UNIVERSITY OF OSLO
DEPARTMENT OF ECONOMICS

Exam: ECON9104 – Topics in Econometrics – Empirical analysis of heterogeneous effects

Exam period: Friday, May 27, 2016 – Friday, June 17, 2016

Guidelines:
Submit your exam answer electronically to: submissions@econ.uio.no. Last day for submission is Friday, June 17, 2016 at 15.00.

Written text should be in pdf format.

Further instructions:
- Papers are awarded either a passing or failing grade. The pass/fail scale is applied as a separate scale with only two possible results.
- Your answer must fill the formal requirements, found at http://www.sv.uio.no/studier/ressurser/kildebruk/ (Norwegian) or at http://www.sv.uio.no/english/studies/resources/sources-and-references/ (English).
- It is of importance that your paper is submitted by the deadline (see above). Papers submitted after the deadline, **will not be corrected**.*)
- All papers must be submitted electronically to the address given above.

*) The standard regulation for illness during exam also applies for the home exams. Please see http://www.sv.uio.no/english/studies/admin/exams/postponed-exam/index.html for further details.

Problem 1: Download data from paper "ExtrapoLATE-ing: External Validity and Overidentification in the LATE Framework" by Angrist and Fernandez-Val. In this paper, not on the reading list, the authors try to assess the external validity of LATE by comparing the LATE's estimated by two instruments within 12 subgroups. You will instead assess the external validity using only one instrument. In your analysis, the outcome variable will be mothers' employment. The treatment variable is whether she has more than two kids or just two kids. The instrument will be whether her first two kids have the same sex. The dataset should be the same one used for producing Table 3 in their paper.

    a. Estimate the bounds for the ATE using the worst case – bounds from Manski (1989), separately for each of the 12 groups.
    b. Estimate the bounds for the ATE where you also use the instrument, separately for each of the 12 groups.
    c. Estimate the bounds for the ATE where you also use the instrument and the monotonicity assumption.
    d. Estimate and report results for the linear MTE model for each of the 12 groups. (The LATES should correspond to the LATES in the lower half of Table 3 of the paper.)
    e. Test whether the MTE is constant within each group using the linear MTE model.
    f. Perform a joint test of whether MTE is constant for all 12 covariate groups using the same approach as in b. and c.

Problem 2: Download the data from Carneiro, Heckman and Vytlacil (2011) [from the reading list]. Figure out their exact model: What are their control variables (x'es) and what are their instruments (z's).

    a. Re-estimate the MTE from their main specification model in 6 ways: Using 4th order polynomials, quadratic splines with knots at 0.35, 0.5 and 0.65 and semi-parametric methods (with bandwidth 0.2) – and doing the estimation with local IV and the separate estimation approach for each of the three model specifications. Plot the results in six MTE graphs.

    b. Find error bounds (standard errors) for the marginal treatment effects from the parametric models. Plot confidence bands in the relevant graphs.

Problem 3: Find a published paper (or published working paper) that applies instrumental variable techniques and that has open-access data.

    a. Download the data and replicate the IV results from the paper.

    b. Estimate the marginal treatment effects under the assumption of conditional independence and separability, using your favourite estimation method.

    c. Graph the instrumental variable weights: How does linear IV weight different segments of the MTE curve?

    d. Comment on the results (about one page): do your results affect or add to the conclusions in the paper?

Please include the code that you use to solve problems 1-3 as an appendix to your report.