HANDOUT 1 – INTRODUCTION AND COURSE OVERVIEW

AGENDA

HOUSE/KEEPING STUFF

- Purpose
- Course outline
- Teaching team
- Course components
- Course evaluation / Grading

TODAY'S CLASS: INTRODUCTION

- Why do we need to study econometrics?
- Laptops in the classroom: Debriefing papers in a helpful way
- Structure: Question we have asked
- Takeaways
- Class rules and coming sessions

COURSE PURPOSE: WHAT ARE WE TRYING TO ACHIEVE IN THIS CLASS?

- Develop your econometrics vocabulary
- Learn to analyze empirical analysis done by others at a level sufficient to make intelligent decisions about how to use that analysis in the design of public policy
- Provide you with the skills necessary to perform empirical policy analysis on your own

TEXBOOKS AND READINGS

- Stock, James H. and Mark W. Watson (2007). Introduction to Econometrics, 2nd ed. Pearson Addison-Wesley.
- Angrist, Joshua D., and Pischke, Jörn-Steffen (2014). Mastering Metrics: The path from cause to effect. Princeton University Press.
- Wooldridge, Jeffrey M. (2009). Econometrics: A Modern Approach, 4th ed. South-Western Cengage Learning.

Readings in the syllabus will be identified as:

(*) Compulsory: Readings/materials are going to be discussed in class
(**) Core readings: Inform students on the content of the class /Complement class materials

COURSE OUTLINE

	What is it?	When to use?	What assumptions we make when using it?	What can go wrong?	What can we do about it?

• Linear regression
• Non-linear regression
• Experiments
• Quasi experiments
  • Instrumental variables
  • Fixed effects
  • Difference in difference
  • Regression discontinuity					

TEACHING TEAM

Who	Contact details	What she/he does?
Miguel Angel Santos	miguel_santos@hks.harvard.edu R-423	Two lectures a week (R-304) MW 10:10 – 11:30 AM Office hours: Fridays (beginning February 2nd)
Teaching fellow: Evgenii Fadeev (TF)	efadeev@g.harvard.edu	STATA brush-up session (sign here) One review session a week Fridays 1:15 – 2:30 PM (TBD)
Course assistants: Maggie Ji (MPP-2) Armando Flores (MPAID-1)	af575@student.hks.harvard.edu maggie_ji@hks18.harvard.edu	Weekly office hours: (TBD) (TBD) Record class participation Grade problem sets

COURSE EVALUATIONS

- Different components of the evaluation will be averaged using these weights:
  - Problem sets: 10%
  - Midterm exam (Feb 26th): 30%
  - Final exercise: 20%
  - Final exam (May 4th): 40%
- There will be four problem sets:
  - Graded with simple scales by the course assistants
  - Detailed answers will be posted for you to review
  - To receive credit, problem sets must be submitted by the start of class on the day due
  - You may work on the problem sets in small groups. But write up your answers individually. Put the names of your study group member(s) on your problem set. Duplicate answers will receive no credit and will be subject to disciplinary review.
- Quality of class participation will be considered when on the margin between two final grades
- Midterm and final are closed book and closed notes. All students are expected to be present.

BIBLIOGRAPHY FOR TODAY´S CLASS

- Dynarski, S. New York Times, November 22nd, 2017. Laptops Are Great. But Not During a Lecture or a Meeting. (*)
- Stock and Watson, 1 (**)

OTHER PAPERS MENTIONED IN CLASS:

- Fried (2006)
- Hermbrooke and Gay (2003)
- Payne-Carter, Greenberg, and Walker (2017)
- Mueller and Oppenheimer (2014)

I - INTRODUCTION

What is econometrics? A set of statistical techniques that allow us to examine ***empirical relationships*** between variables.

- What does empirical mean? Data-based

- Relationship:

  - Causal: Assess consequence that changing the value of one variable (X) has on the value of another variable (Y)

  - Association: Assess the extent to which two variables "move together" in the data. This affects the *predictability* that one variable has on another and viceversa.

We shall be dealing with *samples* to make inferences about empirical relationships between variables in the *population* (this means that the tools of statistical inference – API-201 – are constantly used).

Key idea: Throughout the course, we will be constantly asking whether the relationship being examined is causal or an association.

II. LAPTOPS IN THE CLASSROOM

Policy question: Shall we allow students to use laptops in class?

To answer that question, we need to define a clear treatment (allowing students to use computers) and a desired outcome (learning)

What is the question we are trying to answer: Does using laptops in the classroom enhance learning?

Key concept: Prior. The prior of an uncertain variable is the probability distribution that would express one's beliefs about that variable, **before** some evidence is taken into account.

Key concept counter-factual. What would have happened in the absence of any policy intervention or treatment?

Before we revise some evidence, what are your priors regarding:

a) The distribution of grades for a group of students **not allowed** to use laptops in the classroom
b) The distribution of grades for a group of students **allowed** to use laptops in the classroom

Why would you think laptops enhance learning?

Why would you think laptops do not enhance learning, and might be even be detrimental to it?

Evidence #1: In-class laptop use and its effects on student learning (Fried, 2006, quoted by 575)

Abstract

Recently, a debate has begun over whether in-class laptops aid or hinder learning. While some research demonstrates that laptops can be an important learning tool, anecdotal evidence suggests more and more faculty are banning laptops from their classrooms because of perceptions that they distract students and detract from learning. The current research examines the nature of in-class laptop use in a large lecture course and how that use is related to student learning. Students completed weekly surveys of attendance, laptop use, and aspects of the classroom environment. Results showed that students who used laptops in class spent considerable time multitasking and that the laptop use posed a significant distraction to both users and fellow students. Most importantly, the level of laptop use was negatively related to several measures of student learning, including self-reported understanding of course material and overall course performance. The practical implications of these findings are discussed.

What are the characteristics of the study?

How is the outcome variable measured?

What are the results obtained?

What can be possibly wrong with this study?

Evidence #2: (Hembrooke and Gay, 2003; quoted by 426)

Journal of Computing in Higher Education
Fall 2003, Vol. 15(1)

The Laptop and the Lecture: The Effects of Multitasking in Learning Environments

Helene Hembrooke and Geri Gay
Human Computer Interaction Laboratory
Cornell University

ABSTRACT

THE EFFECTS OF MULTITASKING IN THE CLASSROOM were investigated in students in an upper level Communications course. Two groups of students heard the same exact lecture and tested immediately following the lecture. One group of students was allowed to use their laptops to engage in browsing, search, and/or social computing behaviors during the lecture. Students in the second condition were asked to keep their laptops closed for the duration of the lecture. Students in the open laptop condition suffered decrements on traditional measures of memory for lecture content. A second experiment replicated the results of the first. Data were further analyzed by "browsing style." Results are discussed from Lang's Limited Process Capacity model in an attempt to better understand the mechanisms involved in the decrement. *(Keywords: multitasking, divided attention, technology, education, limited capacity model)*

What are the characteristics of the study?

How is the outcome variable measured?

What are the results obtained?

What can be possibly wrong with this study?

Evidence #3: (Payne-Carter, Greenberg, Walker, 2017)

Contents lists available at ScienceDirect

Economics of Education Review

journal homepage: www.elsevier.com/locate/econedurev

The impact of computer usage on academic performance: Evidence from a randomized trial at the United States Military Academy☆

Susan Payne Carter, Kyle Greenberg*, Michael S. Walker

United States Military Academy, 607 Cullum Road, West Point, NY 10996, USA

A B S T R A C T

We present findings from a study that prohibited computer devices in randomly selected classrooms of an introductory economics course at the United States Military Academy. Average final exam scores among students assigned to classrooms that allowed computers were 0.18 standard deviations lower than exam scores of students in classrooms that prohibited computers. Through the use of two separate treatment arms, we uncover evidence that this negative effect occurs in classrooms where laptops and tablets are permitted without restriction and in classrooms where students are only permitted to use tablets that must remain flat on the desk.

Published by Elsevier Ltd.

What are the characteristics of the study?

How is the outcome variable measured?

What are the results obtained?

What can be possibly wrong with this study?

III – STRUCTURE: QUESTIONS WE HAVE ASKED

- What are the characteristics of the study?
  - What question are they trying to respond?
  - Subjects
  - Context
  - Was treatment randomly assigned?
  - How was treatment administered?

- Outcome variable: What is it measured and how is it measured? Is it a good proxy for what we really want to know?

- What are the results obtained?
  - Specific impacts associated to treatment
  - General conclusions

- What can be possibly wrong with study?
  - Treatment not randomly assigned (effects attributable to other factors)
  - Treatment administered in a way that impacts the target variable
  - Appropriate econometric techniques
  - Do they control for all relevant factors?
  - Are the conclusions drawn fully supported by empirical analysis?
  - Have they addressed causation/correlation issues in a convincing way?
  - Are the results obtained in this particular group generalizable?

IV – TAKEAWAYS

- Good studies can help to reassess your priors: Information that changes our beliefs is called evidence
- What evidence should change your beliefs? Studies that are of good quality and are relevant to the context at hand may
- We will learn to be sophisticated readers of empirical analysis, knowing what makes a good study and how to conduct them
- Be Bayesian!
  - Think about your priors, be aware of your own biases
  - Gauge policy effectiveness: What is your theory of change? What do we expect to happen? What would happen in the absence of treatment?
  - User this to generate hypothesis about the policy impact of changes
  - Econometrics can help us test that hypothesis and make predictions about the current policy question

- Gauge the evidence and see if it changes your beliefs on the theory of change

V. CLASS MOTTO

- Of course, correlation does not imply causality
- But the real class motto is to understand that research design can indeed help us in decision making on public policy, yes, but you can almost always "prove" any point you want to make by tweaking research design. Therefore, the key is to be honest with yourself: Learn to differentiate what you see from what you want to see