapter 2

### 5. Multiple linear regression

- Wooldridge (2013) chapters 3-7, Stock and Watson (2009) chapter 6-9, 18, Angrist and Pischke (2014) chapter 2, Krueger (1993), DiNardo and Pischke (1997), Dale and Krueger (2002), ?

### 6. Heteroskedasticity

- Wooldridge (2013) chapter 8

### 7. Instrumental variables

- Wooldridge (2013) chapter 15, Stock and Watson (2009) chapter 12, Angrist and Pischke (2014) chapter 3, Angrist (1990), Angrist and Krueger (1991), Ashenfelter and Krueger (1994)

### 8. Simultaneous equations models

- Wooldridge (2013) chapter 16, Stock and Watson (2009) chapter 12, Angrist, Graddy, and Imbens (2000)

### 9. Limited dependent variables and sample selection

- Wooldridge (2013) chapter 17, Stock and Watson (2009) chapter 11

## References

- Angrist, Joshua D. 1990. "Lifetime Earnings and the Vietnam Era Draft Lottery: Evidence from Social Security Administrative Records." The American Economic Review 80 (3):pp. 313–336. URL <http://www.jstor.org/stable/2006669>.
- Angrist, Joshua D., Kathryn Graddy, and Guido W. Imbens. 2000. "The Interpretation of Instrumental Variables Estimators in Simultaneous Equations Models with an Application to the Demand for Fish." The Review of Economic Studies 67 (3):pp. 499–527. URL <http://www.jstor.org/stable/2566964>.
- Angrist, Joshua D. and Alan B. Krueger. 1991. "Does Compulsory School Attendance Affect Schooling and Earnings?" The Quarterly Journal of Economics 106 (4):pp. 979–1014. URL <http://www.jstor.org/stable/2937954>.
- Angrist, Joshua D and Jörn-Steffen Pischke. 2014. Mastering 'Metrics: The Path from Cause to Effect. Princeton University Press.
- Ashenfelter, Orley and Alan Krueger. 1994. "Estimates of the Economic Return to Schooling from a New Sample of Twins." The American Economic Review 84 (5):pp. 1157–1173. URL <http://www.jstor.org/stable/2117766>.
- Burtless, Gary. 1985. "Are Targeted Wage Subsidies Harmful? Evidence from a Wage Voucher Experiment." Industrial and Labor Relations Review 39 (1):pp. 105–114. URL <http://www.jstor.org/stable/2523540>.
- Dale, Stacy Berg and Alan B. Krueger. 2002. "Estimating the Payoff to Attending a More Selective College: An Application of Selection on Observables and Unobservables." The Quarterly Journal of Economics 117 (4):pp. 1491–1527. URL <http://www.jstor.org/stable/4132484>.
- DiNardo, J. and J.S. Pischke. 1997. "The returns to computer use revisited: have pencils changed the wage structure too?" Quarterly journal of economics 112 (1):291–303.
- Krueger, Alan B. 1993. "How Computers Have Changed the Wage Structure: Evidence from Microdata, 1984–1989." The Quarterly Journal of Economics 108 (1):pp. 33–60. URL <http://www.jstor.org/stable/2118494>.
- Menzel, Konrad. 2009. "14.30 Introduction to Statistical Methods in Economics." Massachusetts Institute of Technology: MIT OpenCourseWare. URL <http://ocw.mit.edu/courses/economics/14-30-introduction-to-statistical-methods-in-economics-spring-2009/lecture-notes/>.
- Stock, J.H. and M.W. Watson. 2009. Introduction to Econometrics, 2/E. Addison-Wesley.
- Woodbury, Stephen A. and Robert G. Spiegelman. 1987. "Bonuses to Workers and Employers to Reduce Unemployment: Randomized Trials in Illinois." The American Economic Review 77 (4):pp. 513–530. URL <http://www.jstor.org/stable/1814528>.
- Wooldridge, J.M. 2013. Introductory econometrics: A modern approach. South-Western.