

Topics in Empirical Economics, E5034

Lecture: Thursday 13.45-15.15, Room 002, L9, 1-2, first lecture 15th February 2018

Exercise Sessions: Thursday 17.15-18.45, P158, L7, 3-5, first session 15th February 2018. The exercise session starts in the first week.

Description: The course will cover fundamental methods for microeconomic data (with focus on linear models), including instrumental variables estimation, maximum likelihood and generalized method-of-moments estimation. Both theory and applications will be included in the course. The target audience are Master students. The goal of this course is to give a solid introduction to microeconometric methods. The students should be enabled to understand basic concepts in microeconometrics and to utilize recent results for their own applied work.

Grading: Presentation (40%) and written exam/term paper (60%) (9 ECTS points).

Prerequisites: Basic knowledge of econometrics.

Course website: <http://www.farbmacher.de/mannheim/tee/lecture.html>

Office hours: by arrangement

Recommended texts:

Imbens WG, Rubin DB, 2015. *Causal Inference for Statistics, Social, and Biomedical Sciences*. Cambridge Univ. Press

Cameron AC, Trivedi PK, 2005. *Microeconometrics: Methods and Applications*. Cambridge University Press

Anatolyev S, Gospodinov N, 2011. *Methods for Estimation and Inference in Modern Econometrics*. Taylor & Francis

Hayashi F, 2000. *Econometrics*. Princeton University Press

An excellent introduction to many topics is the draft for a textbook by Bruce Hansen available at <http://www.ssc.wisc.edu/~bhansen/econometrics/>.

Outline of the course (preliminary!)

Methods:

1. **Review of basic concepts of statistics and probability theory**
2. **Review of basic concepts of regression analysis and causality**
OLS and IV regressions; Potential outcome framework; Difference-in-differences; Regression discontinuity [Cameron and Trivedi (2005), Chapter 3 and 4]
3. **Methods for linear and non-linear models**
Generalized method of moments; Generalized empirical likelihood [Cameron and Trivedi (2005), Chapter 4 and 6.3]
4. **Many and/or weak instruments**
Anatolyev and Gospodinov (2011), Chapter 6; Windmeijer (2017)
5. **Identification with invalid instruments**
Kang *et al.* (2016); Kolesar *et al.* (2015)
6. **Specification Tests in Econometrics: The Hausman Test**
Hausman (1978); Holly (1982)
7. **Machine Learning in Economics: Ridge regression and Lasso**
Hastie *et al.* (2009), Chapter 3.4; Zou (2006)

Potential applications:

- The persistence of early childhood maturity:
Bedard and Dhuey (2006); Fredriksson and Öckert (2014); McCrary and Royer (2011)
- Season of birth and schooling/earnings:
Angrist and Krueger (1991); Bound *et al.* (1995); Buckles and Hungerman (2013)
- Cardinal treatment of ordinal variables:
Schröder and Yitzhaki (2017)
- Identification when all instruments are potentially endogenous:
Nevo and Rosen (2012); Conley *et al.* (2012); Kolesar *et al.* (2015)
- Identification when some instruments are endogenous:
Kang *et al.* (2016); Windmeijer *et al.* (2016)

In the exercise session we will discuss these applications (if data is available). We will use Stata and/or Mata and will also learn to program in these software packages.

References

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- Angrist JD, Krueger AB, 1991. Does compulsory school attendance affect schooling and earnings? *Quarterly Journal of Economics* **106**(4): 979–1014
- Bedard K, Dhuey E, 2006. The persistence of early childhood maturity: international evidence of long-run age effects. *Quarterly Journal of Economics* **121**(4): 1437–1472
- Bound J, Jaeger DA, Baker RM, 1995. Problems with Instrumental Variables Estimation When the Correlation Between the Instruments and the Endogenous Explanatory Variable is Weak. *Journal of the American Statistical Association* **90**(430): 443–450
- Buckles KS, Hungerman DM, 2013. Season of birth and later outcomes: old questions, new answers. *Review of Economics and Statistics* **95**(3): 711–724
- Cameron AC, Trivedi PK, 2005. *Microeconometrics: Methods and Applications*. Cambridge University Press
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- Fredriksson P, Öckert B, 2014. Life-cycle effects of age at school start. *Economic Journal* **124**(579): 977–1004
- Hastie T, Tibshirani R, Friedman J, 2009. *The Elements of Statistical Learning*. Springer
- Hausman JA, 1978. Specification Tests in Econometrics. *Econometrica* **46**(6): 1251–1271
- Hayashi F, 2000. *Econometrics*. Princeton University Press
- Holly A, 1982. A Remark on Hausman’s Specification Test. *Econometrica* **50**(3): 749–759
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- Kang H, Zhang A, Cai T, Small D, 2016. Instrumental Variables Estimation With Some Invalid Instruments and its Application to Mendelian Randomization. *Journal of the American Statistical Association* **111**(513): 132–144
- Kolesar M, Chetty R, Friedman J, Glaeser E, Imbens GW, 2015. Identification and Inference With Many Invalid Instruments. *Journal of Business and Economic Statistics* **33**(4): 474–484
- McCrary J, Royer H, 2011. The Effect of Female Education on Fertility and Infant Health: Evidence from School Entry Policies Using Exact Date of Birth. *American Economic Review* **101**(1): 158–195
- Nevo A, Rosen AM, 2012. Identification with imperfect instruments. *Review of Economics and Statistics* **94**(3): 659–671

- Schröder C, Yitzhaki S, 2017. Revisiting the evidence for cardinal treatment of ordinal variables. *European Economic Review* **92**: 337–358
- Windmeijer F, 2017. Two-Stage Least Squares as Minimum Distance. Discussion Paper 17/683, University of Bristol
- Windmeijer F, Farbmacher H, Davies N, Davey Smith G, 2016. On the Use of the Lasso for Instrumental Variables Estimation with Some Invalid Instruments. Discussion Paper 16/674, University of Bristol
- Zou H, 2006. The Adaptive Lasso and Its Oracle Properties. *Journal of the American Statistical Association* **101**(476): 1418–1429