Econ 330: Urban Economics

Lecture 13

John Morehouse
20 February, 2020

Lecture 13: Minimum Wage, Monopsony & Empirics

Schedule

Today

1) **Monopsony**

2) **Discussion**

3) **Empirics**

Upcoming

- **HW3 due Feb 25th (one week)**
- **Reading** (Chapter 9)

Competitive Model

We built up labor **supply** and **demand**. Where do these come from?

- Demand: Firms
- Supply: Workers

What did we assume about the market structure?

- **Perfect Competition**
    - Firms pay workers their MV of labor (max WTP)

Probably not super reasonable

Monopsony

Let's consider a different labor market structure:

Monopsony

- We say a firm is a **monopsonist** if they are **the only employer** of labor in the area (city)
- We say a firm has **monopsony power** if they have the ability to influence the market wage
    - Not to be confused with **monopoly** (in which there is only one **seller** of a good)
    - **Monopsony** has to do with one **buyer** of a good

Examples of Monopsonys

Can you think of any?

- Universities (go GTFF!)
- Coal Towns
- Amazon / Walmart Towns?

Monopsony

So what do you think the main consequence(s) of **monopsony** are?

Monopsonists have the ability to pay a wage below the marginal value

The consequences?

- Higher profit for the firms
- Deadweight loss (inefficient outcome)

We will formalize this in a few slides, but first lets go over some evidence of local monopsonys

Monopsony: Formalizing the Result

In the competive model, the firm pays the worker $w = MRP_l$.

- Is this what the monopsonist would do?
- Where is this?

Recall: The competitive model

Remember: in the competitve model, the firm seeks to maximize profits (but does not influence prices).

- The competitive firm hires labor until the marginal profit w.r.t to labor is zero

$$\pi = TR - TC$$
$$\pi = TR - wL - rK$$

Profit maxing cond: $\frac{\Delta \pi}{\Delta L} = 0 \implies MRP_L - w = 0 \implies w = MRP_L$

Monopsony: Formalizing the Result

With a monopsonist, the amount of labor they hire influences the wage. That is, now

$$\pi = TR - w(L)L - rK$$

where $w(L)$ is an increasing function of the amount of labor hired

- The firm should hire labor until marginal cost is equalized to marginal benefit (**same as before**)
    - or: *marginal profit* *wrt labor* is equal to zero

$$\frac{\Delta \pi}{\Delta L} = 0$$

Monopsony: Formalizing the Result

So the monoposonist hires until:

$$MRP_L = MC_L$$

Compared to the competitve outcome:

$$MRP_L = W$$

Important: Note that in the competitive model, marginal cost of labor was constant (and equal to wage).

- Now: marginal cost is increasing because monopsonist is *only* buyer of labor

An Example:

Monopsonist Wage Schedule

Wage	Labor	TC	MC
1	1	1	1
2	2	4	3
3	3	9	5
4	4	16	7
5	5	25	9

Let's fill in the table. What do you notice?

At every level of labor, the marginal cost of labor exceeds the wage

Graph of Monopsony

Monopsony and Minimum Wage

- So we saw the monoposonist outcome leads to **lower employment and wages** than the competitive outcome.
- In perfect competition, what happens to unemployment with a minimum wage?

Monopsony and Minimum Wage

- So we saw the monoposonist outcome leads to **lower employment and wages** than the competitive outcome.
- In perfect competition, what happens to unemployment with a minimum wage?
  - It increases. Labor supply outstrips labor demand
- Is it the same with a monopsony? No!

Minimum Wage Graph

Checklist

1) **Monopsony** ✅

- Monopsony Outcome vs Competitive Outcome
- Min wage in monopsony

2) **Discussion**

3) **Empirics**

Discussion

- Structure of labor market leads to two different effects for the same policy
- In reality, most labor markets are somewhere in between perfect competition and monopsony
- The more competitive a market is, more likely that minimum wage will increase unemployment

A Brief History Lesson

- 1894: New Zealand enacts the Industrial Concilation and Arbitration Act
  - Worlds first Min wage!
- **1912**: Massachusetts enacts the first minimum wage in the US. Other states follow
- **1938**: Fair Labor Standards Act (25 cents per hour **federal** minimum wage)
- **1968**: Federal Minimum Wage reaches **peak purchasing power** at $1.60 per hour ($11.53 in 2019 dollars) 🤯
- **2009**: Min wage is $ 7.25 an hour
- **2019**: 29 states have a higher minimum wage than federal

Thoughts

So what do you think? Is minimum wage good? Is it bad? **Discuss**

Note: The question *is minimum wage good?* is **not** a good question. Good is normative. Better:

- Does minimum wage impact all low wage workers equally?
- Does minimum wage cause increases in unemployment?
- Does minimum wage lead to firms reducing other, non-mandated benefits?

Above questions: quantifiable, with answers that can be answered empirically

Checklist

1) **Monopsony** ✅

- Monopsony Outcome vs Competitive Outcome
- Min wage in monopsony

2) **Discussion** ✅

3) **Empirics**

Introduction

We are going to talk about causality.

Some of these notes are based on written by Ed Rubin & Kyle Raze

Introduction

Hisotrically, social sciences had limited data to study policy questions.

Result: Social sciences were theoretical fields

- Economists used mathematical models
- Sociologists developed qualitative theories
- Both used their theories to make policy reccomendations

Problem: Theories can be (and often are) wrong

- 5 economists often have 5 answers to the same question
- Leads to a politicization of questions that, in principle, have scientific answers (ie: does minimum wage cause increased in unemployment?)

Nowadays

Today: social sciences are increasingly empirical thanks to the growing availability of data

- Ability to test and improve theories using real data
- Data driven answers $\Longrightarrow$ less politicization

Discussion

The economists toolkit:

- **Empirics**: tells us what actually happened
- **Theory**: helps us understand why things happened the way they did

Be careful in distinguishing:

- empirical facts such as *average unemployment was lower after minimum wage was placed*
- empirical or theoretical claims (supported by facts) such as: *average unemployment was lower* ***because*** *of minimum wage* or
    - *average unemployment was lower after minimum wage was placed .pink[because] the market was a monosopsony*

Path to Causality

Suppose we want to answer the question:

Does minimum wage lead to increases in unemployment? What is the *ideal* comparision? (experiment)

The Ideal Experiment

1) Implement minimum wage (in say NJ -- this will give us the causal effect in NJ only).

2) Compute unemployment in NJ post minimum wage, call it $u_{\text{min wage},NJ}$

3) Have a **parallel universe** in which you did not implement min wage in NJ. Compute $u_{\text{no min wage},NJ}$

4) **Treatment effect** of the min wage for NJ, given by:

$$\tau_{\text{min wage},NJ} = u_{\text{min wage},NJ} - u_{\text{no min wage},NJ}$$

Issues

- Unfortunately, we do not have a parallel universe at our disposal
- This is called the **fundamental problem of causal inference**. Put in a different way:
    - We can never see the same individual (unit) when they are both treated and untreated
- So we can never *garuntee* all else is equal, but we will try our best.

Setup

Q1: *Does minimum wage lead to increases in unemployment?*

- We need a setting to study this. For example, in 1993 NJ rose minimum wage from 4.25 to 5.05.

Q2: What comparisons could you make to under the the effect of NJ min wage on unemployment?

1. Compare average unemployment in NJ before and after the policy
2. Also could compare average unemployment in NJ to other states (where min wage remained the same)

Q3: **Problems?**

1. Other factors could be influencing unemployment at same time as NJ as min wage implementation

Issues

A high bar

Both issues discussed on the last slides were violations of the *all else equal* assumption

When *all* factors are held constant, statistical comparisons detect causal relationships. You have likely heard the saying:

> Correlation is not causation

- This saying just points out that often times there are violations of the all else equal assumption

Path to Causality

So our minimum wage comparisons might and probably violate the all else equal assumption. What is a possible solution?

Random Experiments

- Ideally, we would randomly assign firms to have min wage.
- Randomization helps us maintain the *all else equal* assumption

- Here we have **two groups**:

    1. **Treatment:** Assigned minimum wage
    2. **Control:** Not assigned minimum wage

- **Average Treatment Effect**: ATE = Average(treated) - Average(control)
    - Unobservable/observable differences average out to zero due to random assignment

Problem

We can't randomly assign firms to minimum wage. If we *invited* firms to participate (very few would, probably), we would have **selection bias** (non-random assignment of treatment)

- Simple comparisons of treatment and control units might violate all else equal

What do we do?

1. Give up
2. **Think of a different comparison that gets us closer to all else equal.**

Another Comparsion

So we tried:

1) Comparing NJ to itself before and after the policy ❌

2) Comparing NJ to another state after the policy ❌

Here is **another idea**:

- What if we compared the difference between NJ and another state **before & after** the minimum wage?
    - If the *pre-treatment* difference is constant, then comparing this to the *post-treatment* should give us the treatment effect of the policy.
- This is called the **Difference in Differences** estimator (or DiD, double diff, etc.)

Differences-in-Differences

Card and Krueger (1994)

Effect of Minimum Wage on Employment

Outcome: Number Full-Time Workers		
Group	**Before**	**After**
Treatment (NJ)	20.44	21.03
Control (PA)	23.33	21.17
Difference	-2.89	-0.14

Difference-in-differences = -0.14 – -2.89

= 2.76. (a **13%** increase!!)

Result: Increasing the minimum wage did not reduce employment!

The Evidence and Metrics

- Card & Krueger (1993) *Minimum Wages and Employment: A Case Study of the Fast Food Industry in New Jersey and Pennsylvania*
  - Min wage in NJ rose from $ 4.25 to $ 5.05
  - Here: NJ is the **treatment** group and Penn is the **control** group. NJ exposed to policy, NY not
- Finds that employment in NJ **increased**!

Metrics

Research Design

- Compares employment of fast food restaurants in NJ to Pennsylvania (where min wage stayed at $4.25)
- Treatment: NJ, Control: Pennsylvania
- **DiD estimates** of min wage effect on unemployment, prices, and wages

Main Findings

1. Policy *increased* employment in NJ fast food establishments by a whopping **13**%
2. Business increased prices, suggesting that most of the burden of the min wage was handed to others

Comments

- Pretty clear result from the paper: minimum wage increased employment **in fast food, in NJ**.
- They comment about possible monopsony power in this labor market, which would be consistent with our earlier theory

Issues

- Nothing about hours worked. Employment might have increased, but its not clear that average number of hours worked increased
    - Q: Do we care about unemployment? Or do we care about maximizing incomes for the largest group of people? Different things.

Another Problem

Issues part 2

The mechansim for the increase is not tested or clear. Possible stories:

1. Fast food chains generally have more capital than small businesses. Small food places went out of business, and demand shifted to the fast food chains (causing employment to increase)

2. Monoposony power in fast food chains

3. Both 1 and 2? Something else?

Policy Implications will depend **heavily** on what the underlying mechanism is. If most of the results are driven by 1, maybe the net-effect on employment is negative.

Internal Vs. External Validity

Internal Validity

Addresses the question: *should we believe this study?*

- A study has internal validity if we believe the **causal effect** of a variable on another variable has been well identified (ie: we have maintained all else equal)

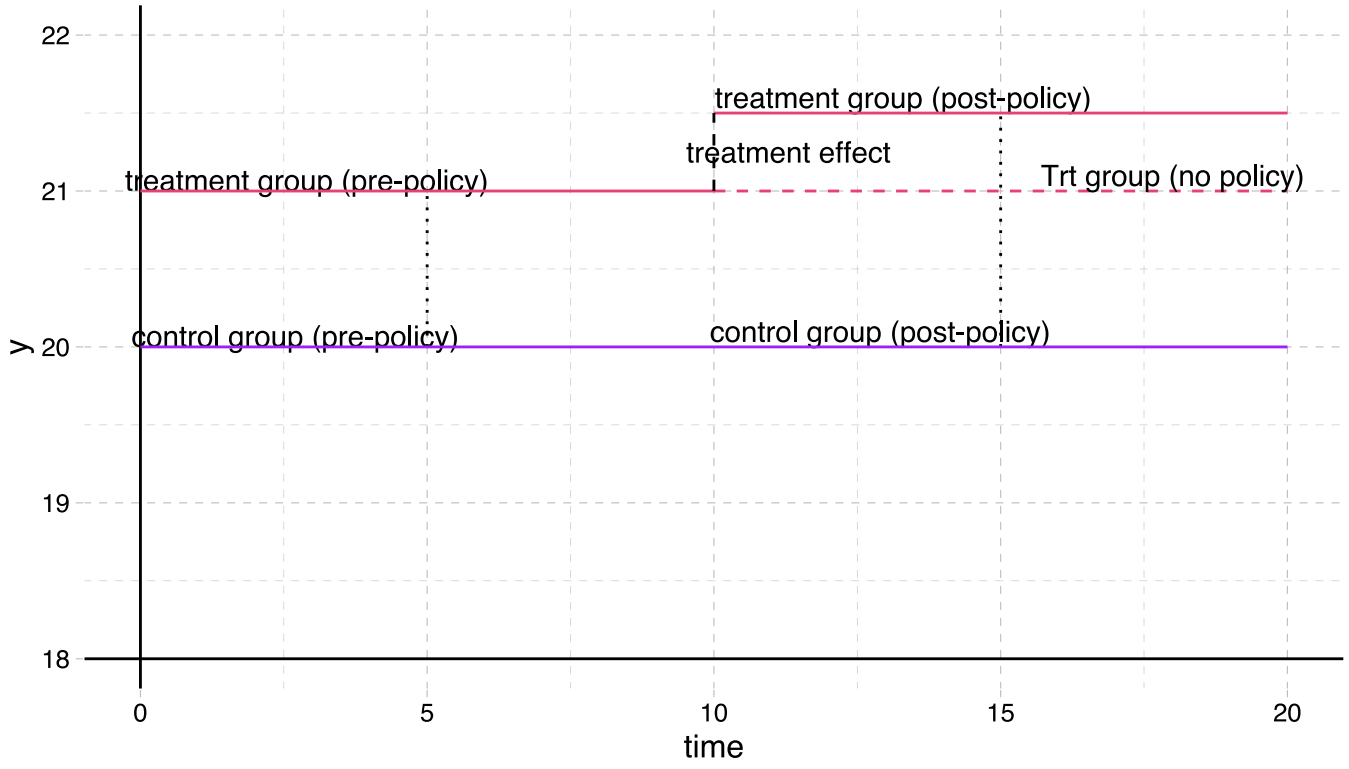
External Validity

Addresses the question: *how far can we generalize the results of this study?*

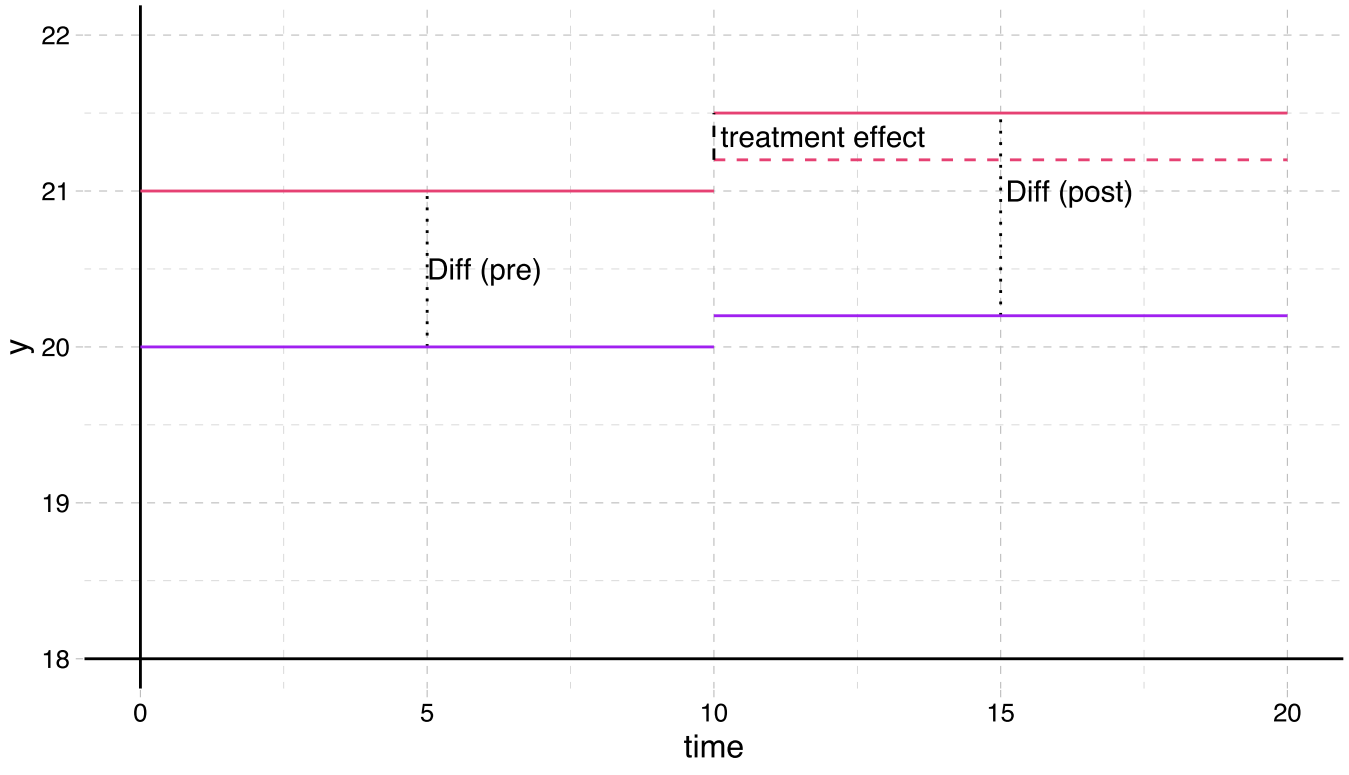
- External validity is often harder to show. Need to argue that your context is similar to other contexts. Even then, you might not be believed.

Card & Krueger: very hard to argue external validity

DiD Plot Ex 1


22
21
20
19
18
y
0
5
10
15
20
time
treatment group (post-policy)
treatment effect
Trt group (no policy)
treatment group (pre-policy)
control group (pre-policy)
control group (post-policy)

DiD Plot Ex 2



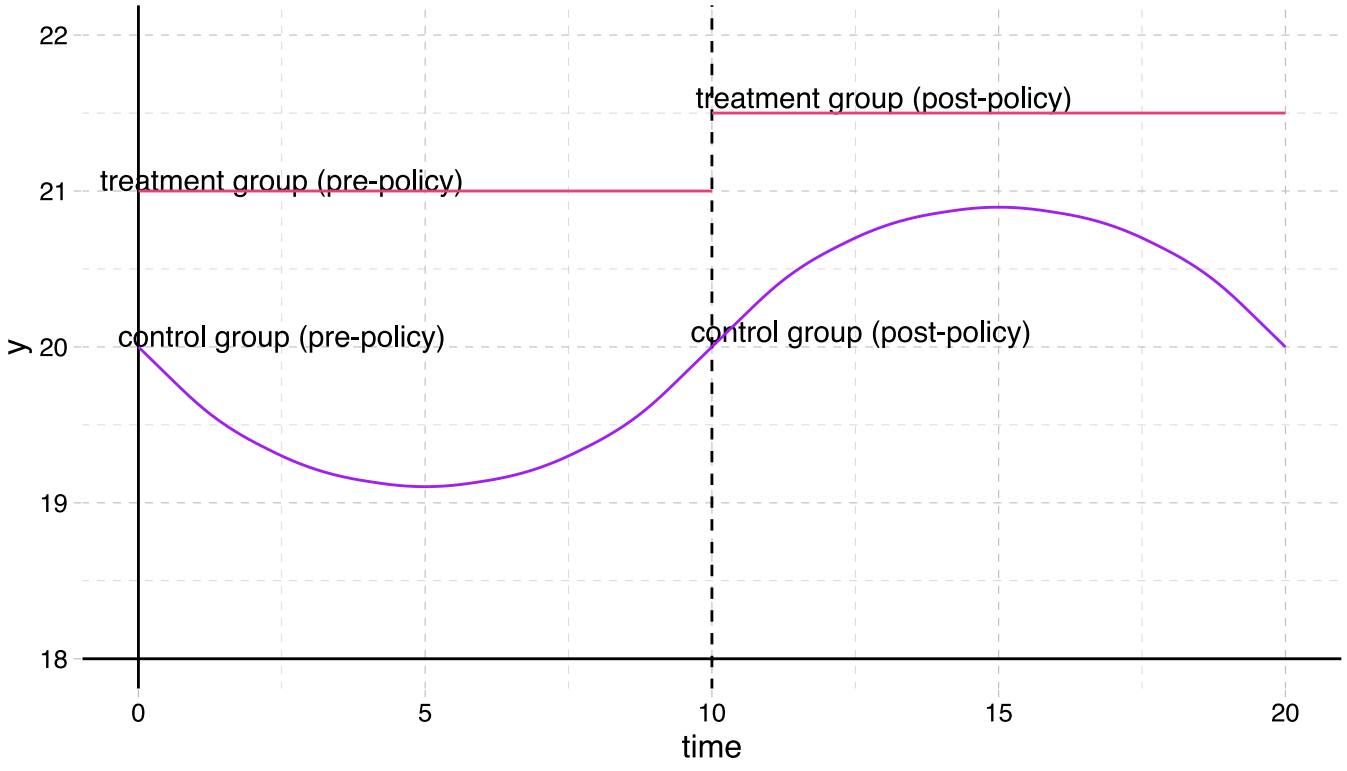
To be clear, the average treatment effect, τ is given by:

$$\tau = \underbrace{\left(y_{\text{treat, post}} - y_{\text{control, post}}\right)}_{\text{diff (post)}} - \underbrace{\left(y_{\text{treat, pre}} - y_{\text{control, pre}}\right)}_{\text{diff (pre)}}$$

Not a Silver Bullet

- Note: DiD is a clever way of getting treatment effects.
  - **Treatment effect** is identified by assuming: in the absence of treatment, the average difference between treated and control units would have remained constant
  - We need this difference to be constant before hand. Called the parallel trends assumption

Bad Control Ex



Checklist

1) **Monopsony** ✅

- Monopsony Outcome vs Competitive Outcome
- Min wage in monopsony

2) **Discussion** ✅

3) **Empirics** ✅

- Treatment and control effects
- The ideal experiment
- Making Comparisons
- Diff in Diff
- External vs Internal Validity