

# Introduction to Econometrics

*Business School, Nanjing University*

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<b>Course Website</b>	Course Web	<b>Time:</b>	Monday 9: 00-12: 00 am

## Course Description

This course introduces students to modern causal inference methods for analyzing data in economics and other social sciences. The goal is to help student develop a solid theoretical background in introductory level econometrics, the ability to implement modern techniques and to critique empirical studies in economics and other social sciences. Specifically, we will learn **six** modern econometric research design techniques that aim to credibly estimate causal effects:

- **Randomized Controlled Trial(RCT)**
- **Regression(OLS)**
- **Decomposition(WD)**
- **Instrumental Variables(IV)**
- **Regression Discontinuity Designs(RDD)**
- **Differences-in-Differences(DID)**

At the end, students mastering tools will use at least one of them to finish an empirical research project.

## Evaluation

- 出勤率 (Participation) (10%)
- 作业 (Homework) (20%)
- 期末考试 (Final exam) (40%)
- 研究计划 (Group project) (30%)

## Textbooks

### *Econometrics*

- James H. Stock and Mark W. Watson, *Introduction to Econometrics*, 3rd Edition, Addison-Wesley, 2012.
- Jeffrey M. Wooldridge, *Introductory Econometrics: A Modern Approach*, 5th Edition, South-Western College, 2013.
- Joshua Angrist and Jorn-Steffen Pischke, *Mastering' Metrics: The Path from Cause to Effect*, Princeton press, 2015.
- Joshua Angrist and Jorn-Steffen Pischke, *Mostly Harmless Econometrics: An Empiricist's Companion*, Princeton press, 2008.

### *Computing Softwares: Stata and R*

- 任意一本关于 Stata 或者 R 操作的中文书

## Additional Readings

- Steven D. Levitt and Stephen J. Dubner, *Freakonomics: A Rogue Economist Explores the Hidden Side of Everything*, 2005. (中译本《魔鬼经济学》斯蒂夫·列维特和斯蒂芬·都伯纳著, 广东经济出版社, 2006 年 1 月。)
- Steven D. Levitt and Stephen J. Dubner, *SuperFreakonomics: Global Cooling, Patriotic Prostitutes, and Why Suicide Bombers Should Buy Life Insurance*, 2009. (中译本,《超爆魔鬼经济学》, 斯蒂夫·列维特和斯蒂芬·都伯纳著, 中信出版社, 2010 年 1 月。)
- Ian Ayres, *Super Crunchers: Why Thinking-By-Numbers is the New Way To Be Smart*, 2007. (中译本《超级数字天才》, 伊恩·艾瑞斯著, 中国青年出版社, 2008 年 1 月。)
- Raymond Fisman and Edward Miguel, *Economic Gangster: Corruption, Violence and the Poverty of Nations*, 2008. (中译本《经济黑帮: 腐败、暴力的黑帮经济学》, 中信出版社, 2010 年 8 月)
- Abhijit V. Banerjee & Esther Duflo, *Poor Economics A Radical Rethinking of the Way to Fight Global Poverty*, 2011.(中译本:《贫穷的本质: 我们为什么摆脱不了贫穷》, 中信出版社。)
- Angus Deaton, *The Great Escape: Health, Wealth, and the Origins of Inequality*, 2015.(中译本:《逃离不平等: 健康、财富及不平等的起源》, 中信出版社。)
- 涂子沛,《大数据: 正在到来的数据革命, 以及它如何改变政府、商业与我们的生活》, 广西师范大学出版社, 2012 年 7 月。

## Schedule

Week	Topic	Date	
1	<b>Introduction</b>	9/6	
2	<b>Causal Inference and Experimental Method(I)</b>	9/13	
3	<b>Causal Inference and Experimental Method(II)</b>	9/20	
4	<b>Regression(I)</b>	9/27	
5	<b>Regression(II)</b>	10/4	
6	<b>Regression(III)</b>	10/11	
7	<b>Regression(IV)</b>	10/18	
8	<b>Regression(V)</b>	10/25	
9	<b>Decomposition(I)</b>	11/1	
10	<b>Decomposition(II) -Lab5</b>	11/6	
11	<b>Instrumental Variable(I)</b>	11/15	
12	<b>Instrumental Variable(II)-Lab6</b>	11/20	
13	<b>Regression Discontinuity(I)</b>	11/29	
14	<b>Regression Discontinuity(II) -Lab7</b>	12/4	
15	<b>Difference in Differences(I)</b>	12/13	
16	<b>Difference in Differences(II)-Lab8</b>	12/18	
17	<b>Final Review</b>	12/27	

## Lab/Recite Session

Week	Topic	Date	Location	Time
2	<b><i>Recite 1: Probability Review</i></b>	9/11	逸夫楼 B-313	8:00-10:00am
3	<b><i>Recite 2: Statistics Review</i></b>	9/18	逸夫楼 B-313	8:00-10:00am
4	<b>Lab1: Introduction to Stata and R</b>	9/25	逸夫楼 B-407	8:00-10:00am
5	<b>Lab2: Introduction to Stata and R</b>	10/9	逸夫楼 B-407	8:00-10:00am
7	<b>Lab3: OLS in Stata and R</b>	10/16	逸夫楼 B-407	8:00-10:00am
9	<b>Lab4: OLS in Stata and R</b>	10/30	逸夫楼 B-407	8:00-10:00am
10	<b>Lab5: DE in Stata and R</b>	11/8	逸夫楼 B-407	9:00-12:00am
12	<b>Lab6: IV in Stata and R</b>	11/20	逸夫楼 B-407	8:00-10:00am
14	<b>Lab7: RD in Stata and R</b>	12/4	逸夫楼 B-407	8:00-10:00am
16	<b>Lab8:DID in Stata and R</b>	12/18	逸夫楼 B-407	8:00-10:00am
17	<b><i>Recite 3: Full Review</i></b>	12/27	逸夫楼 B-313	9:00-12:00am

### Outline

(Preliminary, to be adjusted possibly)

#### 0.1 Introduction

- What the course is about? What is the benefit if we learn it? How to learn it?
- ***Probability and Statistics Review***
  - Stock and Watson (2012): Chapter 2-3.
  - Wooldridge (2013): Appendix A, B & C.

#### 0.2 Causal Inference in Social Science and Randomized Experiment(I)

- Stock and Watson (2012): Chapter 1 & 13
- Angrist and Pischke (2014): Chapter 1
- Angrist and Pischke (2008): Chapter 1-2
- ***Probability and Statistics Review***
  - Stock and Watson (2012): Chapter 2-3.
  - Wooldridge (2013): Appendix A, B & C.

#### 0.3 Causal Inference in Social Science and Randomized Experiment(II)

- Stock and Watson (2012): Chapter 1 & 13
- Angrist and Pischke (2014): Chapter 1
- Angrist and Pischke (2008): Chapter 1-2
- ***Probability and Statistics Review***
  - Stock and Watson (2012): Chapter 2-3.
  - Wooldridge (2013): Appendix A, B & C.

#### **0.4 Regression (I): Simple OLS-Estimation**

- Stock and Watson (2012): Chapter 4-5, 17
- Wooldridge (2013): Chapter 2
- Angrist and Pischke (2014):Chapter 2
- Angrist and Pischke (2008): Chapter 3

#### **0.5 Regression (II)- Multiple OLS-Hypothesis Test**

- Stock and Watson (2012): Chapter 6-7
- Wooldridge (2013): Chapter 3,
- Angrist and Pischke (2008): Chapter 3
- Angrist and Pischke (2014): Chapter 2

#### **0.6 Regression Review (III): Multiple OLS-Estimation and Hypothesis Test**

- Stock and Watson (2012): Chapter 6-7
- Wooldridge (2013): Chapter 4-5

#### **0.7 Regression Review (IV): Nonlinear Regression Functions**

- Stock and Watson (2012): Chapter 8-9
- Wooldridge (2013): Chapter 6-8

#### **0.8 Regression Review (V): Binary Dependent Variables**

- Stock and Watson (2012): Chapter 11
- Wooldridge (2013): Chapter 9 & 17

#### **0.9 Inequality Decomposition(I)**

- Fortin, Lemieux and Firpo(2010), “Decomposition Method” in the Handbook of Labor Economics , Vol(4).

#### **0.10 Inequality Decomposition(II)**

- Fortin, Lemieux and Firpo(2010), “Decomposition Method” in the Handbook of Labor Economics , Vol(4).

#### **0.11 Instrumental Variables (I)**

- Stock andWatson (2012): Chapter 12
- Wooldridge (2013): Chapter 15
- Angrist and Pischke (2014): Chapter 3
- Angrist and Pischke (2008): Chapter 4

### **0.12 Instrumental Variables (II)**

- Stock and Watson (2012): Chapter 12
- Wooldridge (2013): Chapter 15
- Angrist and Pischke (2014): Chapter 3
- Angrist and Pischke (2008): Chapter 4

### **0.13 Regression Discontinuity (I)**

- Angrist and Pischke (2008): Chapter 4
- Angrist and Pischke (2014): Chapter 4
- Guido W. Imbens and Thomas Lemieux (2007), “Regression discontinuity designs: A guide to practice” , Journal of Econometrics, 142(2), pp.615-635.

### **0.14 Regression Discontinuity (II)**

- Angrist and Pischke (2008): Chapter 4
- Angrist and Pischke (2014): Chapter 4
- Guido W. Imbens and Thomas Lemieux (2007), “Regression discontinuity designs: A guide to practice” , Journal of Econometrics, 142(2), pp.615-635.

### **0.15 Difference in Differences (I)**

- Angrist and Pischke (2014): Chapter 5
- Angrist and Pischke (2008): Chapter 5
- Stock and Watson (2012): Chapter 10
- Wooldridge (2013): Chapter 13

### **0.16 Difference in Differences (II)**

- Angrist and Pischke (2014): Chapter 5
- Angrist and Pischke (2008): Chapter 5
- Stock and Watson (2012): Chapter 10
- Wooldridge (2013): Chapter 13

### **0.17 Final Review**