## Empirical analysis of heterogeneous effects: Main course outline.

The course consists of 5 lectures and 2 computer workshops. Students who want to prepare for course are encouraged to read Heckman and Vytlacil (2007b); Heckman (2010) and to rehearse what they know about instrumental variable estimation in heterogeneous effects models from earlier courses.

Lecture 1 (May 23rd, 10.15-12.00): Introduction, overview: Heterogeneous effects models, LATE, bounds approach, Roy models, Correlated random coefficient models

• Readings: Björklund and Moffitt (1987); Heckman (2010); Imbens and Angrist (1994); Angrist, Imbens, and Rubin (1996); Manski (1989); Manski and Pepper (2000); Vytlacil (2002); Rosen and Willis (1979); Heckman and Vytlacil (2007b); Imbens and Rubin (1997)

Lecture 2: (May 24th, 10.00-12.00): The Generalized Roy Model: Estimation through local IV and the control function counterpart. The interpretation of IV.

• Readings:Heckman and Vytlacil (1999, 2007b); Heckman (2010); Heckman and Urzua (2010); Heckman, Urzua, and Vytlacil (2006); Brinch, Mogstad, and Wiswall (2012); Carneiro and Lee (2009); Heckman and Vytlacil (2007a)

Lecture 3: (May 24th, 14.15-16.00): Models with covariates, separability. Parametric estimation, series estimation.

- Readings: Carneiro, Heckman, and Vytlacil (2011); Heckman, Urzua, and Vytlacil (2006); Moffitt (2008); Brinch, Mogstad, and Wiswall (2012); Robinson (1988); Angrist and Imbens (1995); Ichimura and Todd (2007); French and Song (2014)
- And the web appendix of Heckman, Urzua and Vytlacil (2006).

Computer workshop 1: (May 25th, 12.15-14.00) Estimation of treatment effects models without covariates, parametric estimation with covariates.

Lecture 4: (May 26th, 9.15-11.00): Models with covariates. Semi-parametric estimation. Weights with covariates. Policy relevant treatment effects.

• Carneiro, Heckman, and Vytlacil (2011); Heckman and Vytlacil (2007b); Heckman (2010); Heckman and Vytlacil (2005, 2001b)

Computer workshop 2: (May 26th, 12.15-14.00): Semi-parametric estimation of generalized Roy models. Backing out MTE and weights.

Lecture 5: (May 27th, 10.15-12.00): Bounds on treatment effects under partial identification, testing for constant mte, extensions to multivalued treatments.

• Eisenhauer, Heckman, and Vytlacil (2015); Heckman and Vytlacil (2001a); Romano and Wolf (2005); Heckman and Schmierer (2010)

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