University of Victoria
Department of Economics

# Economics 565
## Econometrics of cross-section data
Fall 2013

## 1 Course information.

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| **Instructor.** | Chris Auld<br>auld@uvic.ca<br>250.721.8537<br>BEC 374 |
| **Homepage.** | http://web.uvic.ca/~auld/e565.html |
| **Course Hours.** | 3 lecture hours per week, plus occasional tutorials |
| **Course location:** | David Strong C124, Tuesdays and Thursdays, 4:30 |
| **Office hours:** | Tuesdays and Thursdays, 1:30-3:00. |
| **Prerequisites.** | Two semesters of mathematical statistics or econometrics at the undergraduate level, a course in linear algebra, and a course in multivariate calculus. Or instructor's consent. |

## 2 Course description.

The goal of the course is to equip students with the statistical tools and insight required to consume and produce high-quality research in applied microeconometrics. Focusing on cross-sectional data allows us to put aside the many issues that arise when dealing with time series, so that we may focus on core conceptual and pragmatic issues involved in developing and estimating models suitable for causal inference from observational data. We will begin with a review of the linear model and proceed to an in-depth discussion of instrumental variables. Further topics may include: regression discontinuity designs, models for binary and other limited dependent variables, censored regression, and quantile regression. All topics will be addressed using a combination of blackboard theory, applied examples from the literature, and hands-on computing exercises using Stata.

# 3 Objectives.

After finishing this course you should be able to:

1. Read journal articles in applied microeconometrics or other fields attempting to infer causation from observational data with an informed and critical eye.
2. Evaluate the credibility of statistical arguments in the academic literature and elsewhere.
3. Develop microeconometric models to address research questions.
4. Manipulate data, calculate descriptive statistics, estimate microeconometric models, draw graphs, and generate publication-ready tables of results using the statistical software *Stata*.
5. Present results in writing in a clear manner.

# 4 Evaluation.

Course evaluation is as follows.

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| midterm examination | 25 |
| final examination | 40 |
| assignments | 35 |

The course grade is then calculated using the weights indicated above. As a guide to determining standing, these letter grade equivalants will generally apply:

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|---|---|---|---|---|---|---|---|---|---|
| A+ | 95-100 | A | 87-94 | A- | 80-86 | B+ | 75-79 | B | 65-74 |
| B- | 55-64 | C+ | 50-54 | C | 45-49 | D | 40-44 | F | $< 40$ |

If, for some reason, the distribution of grades determined using the aforementioned conversion chart appears to be abnormal the instructor reserves the right to change the grade conversion chart if the instructor, at the instructor's discretion, feels it is necessary to more fairly represent student achievement.

You must pass the final examination to receive a passing grade in the course.

Non-programmable calculators will NOT be allowed during the writing of tests or final examinations.

At the instructor's sole discretion, there will either be a Department scheduled final examination lasting 3 hours, or a take-home final examination.

# 5 Assignments.

There will be approximately four assignments focusing on developing your computing skills. You are encouraged to collaborate with your colleagues while working on these assignments, however, you must write up your results on your own.

Please note that there may be questions on examinations which ask you to interpret or write *Stata*

# 6 Required and recommended materials.

## 6.1 Texts.

The required textbook is *Microeconometrics Using Stata* by Colin Cameron and Pravin Trivedi. Students are strongly recommended to also obtain a copy of *Mostly Harmless Econometrics* by Josh Angrist and Jörn-Steffan Pischke. Other references which may prove useful include:

- Stock and Watson, *Introduction to Econometrics.*

  Stock and Watson is an advanced undergraduate level text. It contains lucid descriptions of many econometric ideas, and may serve as a useful reminder for more basic material.

- Greene, *Econometric Analysis*,

  Greene is a graduate level text which is quite comprehensive. It contains particularly good exposition on maximum likelihood and limited dependent variable models.

- Wooldridge, *Econometric Analysis of Cross Section and Panel Data.*

  A modern graduate level text which does not cover issues in time series except as they pertain to panel data.

- Kennedy, *A Guide to Econometrics.*

  Coles' Notes for econometrics. Now dated, but still a good companion to any of the graduate level texts above.

There are also a number of econometrics textbooks available for free online which you may like to use as supplemental material. For example,

http://pareto.uab.es/mcreel/Econometrics/econometrics.pdf

contains links to a number of free resources.

## 6.2 Software.

We will make extensive use of the statistical software Stata. The current version of Stata is 13.0, but any version at least as recent as 8.0 will suffice for the purposes of the course. Some of the datasets we will use are quite large, so you should not use "small" Stata or another student version. "Small" Stata will typically also prove too limited for use in research for your Master's essay or doctorial thesis.

Stata is installed on student computing facilities on campus. You may also wish to purchase Stata, particularly if you are a Ph.D. student or intend to become one. To order Stata, follow this link:

http://www.stata.com/order/new/edu/gradplans/gp2-order.html.

Again, do not purchase "small" Stata as its limitations render it inadequate for our purposes. Purchase Stata SE or better.

# 7 Notes.

### Attendance.

Attendance will not be taken. However, students are responsible for all material covered in lectures whether or not they attend any given lecture. Lecture slides posted online do not contain all of the material discussed in class and are not an adequate substitute for attending lectures.

### Contacting the Instructor.

Questions regarding class material should usually be posed during class or in person during office hours. It is not feasible to provide lengthy explanations of class material over email. Should you send email for whatever reason, please put "ECON 565" in the subject line.

### Travel Plans

Students are advised not to make work or travel plans until after the examination timetable has been finalized. Students who wish to finalize their travel plans at an earlier date should book flights that depart after the end of the examination period. There will be no special accommodation if travel plans conflict with the examination.

## Policy on Inclusivity and Diversity

The University of Victoria is committed to providing an environment that affirms and promotes the dignity of human beings of diverse backgrounds and needs.

# 8 Outline.

1. Introduction: correlation, causation, and statistical inference.
   (a) Potential outcomes.
   (b) Randomization.
   (c) Size, power, p-values, and the logic of classical inference.
   (d) Simulation, Monte Carlo, and elements of statistical computing.
2. Regression.
   (a) Review of OLS estimation.
   (b) Pragmatic issues and OLS: dummies, interactions, goodness of fit.
   (c) Issues in estimating standard errors.
   (d) Causation and OLS estimates.
3. Instrumental variables.
   (a) Sources of endogeneity: omitted variables, simultaneity, measurement error.
   (b) The linear IV estimator and its statistical properties.
   (c) Weak instruments and invalid exclusion restrictions.
   (d) Properties and diagnostic tests with constant effects.
   (e) Essential heterogeneity.
   (f) Notions of average causal effects.
   (g) Specification tests for IV models.
4. Nonlinear models for limited dependent variables.
   (a) Binary regression: linear probability, probit, logit.
   (b) Marginal effects.
   (c) Computational issues and ML estimation.
   (d) Censored regression and regression with selected samples.
   (e) Count data.
5. Topics.
   (a) Regression discontinuity designs.
   (b) Matching estimators.
   (c) Quantile regression.

# 9 Examples of applied papers we may discuss.

Fletcher, J. and S. Kumar (2013). Religion and risky health behaviors among U.S. adolescents and adults, NBER working paper 19225.

Oreopoulis, P. (2003) The Long-Run Consequences of Growing up in a Poor Neighborhood, Quarterly Journal of Economics, 118 (4):1533-1575.

Chou, S.-Y., Grossman, M., and Saffer, H. (2004). An economic analysis of adult obesity: Results from the behavioral risk factor surveillance system. *Journal of Health Economics*, 23, 565-587.

Levitt, S. and C. Syverson (2004) Market distortions when agents are better informed: The value of information in real estate, NBER Working Paper 11053.

Mullahy, J. and J. Sindelar (1993) Alcoholism, Work, and Income. Journal of Labor Economics 11: 494-520.

Peters, B. and E. Stringham (2007) No booze? You may lose: Why drinkers earn more money than nondrinkers, Working paper, San Jose State U.

Dahl, G. and S. DellaVigna (2008) Does movie violence increase violent crime? NBER 13718.

Leamer, E., (1983) Let's Take the Con Out of Econometrics, American Economic Review, Vol. 73, No. 1, pp. 31-43

McCloskey, D. and S. Ziliak. (1996) The Standard Error of Regressions. Journal of Economic Literature, pp. 97-114.

Case, A. and C. Paxson (2006) Stature and status: Height, ability, and labor market outcomes NBER 12466.

DiNardo, John; Jorn-Steffen Piscke. The Returns to Computer Use Revisited: Have Pencils Changed the Wage Structure Too? Quarterly Journal of Economics, Vol. 112 (February 1997): 291-303.

Gentzkow, M. and J. Shapiro (2006) Does television rot your brain? New evidence from the Coleman Study, Working paper, University of Chicago.

Acemoglu, D., S. Johnson and J. Robinson (2001) The Colonial Origins of Comparative Development: An Empirical Investigation, *American Economic Review*, 91(5), 1369-1401.

Angrist, J. and W. Evans (1998): Children and their Parents Labor Supply: Evidence from Exogenous Variation in Family Size, American Economic Review, 450-477.

Hamilton, B. and V. Hamilton and N. Mayo (1996) What Are the Costs of Queuing for Hip Fracture Surgery in Canada?, Journal of Health Economics, 15 (1996) 161-185.

Levitt, S. (1996) The Effect of Prison Population Size on Crime Rates: Evidence from Prison Overcrowding Litigation, Quarterly Journal of Economics, Vol. 111, No. 2, pp. 319-351

Gentzkow, M. and J. Shapiro (2006) Does television rot your brain? New evidence from the Coleman Study, Working paper, University of Chicago.

Schmeiser, M. (2007) Expanding Wallets and Waistlines: The Impact of Family Income on the BMI of Women and Men Eligible for the Earned Income Tax Credit, working paper, Cornell U.

Stinebrickner, T. and R. Stinebrickner, The causal effect of studying on academic performance, Working paper, University of Toronto.

Bound, John, David A. Jaeger, and Regina M. Baker, Problems with instrumental variables estimation when the correlation between the instruments and the endogenous explanatory variable is weak, Journal of the American Statistical Association, Vol 90, No. 420, June, 1995, pp. 443-540.

Auld, M.C. and Grootendorst, P. (2004) An empirical analysis of milk addiction. *Journal of Health Economics* 23:1117-1133.

Dranove, D., and P. Weiner, (1994), Physician-Induced Demand for Childbirths, *Journal of Health Economics*, 13, March, pp. 61-73.

Delvande, A., D. Goldman, and N. Sood (2007) Criminal prosecution and HIV-related risky behavior, NBER 12903.

McCullough and Vinod (1999) The numerical reliability of econometric software, Journal of Economic Literature, vol. 37, issue 2, pp 633-665

Visser, M., W. Harbaugh, and N. Mocan (2006) An experimental test of criminal behavior among juveniles and young adults, NBER 12507.

DellaVigna, S, and E. Kaplan (2006) The Fox News Effect: Media Bias and Voting, Working paper, UC Berkeley.

Card, David and Alan B. Krueger (1994), Minimum Wages and Employment: A Case Study of the Fast Food Industry. American Economic Review 84(4), (1994): 772-793.

Donohue, J. and S. Levitt (2001), The Impact of Legalized Abortion on Crime, Quarterly Journal of Economics, 116(2): 379-420.