# Econ 330: Urban Economics

## Lecture 12

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# Lecture XII: Place Based Policies

# Schedule

## Today

1. **Intro to Place-Based Policies**
2. **Utility Revisited**

## Upcoming

- **Read Chapter 8 of ToTC**
- **HW3 not due until Feb 25th**

# Place-Based Policies

**Defn**: **Place - Based Policies** Are policies that are location-specific **specific areas**

- Can you think of some examples? **Discuss**
  - State and Local Taxes
  - State/City minimum wage
  - Zoning laws & Land Use Restrictions
  - Enterprise Zones

# Place Based Policies

To be clear: **federal policies** that are uniform across all states *are not* place-based policies

- State policies are *place-based*

This can be confusing.

- In some sense, even federal income tax seems like a "place-based" policy, where the place is the whole US
- Much hard(er) to **migrate** across international borders, state borders are easy
- Some people might have slightly different definitions of this. It can be a bit loose.

# Enterpise Zones

**Defn Enterprise Zone**:

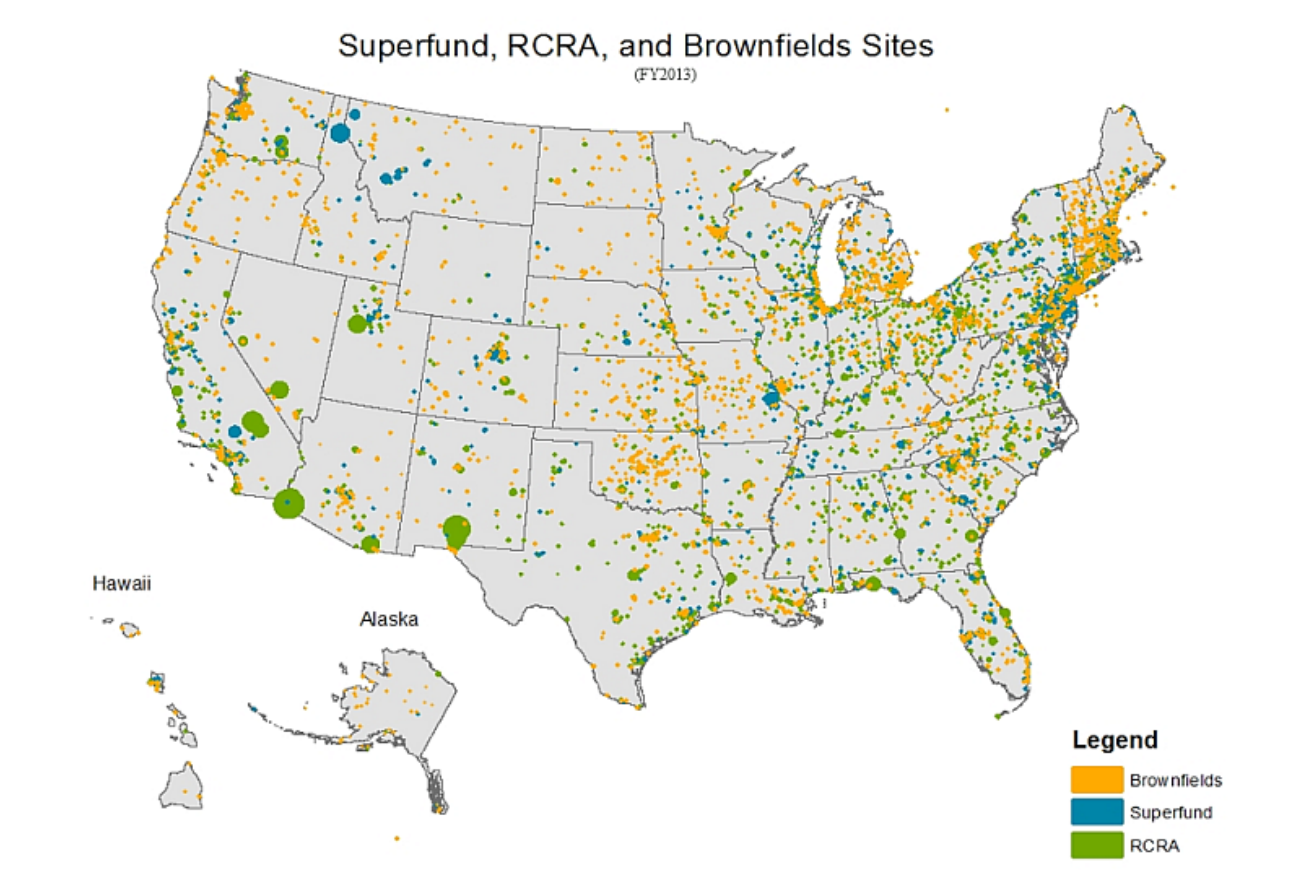
> A geographic area that has been granted tax breaks, regulatory exemptions, or other public assistance in order to encourage private economic development and job creation

Examples:

- Jersey City, NJ since 1983
- China: Shanghai and Shenzen (Special Economic Zones (SEZ))

# Brownfield Remediation

- A *brownfield* is previously developed land not currently in use due to industrial or commercial pollution



# Brownfield Remediation

- Property values around brownfields?
  - Lower
  - Cleaning these up raises amenity value of the neighborhood
  - What happens to property values?
  - They go up! (this is gentrification)

# Air Quality Monitoring

*December 2, 1970*: Environmental Protection Agency (EPA) is Established

- With it: The Clean Air Act

**Following years**: amendments to the CAA (expanding scale and scope of EPA)

- 1990: Huge power granted to state and local authorities to enforce air quality standards
- 1997: PM 2.5 (particulate matter of 2.5 micrograms or less) standards placed
- 2005: PM2.5 standards enforced
- 2011: standards for greenhouse gases

# Air Quality Monitoring

Particulate Matter (**PM**) in the US is regulated under the CAA at the **county level**†

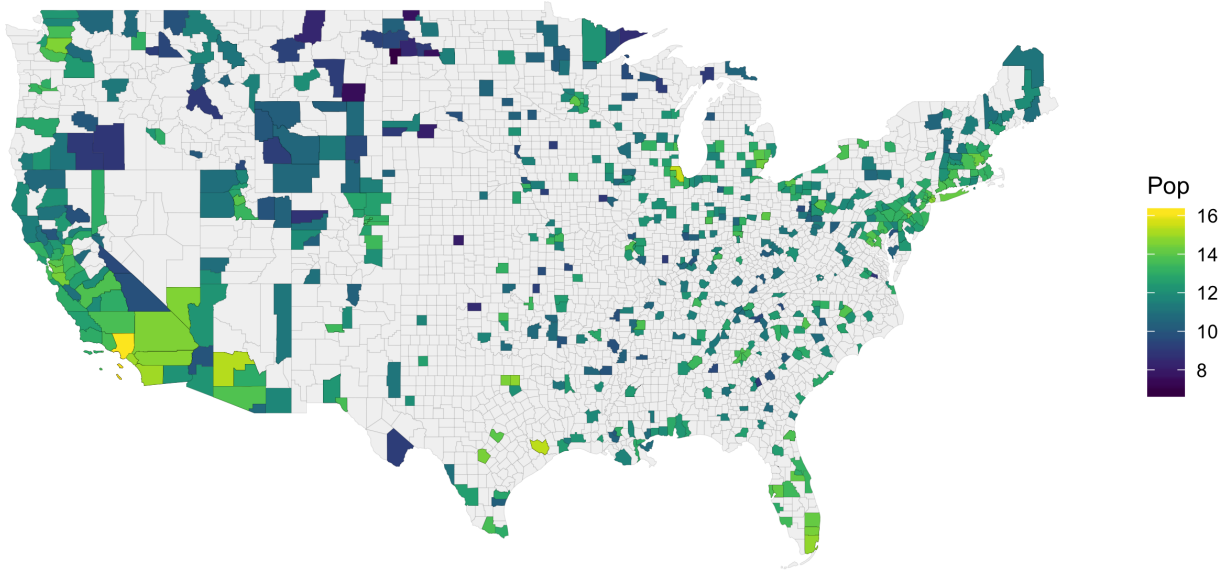
- If a county exceeds certain threshold for **PM** , **all** firms over a certain size need to pay a pretty big fine
- Exceptions for fires, other natural events
- Not all counties are monitored

† For more details, look here

# Air Quality Monitoring

US Counties with PM2.5 Monitors

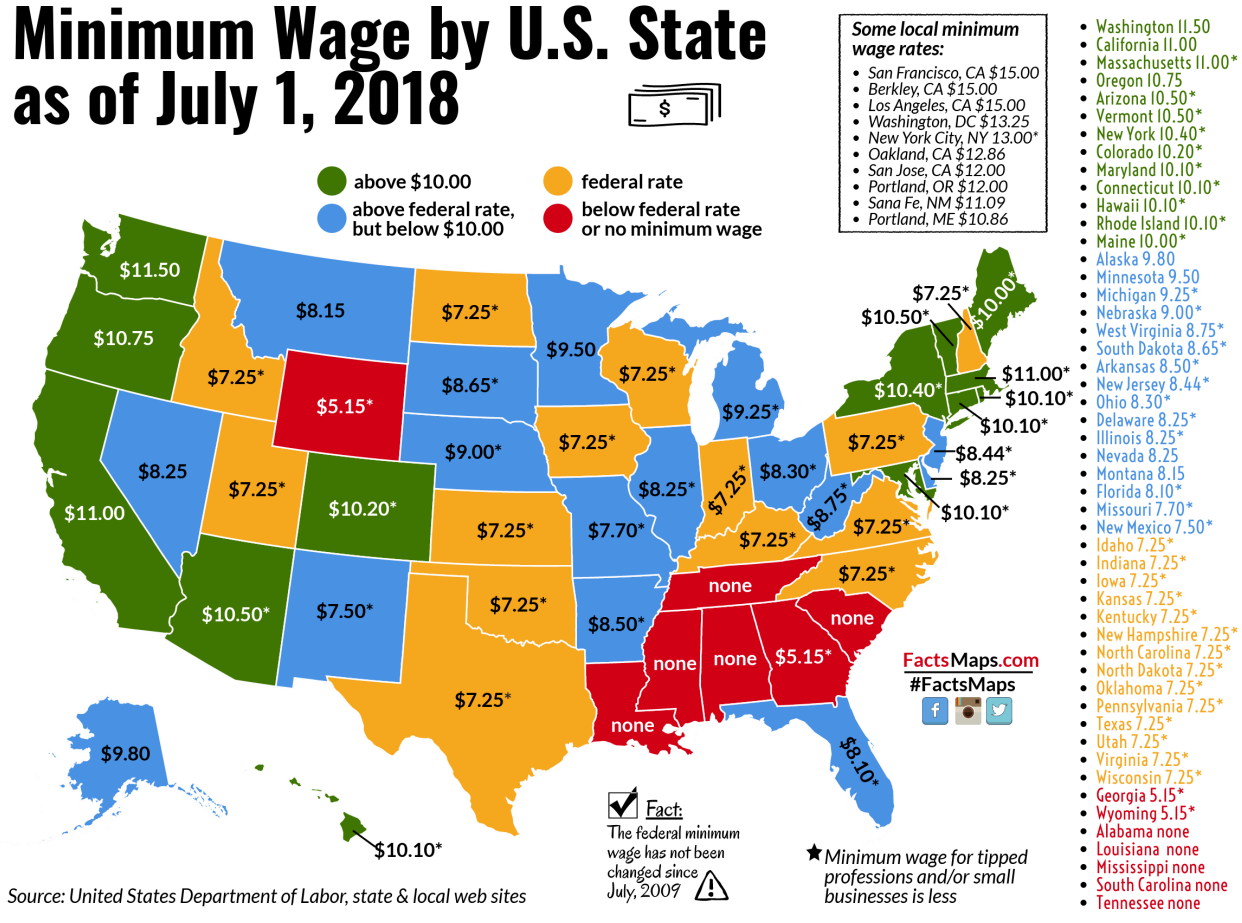
Population measured in logs




Sources: US EPA and Census

# Minimum Wage

Federal Minimum Wage: 7.25 (not a place based policy)



# Discussion

- Place-based policies can be tough to assess. Depends on the policy
    - Can target places, but people are mobile, and respond to changes in incentives

**Question**: Why do federal policies impact cities differently?

- Min wage: might be binding in some states, others not
- Federal Income Tax: Cost of Living varies by state.

# Checklist

1) **Intro to Place-Based Policies** ✅

2) **Location Choice Theory**

# Up Next

- This next part you might find a little bit difficult
- My hope is to scratch the surface for how you might think of modeling the effects of a place-based policy
    - Need to set up a ton of stuff first
- Some of these examples are based on Mark Colas' notes. He will teach you more about this in his 400 urban econ class
- I found some of this stuff inspiring - I hope you do too

# A Framework

We talked a little bit about **utility** earlier in the term. What is it?

- An abstract notion of people's preferences. **Why do we care about this?**
- Want to think about policies and impact of policies
    - Need to think about what people care about to assess incidence/effectiveness of a particular policy
- Remember: **higher levels of utility** are more desirable than low levels of utility

# A framework

**Example**: Could have preferences over left-shoes and right-shoes. Utility might be:

$$U(\text{left shoes}, \text{right shoes}) = \min\{\text{left shoes}, \text{right shoes}\}$$

Q1: In words, what does this say?

- I don't care about consuming more shoes unless I get more of both left and right shoes.

Q2 Give the above utility function, which bundle would I rather consume?

$$\text{bundle } 1 : (10000, 1) \qquad\qquad \text{bundle } 2 : (2, 2)$$

- $U(10000, 1) = 1 < U(2, 2) = 2$, so I would rather consume bundle 2

# Utility

**Main point**: Use it to rank outcomes. Remember: utility is **ordinal** *not* **cardinal**

- This means: we cannot speak to ordering of outcomes, not level.
  - Many utility functions give equivalent preference rankings

Q: What if utility over shoes was:

$$U_2(\text{left shoes}, \text{right shoes}) = 10 * \min\{\text{left shoes}, \text{right shoes}\}$$

- Does this represent the same underlying preferences as the previous example (not multiplying by 10?)
  - Yes, because $U_2(10000, 1) = 10 * 1 = 10 < U_2(2, 2) = 10 * 2 = 20$
  - So the bundle $(2, 2)$ is still preferred to $(10000, 1)$

# Utility over Locations

Could we write a utility function over locations? Sure! What would go into this function?

- What do people make location decisions on?
- Let's start by assuming people only care about 3 features of locations:
  - **wages**, **rents**, **amenites**
  - These all vary across locations, right? (first part of this class)

# Utility over Locations

- Let $w_j$, $r_j$, and $a_j$ denote wages, rents, and amenities in location $j$
  - $j = SF$, for example
- **General form**: $U(w_j, r_j, a_j) = U_j$
  - Says: utility in location $j$ is a function of wages, rents, and amenities, in location $j$
- In practice, could write down an infinite number of functions for $U(\cdot)$.
- **Usual assumptions**: people like (higher utility) higher wages, lower rents, and better amenities. **Reasonable?**

# Example

**Example**: Let's go with a **linear function** (and it's the same for everyone):

$$U(w_j, r_j, a_j) = w_j - .5 * r_j + a_j$$

- Suppose our two locations are SF and OAK again. If:
  - $w_{SF} = 10, r_{SF} = 8, a_{SF} = 4$
  - $w_{OAK} = 8, r_{OAK} = 3, a_{OAK} = 1$

Q How do workers sort across the cities?

- $U(w_{SF}, r_{SF}, a_{SF}) = 10 - .5 * 8 + 4 = 10$
- $U(w_{OAK}, r_{OAK}, a_{OAK}) = 8 - .5 * 3 + 1 = 7.5$
- $10 > 7.5$ so everyone lives in SF

# What went wrong?

In that model, everyone lived in SF and nobody lived in Oakland. Problems?

- Not everybody has the same preferences (utility functions)
- Was that last example an example in **locational equilibrium**?
- No! In locational equilibrium, utility is equalized across locations. Can't have:
  - $U(w_{SF}, r_{SF}, a_{SF}) > U(w_{OAK}, r_{OAK}, a_{OAK})$

# Equilibrium

- Again: in equilibrium, utility is equal across locations.
- All values from last example were made up, but amenity values were **extra made up**. Why?
- We don't observe them! We see wages and rents in data, but amenities are more abstact.
    - Can be composed of a ton of different things
- How can we locational eq to "fix up" our last example?

# Calculating Amenities

- Ok, now suppose we have the same wages and rents:
  - $w_{SF} = 10, r_{SF} = 8$
  - $w_{OAK} = 8, r_{OAK} = 3$
- **Twist** *We do not know amenities in each city*
- Furthermore, suppose we enforce that utility is equal in all locations, which is some number $k$
- How can we solve for amenities in each city?

$$U(w_j, r_j, a_j) = w_j - .5 * r_j + a_j = k \implies a_j = k + .5 * r_j - w_j$$

- So $a_{SF} = k + .5 * 8 - 10$ and $a_{OAK} = k + .5 * 3 - 8$
  - and thus $a_{SF} > a_{OAK}$

# Backing Up

$$a_j = k + .5 * r_j - w_j$$

Q What does this equation tell us?

- In equilibrium, **higher rents** $\implies$ higher amenity value
- In equilibrium, **higher wages** $\implies$ lower amenity value
- **Note**:
  - Our calculation for $a_j$ rested heavily on our assumption for the utility function
  - Q: Did the ordering of the $a_j$'s rest on the assumption?

# Another Problem

- Okay, so people move and utility is equal across all locations
- Thus far, we have assumed **wages** and **rents** do not respond to these choices
    - First 6 weeks of this class should tell you: this is a **bad assumption**
- Let's let rents, but not wages, adjust to individual location decisions
    - *Rents are endogenous*

# Rents

- Rents in every city given by:

$$r_j(L_j) = 2 * L_j$$

- $r_j(L_j)$: rents *are a function* of the population (not multiplied)
- $L_j$ is the pop in city $j$ -- the 2 was arbitrary

# Example

- Suppose we have two cities $1$ and $2$, with 7 people total. That is: $L_1 + L_2 = 7$
- Utility: $U(w_j, r_j(L_j), a_j) = w_j - .5 * r_j(L_j) + a_j$
- Wages: $w_1 = 12$, $w_2 = 7$, **rents** : $r_j(L_j) = 2 * L_j$
- Amenities: $a_1 = a_2 = 0$ (to make it easy)
- Question: How many people live in each city, and what are rents in each city? **Note**: You have **two equations**
  - $U(w_1, r_1(L_1), a_1) = U(w_2, r_2(L_1), a_2)$ (from locational eq)
  - $L_1 + L_2 = 7$ you know the total population ... and **two unknowns** (namely, $L_1$ and $L_2$)

# Example

Locational eq gives:

$$\begin{aligned} w_1 - .5 * r_1(L_1) &= w_2 - .5 * r_1(L_2) \\ 12 - .5 * (2 * L_1) &= 7 - .5 * (2 * L_2) \\ -L_1 &= -5 - L_2 \\ L_1 &= 5 + L_2 \end{aligned}$$

Population must sum to 7. Thus:

$$\begin{aligned} L_1 + L_2 &= 7 \\ 5 + L_2 + L_2 &= 7 \\ 2 * L_2 &= 2 \\ L_2 = 2 \implies L_1 &= 5 \end{aligned}$$

# Back to Place-Based Policies

Ok, how do we tie this back into **place-based** policies?

**Example**

- Initial equilibrium: $U(w_j, r_j(L_j), a_j) = k$ for all cities $j$
- Let's suppose $SF$ implements a 30%, flat, income tax
  - Post-tax wage in city $SF$ is now $w_{SF}^{tax} = 0.7 * w_{SF}$
  - Assume **wages are fixed**, but **rents adjust to population**
- Utility in city $j$ is:

$$U(w_{SF}^{tax}, r_{SF}(L_{SF}), a_{SF}) < U(w_{SF}, r_{SF}(L_{SF}), a_{SF})$$

- If utility is **increasing in wages** (more money $\implies$ more utility), then an income-tax lowers utility.

# In Equilibrium

Ok so, can it be an equilibrium if:

$$U(w_{SF}^{tax}, r_{SF}(L_{SF}), a_{SF}) < U(w_{SF}, r_{SF}(L_{SF}), a_{SF})$$

- No! because $U(w_{SF}, r_{SF}(L_{SF}), a_{SF}) = k$
  - So $U(w_{SF}^{tax}, r_{SF}(L_{SF}), a_{SF}) \neq k$
- People move away from SF (and rents fall). So utility goes up in SF
- It continues to go up until $U(w_{SF}^{tax}, r_{SF}(L_{SF}), a_{SF}) = k$

# Extensions

- This flexible way of modeling gives us many options for modeling place based policies
- Other kind of subsidies/taxes: goes into $w_j$
- Rent subsidies or property taxes: impacts $r_j$
- Q: How would you model an increase in public school quality?

# Extensions

- A lot of thought goes into figuring what the coefficients on the utility function should be. That is:
  - $U(w_j, r_j(L_j), a_j) = w_j - .5 * r_j(L_j) + a_j$
- Why a .5 attached to rents? Is this important?
  - Yes it is important. A higher value attached to rents $\implies$ people are more responsive with their location choice with respect to changes in rents

# Checklist

1) **Intro to Place-Based Policies** ✅

2) **Location-Choice Theory**✅

- Modeling utility across cities
- Calculating Amenity Values
- Rent adjustment model
- Modeling place-based policies