

# Syllabus Econometrics I, 310153, Fall 2016

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## Lecturer

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## Office hours

Upon appointment.

## Prerequisites

We assume that you have an understanding of basic econometrics; successful completion of an introductory course in econometrics is required. Please contact the lecturer **before the start of the course** if you want to follow this course, but do not feel that you have a sufficient grasp of statistics and regression analysis. Note that this course replaces the course 'Applied methods for economists' taught in previous years.

## Textbook

Joshua Angrist and Jörn-Steffen Pischke, 2015, *Mastering Metrics. The path from cause to effect*, Princeton University Press, Princeton and Oxford.



We occasionally fall back on basic econometrics as worked out in a textbook like Jeffrey Wooldridge, *Introductory Econometrics* (currently used in the BSc. Econometrics course).

## Software

We work with **STATA**<sup>®</sup> in this course. On Blackboard, I posted some helpful material for those of you with no prior experience with this program. On campus, we have computers with access to STATA, but it is **highly recommended to have a copy of this program on your own computer**. That way, you can work with STATA at every location, which is not only valuable for this course and other courses, but also for when you are writing your Master's thesis. A STATA IC individual student (perpetual) license costs €176.72, and a one-year licence costs €119. Order through your bcal distributor <http://www.dpc-software.nl/>

## Description of the course

This is a course in research design. A research design is the qualitative story that is going to give you (quasi)-experimental variation in the variable that you want to manipulate. This is independent of whether you are doing micro or macroeconomics. Experimental variation

allows for a causal interpretation of the results of your quantitative analysis, which is our aim. We focus on questions related to policy evaluation.

Put differently: a research design is like a mold in which you pour the data (see figure). Obviously, before you do anything, you start with making a mold. So, rather than simply regressing variables on each other, you learn to think about the method of your study first.



During the first four weeks of the course, we discuss four commonly used research designs: randomized trial, regression discontinuity, difference-in-difference, instrumental variable.

Next, we go beyond the estimation of average treatment effects, first by allowing the treatment effect to vary with calendar time. We look into panel data models where adjustment to some shock or treatment takes place over several time periods. Examples of applications are: shocks that percolate through a system and treatments that require learning. Second, we allow for treatment heterogeneity. We analyze whether the treatment effect varies with attributes of individuals/locations or attributes of the context in which an experiment occurs. Both issues are daily business for an applied econometrician, whether you do micro or macro.

The course should help you to conduct meaningful and creative empirical work by yourself, by learning to recognize research designs in the day to day world. In addition, this course should help you to assess the quality of empirical work from others.

## Course planning

The course starts in the week of August 29, 2016. The course runs for six weeks in a row (without breaks).

## Teamwork

The two weekly computer assignments (more about this later) should be made in groups of three (not two, not four). You are invited to form groups; we will assign all other students to groups of three in the first week of the course.



## Weekly schedule

In the **first** two-hour session of the week, we discuss the theory related to that week's topic. You are expected to do the reading before this session, as we will build upon the reading. In this first week (August 29), we will gather in a lecture hall for this session. The other five weeks, video lectures will be uploaded for the first session of the week.

The **second** two-hour session of the week is interactive and takes place in the computer lab. Before the start of this session, submit a PDF (!) of your (individual) **PAPER REVIEW**: a number of questions about a paper related to that week's topic that you are asked to read. Note the deadline, late submissions are not graded.

The lab session consists of two parts:

The session starts with a short (individual) **WEEKLY ONLINE QUIZ**. The quiz questions relate to that week's topic as worked out in the reading and discussed in the first session of that week. The rest of the time you can start to work on the two (group-based) **COMPUTER ASSIGNMENTS** of that week, while getting STATA-related help from the lecturer and the TA. The assignments are due in the following week.

*Table 1.* Schedule of handing in paper-reviews and computer assignments

<b>Deadline</b>	<b>Due</b>
Tue Aug 30, 12.45h	Paper review 1
Tue Sep 6, 12.45h	Paper review 2, Computer assignment 1a and 1b
Tue Sep 13, 12.45h	Paper review 3, Computer assignment 2a and 2b
Tue Sep 20, 14.45h	Paper review 4, Computer assignment 3a and 3b
Tue Sep 27, 14.45h	Paper review 5, Computer assignment 4a and 4b
Tue Oct 4, 14.45h	Paper review 6, Computer assignment 5a and 5b
Tue Oct 11, 14.45h	Computer assignment 6a and 6b

## **Exam**

The date of the final exam is October 21, 2016. The exam is paper-based and does not involve any computer-based work with STATA (a lab-exam is not feasible), but may include some questions about how to interpret STATA output. In order to prepare for the exam, you need to read the pages in the textbook and the papers indicated in the syllabus, the slides, the material presented during the lecture that goes beyond what is written on the slides, and you need to study the material from the lab sessions.

## **Grading**

Your grade is based on your performance on the written exam and your participation grade. Your participation grade is based on three parts:

1. Your average score on the (individual) weekly online quizzes. **If you do not make a weekly online quiz, then your grade for that quiz is a 1.**
2. The average grade on the graded (group-based) Computer Assignments 1b, 2b, ..., 6b.
3. Your grade on pass/fail assignments: the (individual) Paper Reviews and the (group-based) Computer Assignment 1a, 2a, ..., 6a. You receive a 10 if you complete all elements successfully. For each element that you miss, 2 points will be subtracted from your total, all the way down to a 0.

To be able to pass the course, your overall score should be higher than 5.5. Your grade is computed as follows:

$$\text{Grade} = 0.6 * \text{Grade Final Exam} + 0.4 * (0.3 * \text{Average score on weekly quizzes} + 0.4 * \text{Average on graded Computer Assignments} + 0.3 * \text{Grade on pass/fail items})$$

We have one additional requirement: **your score on the final exam should be at least a 5.5.**

### **Resit exam**

If you take the resit exam on January 16, 2017, the grades for the other items still count. In other words: doing the resit is not a way of escaping (dismal performance on) the quizzes etc. Your score on the resit exam should be at least a 5.5 to be able to pass the course.

### **Repeater policy**

If you are a repeater, then you can choose to either fully redo the course, including all assignments etc., or to do the final exam only. Obviously, your participation grade of the previous year no longer counts.

### **Weekly overview**

The next pages provide an overview of what we do in each week of the course, including any assignments.

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## **Week 1. Administration of short survey**

Part of this course is completing a short survey. Participation is mandatory. The survey results will be used in the lab session. You will be asked to complete the survey before Tue, Aug 30, 10.30am.

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## **Week 1. Randomized trials: the benchmark**

### Session 1

**Date:** Monday, August 29, 2016

**Reading:** Introduction and Chapter 1 ('Randomized trials') in Angrist and Pischke, reading the Appendix of Chapter 1 is optional (and supposed to be familiar material). Additional reading: [interview](#) with Joh List, a forerunner in the use of field experiments in economics (downloadable from Blackboard).

### Session 2

**Date:** Tuesday, August 30, 2016

**Weekly quiz:** quiz about the material covered in Monday's session.

**Paper Review 1:** Alain Cohn, Michel Marechal, Thomas Noll, 2015, Bad boys: criminal identity salience affects rule violation, *Review of Economic Studies*, 82, 1289-1308 (weblink on Blackboard). Read up to Section 3.1, skip Section 3.2 and the rest of the paper. Template for paper review downloadable from Blackboard.

**Computer Assignment 1a:** work with data from survey. Assignment + STATA datafile available as of Tue, Aug 30, 2016, 12pm (for assignment/data see Blackboard).

**Computer Assignment 1b:** work with data from Cohn et al. 2015 (assignment/data downloadable from Blackboard).

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## **Week 2. Research design in the absence of a randomized trial /**

### **Instrumental variable approach**

#### Session 1

**Date:** video lecture available no later than Monday, September 5, 2016, 10 am.

**Reading:** Chapter 3 ('Instrumental variables'). How regression works is reviewed in Chapter 2 ('Regression'), this is supposed to be familiar material. Do not read the drawn-out example of college admissions in the US in detail, I will cover some key concepts in the lecture.

#### Session 2

**Date:** Tuesday, September 6, 2016

**Weekly quiz:** quiz about the material covered in Monday's session.

**Paper Review 2:** Jonneke Bolhaar, Nadine Ketel, Bas van der Klaauw, Job-search periods for welfare applicants: evidence from a randomized experiment, IZA working paper 9786 (downloadable from Blackboard). Read until p. 24 'Income from wage and other benefits'.

**Computer Assignment 2a:** work with data from Daron Acemoglu, Simon Johnson, James A. Robinson, 2001, The colonial origins of comparative development: an empirical investigation, *American Economic Review*, 91 (5), 1369-1401 (for assignment/data see Blackboard).

**Computer Assignment 2b:** work with data from Joshua Angrist and William Evans, 1998, Children and Their Parents' Labor Supply. Evidence from Exogenous Variation in Family Size, *American Economic Review*, 88 (3), 450-477 (for assignment/data see Blackboard).

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### **Week 3. Regression discontinuity designs**

#### Session 1

**Date:** video lecture available no later than Monday, September 12, 2016, 10 am.

**Reading:** Chapter 4 ('Regression discontinuity designs') in Angrist and Pischke.

#### Session 2

**Date:** Tuesday, September 13, 2016

**Weekly quiz:** quiz about the material covered in Monday's session.

**Paper Review 3:** R. Lalive and J. Zweimüller, 2009, How Does Parental Leave Affect Fertility and Return-to-Work? Evidence from Two Natural Experiments, *Quarterly Journal of Economics*, 124 (3), 1363-1402. (link on Blackboard).

**Computer Assignment 3a:** work with data from Jacob and Zhu (2012) (assignment/data downloadable from Blackboard).

**Computer Assignment 3b:** work with data from Lalive and Zweimüller (2009) (assignment/data downloadable from Blackboard).

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### **Week 4. Difference-in-difference analysis**

#### Session 1

**Date:** video lecture available no later than Monday, September 19, 2016, 10 am.

**Reading:** Chapter 5 ('Differences-in-differences') in Angrist and Pischke.

#### Session 2

**Date:** Tuesday, September 20, 2016

**Weekly quiz:** quiz about the material covered in Monday's session.

**Paper Review 4:** D. Card and A.B. Krueger, 1994, Minimum wages and employment: a case study of the fast-food industry in New Jersey and Pennsylvania, *American Economic Review*, 84 (4), 772-793 (link on Blackboard).

**Computer assignment 4a:** work with data from Card and Krueger (1994) (assignment/data downloadable from Blackboard).

**Computer assignment 4b:** work with data from a recent field experiment conducted in the Tilburg area (assignment/data downloadable from Blackboard).

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## **Week 5. Time-varying treatment effects**

### Session 1

**Date:** video lecture available no later than Monday, September 26, 2016, 10 am.

**Reading:** slides

### Session 2

**Date:** Tuesday, September 27, 2016

**Weekly online quiz:** quiz about the material covered in Monday's session.

**Paper review:** Allcott and Rogers, 2014, The short-run and long-run effects of behavioral interventions: experimental evidence from energy conservation, *American Economic Review*, 104(10), 3003-3015 only - stop at paragraph 'While we like the ...' (link on Blackboard).

**Computer assignment 5a:** work with data from a recent field experiment in the Tilburg area (assignment/data downloadable from Blackboard).

**Computer assignment 5b:** work with data from Vollaard (2016), Temporal displacement of environmental crime. Evidence from marine oil pollution, manuscript under review (assignment/data downloadable from Blackboard).

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## **Week 6. Heterogeneous treatment effects**

### Session 1

**Date:** video lecture available no later than Monday, October 3, 2016, 10 am.

**Reading:** slides

### Session 2

**Date:** Tuesday, October 4, 2016

**Weekly online quiz:** quiz about the material covered in Monday's session.

**Paper review:** Allcott, Hunt, 2011, Social norms and energy conservation, *Journal of Public Economics*, 95, page 1082 - page 1091 (up to paragraph 4.1), in Section 4 ('Heterogeneous treatment effects'), skip discussion on Quantile Treatment Effects (from 'I first examine ...' to '... for all subgroups or individual households'). (link on Blackboard).

**Computer assignment 6a:** work with data from a recent field experiment conducted in the Tilburg area (assignment/data downloadable from Blackboard).

**Computer assignment 6b:** idem.

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**\*\*\*\*\* Final exam, October 21, 2016 \*\*\*\*\***