

Lecture 13: Environmental Justice History and Context

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Environmental Economics
Econ 4075

Environmental Justice Roadmap

The next two lectures we will focus on two big questions:

1. Why is there inequality of pollution exposure for minority and low-income populations?
 - Contextual background, common explanations
2. How can we determine if environmental policies will worsen environmental or wealth inequality for minority and low-income populations?
 - Framework for EJ analysis of regulations, analytic considerations, prospective analyses, retrospective studies

Part 1: Environmental Justice Background

History of the EJ Movement

Very [long history](#) of environmental injustice and organized opposition. Inflection point with protests against the siting of a PCB landfill in Warren County.

A contractor hired by the Ward Transformer company illegally sprayed 13,000 gallons of PCB waste on 243 miles of roads at 51 sites in North Carolina in 1978.



Figure: 40,000 cubic yards of soil was contaminated in 14 North Carolina counties. ([Image source](#), [content source](#)).

History of the EJ Movement


After considering 90 potential landfill sites, NC narrowed down to two locations:

- Public landfill in Chatham County (26% Black, 7% below FPL).
 - Already a landfill. Clay-lined.
- Privately-owned land on recently foreclosed property in Warren County (60% Black, 25% below FPL).
 - No city council or mayor
 - Shallow groundwater and permeable soils

A toxic dump in a majority-Black county

In 1982, against the protest of residents, North Carolina chose a site in Warren County to dispose of PCBs (a class of toxic chemicals) that had been illegally dumped.

Black percentage of population



0 25 50%

Source: 1980 decennial census via IPUMS

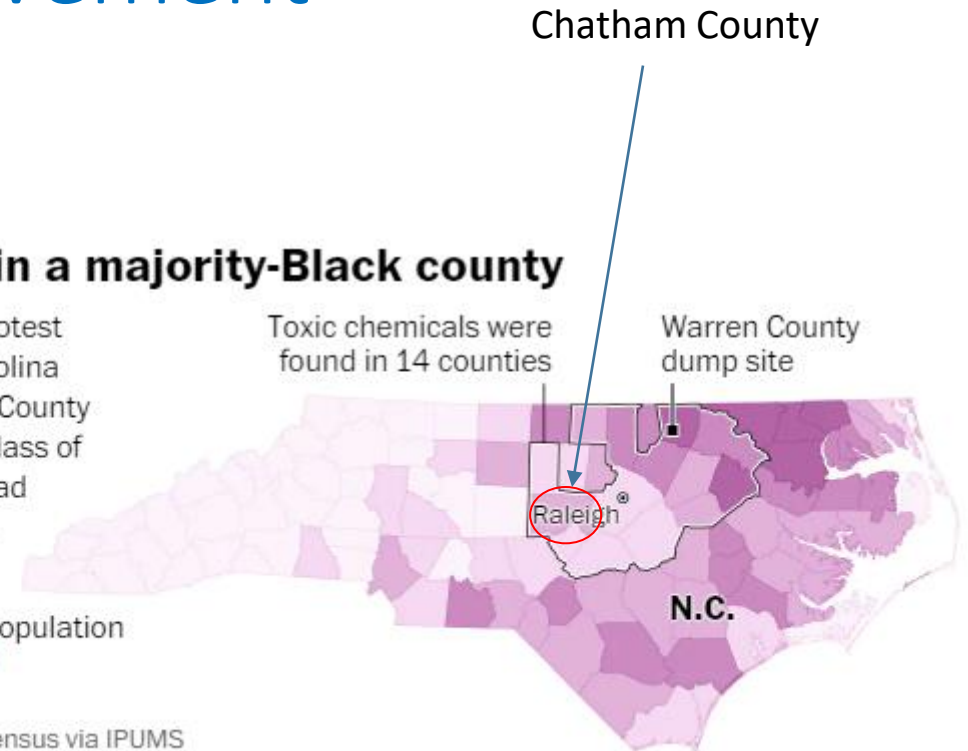


Figure: Locations of the chemical spills and Warren county dump site ([source](#)).

History of the EJ Movement



Figures: Protesters attempting to block delivery of PCB waste to the Warren County, NC landfill in 1982 ([left image source](#) and [right image source](#)).



A Movement is Born



Image source: [UNC library.](#)



Image: Rev. Ben Chavis, a leader of UCC and the Commission for Racial Justice (CRJ). Coiner of the term “environmental racism.” ([Source](#))



[Image source.](#)

History of the EJ Movement

Two landmark studies followed:

- [Siting of Hazardous Waste Landfills and their Correlation with Racial and Economic Status of Surrounding Communities](#) by the General Accounting Office (1983)
- [Toxic Wastes and Race](#) by the Commission for Racial Justice of the United Church of Christ (1987).

Demographic Characteristics of Communities with Uncontrolled Toxic Waste Sites

- Three out of every five Black and Hispanic Americans lived in communities with uncontrolled toxic waste sites.
- More than 15 million Blacks lived in communities with one or more uncontrolled toxic waste sites.
- More than 8 million Hispanics lived in communities with one or more uncontrolled toxic waste sites.

A Broad Coalition

In 1991, the UCC's Commission for Racial Justice held the First National People of Color Environmental Leadership Summit.

- The [17 Principles of Environmental Justice](#).



People of Color Summit delegates hold rally on the steps of the U.S. Capitol building, Washington, DC, 1991 (Photo by R.D. Bullard)

Principles of Environmental Justice

These 17 principles were adopted on October 27, 1991, at the First National People of Color Environmental Leadership Summit held in Washington, DC. This historic summit was sponsored by the United Church of Christ's Commission for Racial Justice and was attended by around 1,100 persons. The principles played a foundational role in defining environmental justice for a growing movement.

PREAMBLE

WE, THE PEOPLE OF COLOR, gathered together at this multinational People of Color Environmental Leadership Summit, to begin to build a national and international movement of all peoples of color to fight the destruction and taking of our lands and communities, do hereby re-establish our spiritual interdependence to the sacredness of our Mother Earth; to respect and celebrate each of our cultures, languages and beliefs about the natural world and our roles in healing ourselves; to ensure environmental justice; to promote economic alternatives which would contribute to the development of environmentally safe livelihoods; and, to secure our political, economic and cultural liberation that has been denied for over 500 years of colonization and oppression, resulting in the poisoning of our communities and land and the genocide of our peoples, do affirm and adopt these Principles of Environmental Justice:

1. **Environmental Justice** affirms the sacredness of Mother Earth, ecological unity and the interdependence of all species, and the right to be free from ecological destruction.
2. **Environmental Justice** demands that public policy be based on mutual respect and justice for all peoples, free from any form of discrimination or bias.

The Movement Gains Support

[Executive Order 12898](#) signed in 1994.

- Directs all federal agencies to identify and address disproportionately high and adverse effects of their policies on **minority** and **low-income** populations.



Bill Clinton signing EO 12898 ([source](#)).



Office of Environmental Justice Definition

The **fair treatment** and **meaningful involvement** of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Fair treatment means no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental and commercial operations or policies.

-- [U.S. Environmental Protection Agency](#)



Office of Environmental Justice Definition

Procedural Justice

The **fair treatment** and **meaningful involvement** of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Distributive Justice

Fair treatment means no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental and commercial operations or policies.

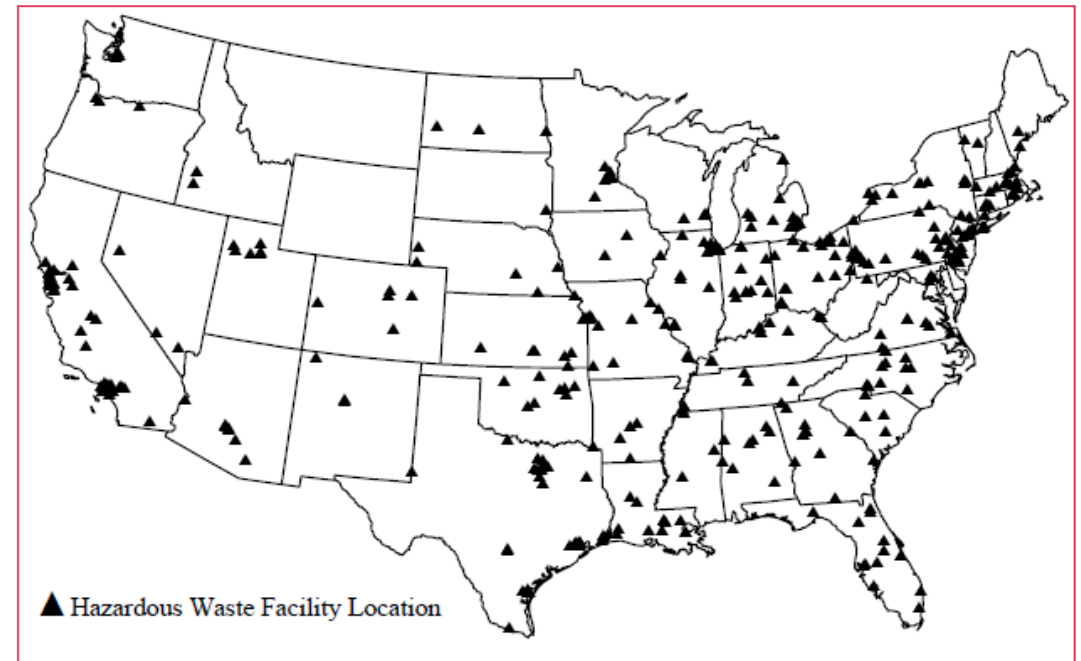
-- [U.S. Environmental Protection Agency](#)

Toxic Wastes and Race at Twenty 1987—2007

**A Report Prepared for the
United Church of Christ
Justice & Witness Ministries**

Many studies established correlation between differential potential exposure and presence of low-income and minority populations.

Follow-up to Toxic Wastes and Race showed EJ concerns still prevalent.



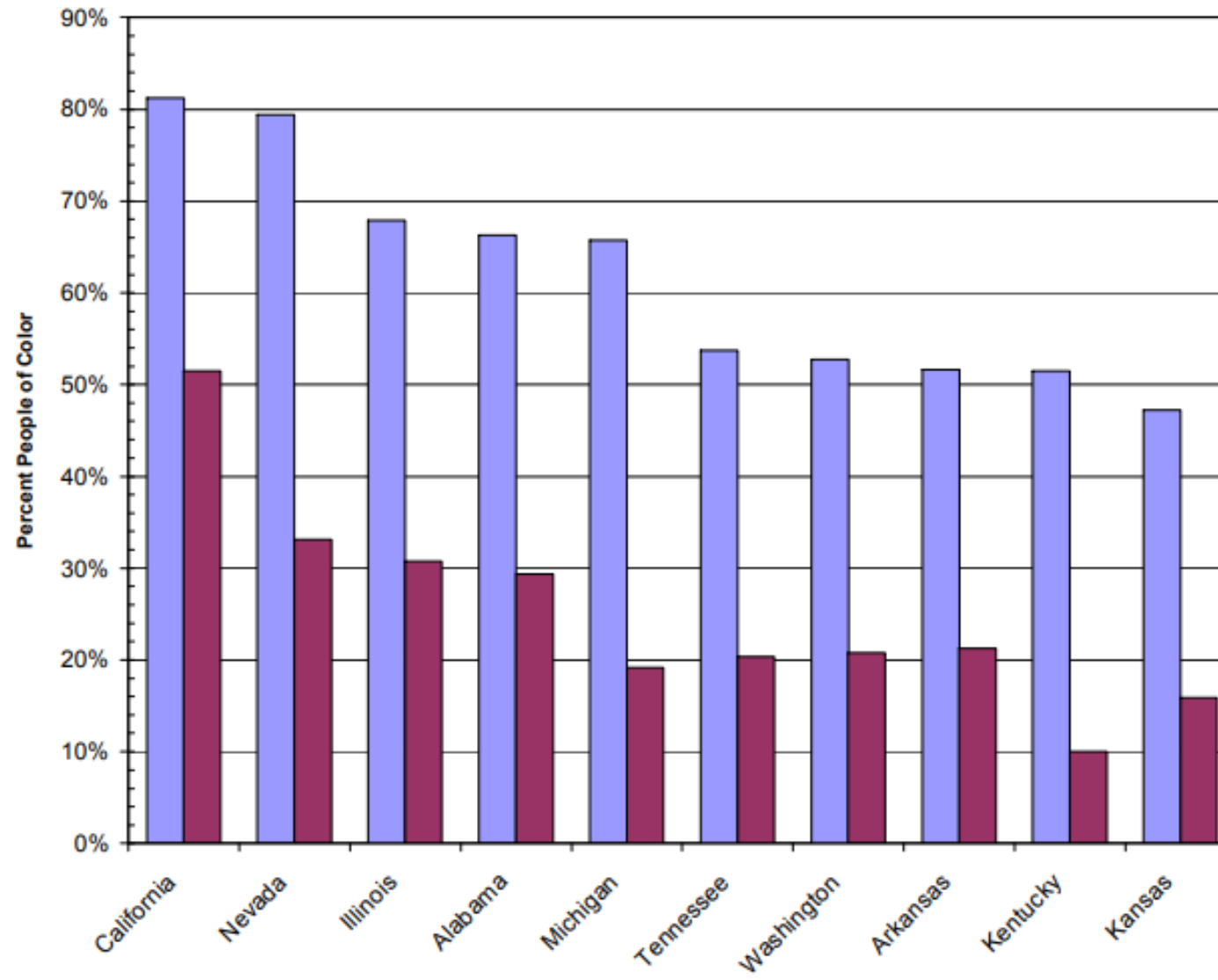
[Link to the full report.](#)

Table 4.1 – Racial and Socioeconomic Disparities between Host Neighborhoods and Non-Host Areas for the Nation's 413 Commercial Hazardous Waste Facilities (1990 and 2000 Census)

	2000				1990			
	Host	Non-Host	Diff.	Ratio	Host	Non-Host	Diff.	Ratio
Population								
Total Pop. (1000s)	9,222	272,200	-262,979	0.03	8,673	240,037	-231,364	0.04
Population Density	870	29.7	840	29.0	820	25.1	790	27.3
Race/Ethnicity								
% People of Color	55.9%	30.0%	25.9%	1.86	46.2%	23.4%	22.8%	1.97
% African American	20.0%	11.9%	8.0%	1.67	20.4%	11.7%	8.7%	1.74
% Hispanic or Latino	27.0%	12.0%	15.0%	2.25	20.7%	8.4%	12.3%	2.47
% Asian/Pac. Is.	6.7%	3.6%	3.0%	1.83	5.3%	2.8%	2.5%	1.88
% Native American	0.7%	0.9%	-0.2%	0.77	0.6%	0.8%	-0.3%	0.68
Socioeconomics								
Poverty Rate	18.3%	12.2%	6.1%	1.50	18.5%	12.9%	5.6%	1.43
Mean Household Income	\$48,234	\$56,912	-\$8,678	0.85	\$33,115	\$38,639	-\$5,524	0.86

[Link to the full report](#), which includes another timeline of EJ milestones.

Figure 4.3 – States with the 10 Largest Differences in People of Color Percentages between Host Neighborhoods and Non-Host Areas



[Link to the full report.](#)

EJ Internationally

Differential exposure to nuisance pollution has been established as a stylized fact across many pollutant types, EJ groups of concern, and localities.

EJ concerns have been studied in many other contexts including India ([Kopas et al., 2020](#)), Italy ([Germani et al., 2014](#)), and New Zealand ([Pearce et al., 2006](#)).

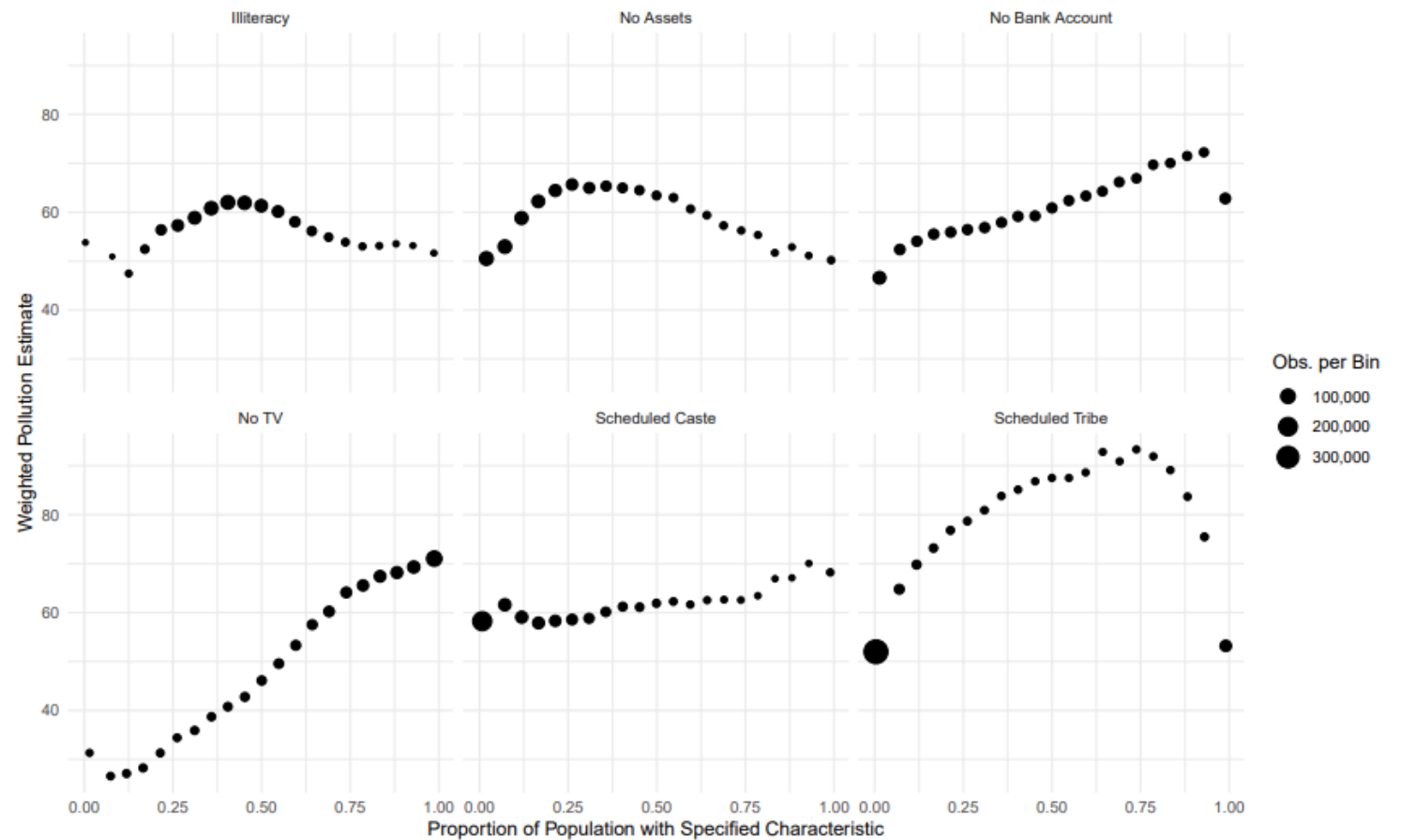


Figure 4: **Pollution Outcomes by Socioeconomic Characteristics.** Plot shows average pollution measures within groups binned by proportion of the population with the characteristic indicated by the panel label.

Part 2: Sources of Environmental Inequality

Possible Explanations

Many non-exclusive sources of environmental justice concerns:

1. Disproportionate siting by firms
2. Coming to or fleeing pollution by households
3. Market coordination of firms and households
4. Discriminatory policies and/or enforcement
5. Intergenerational transmission

1. Disproportionate Siting

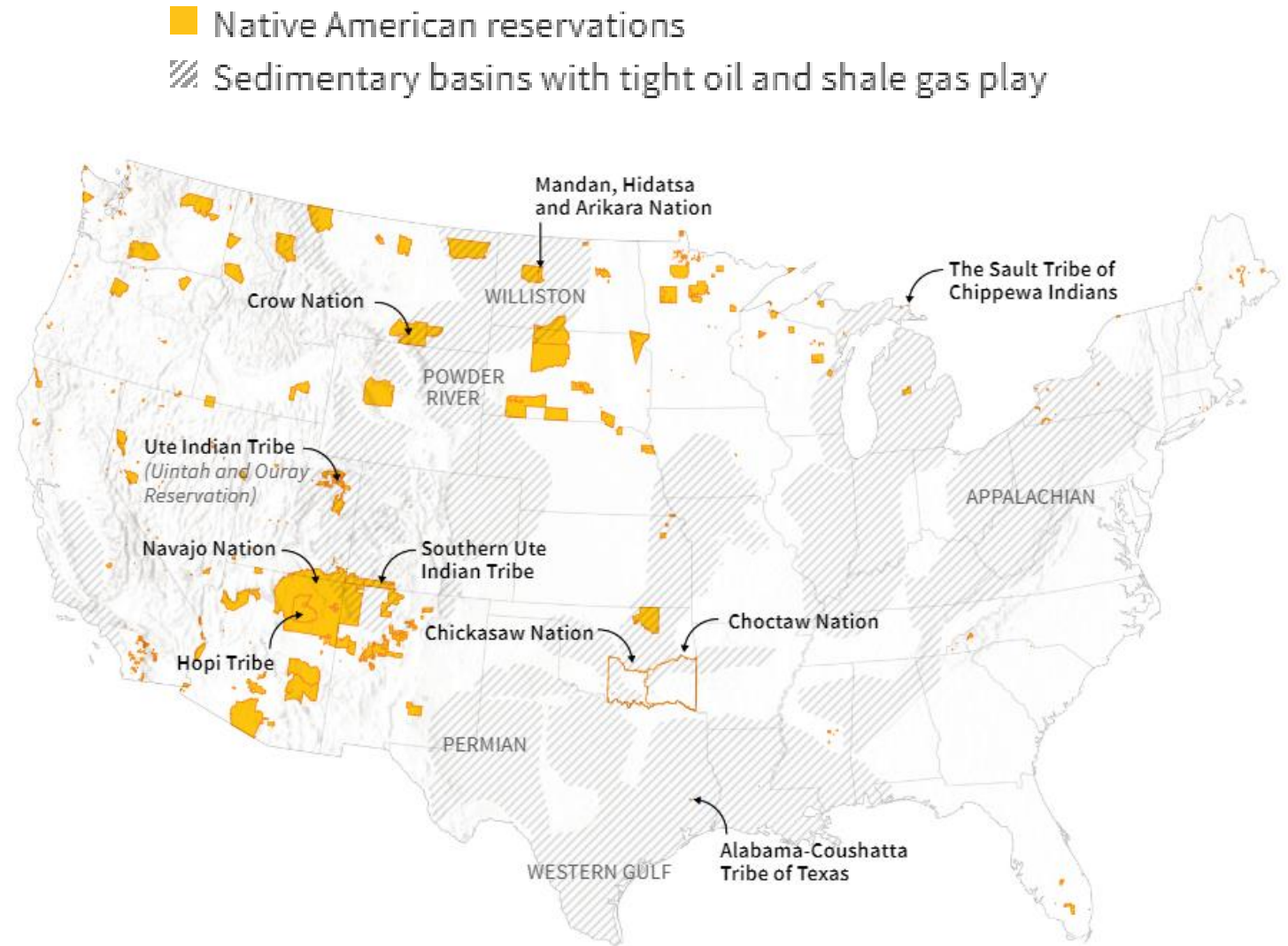
Some possible explanations for differential siting behavior of polluting firms in neighborhoods of lower income and/or with more people of color.

- Internal Colonialism
- Discriminatory siting behavior
- Firms select locations based on local economic conditions such as inexpensive land, low-wage labor, or transportation networks.
- Government permitting decisions may steer firms to certain regions

Internal Colonialism

Tribal reservations are 2% of US land but have:

- 30% of coal west of the Mississippi
- 50% of all uranium
- 20% of oil and shale natural gas



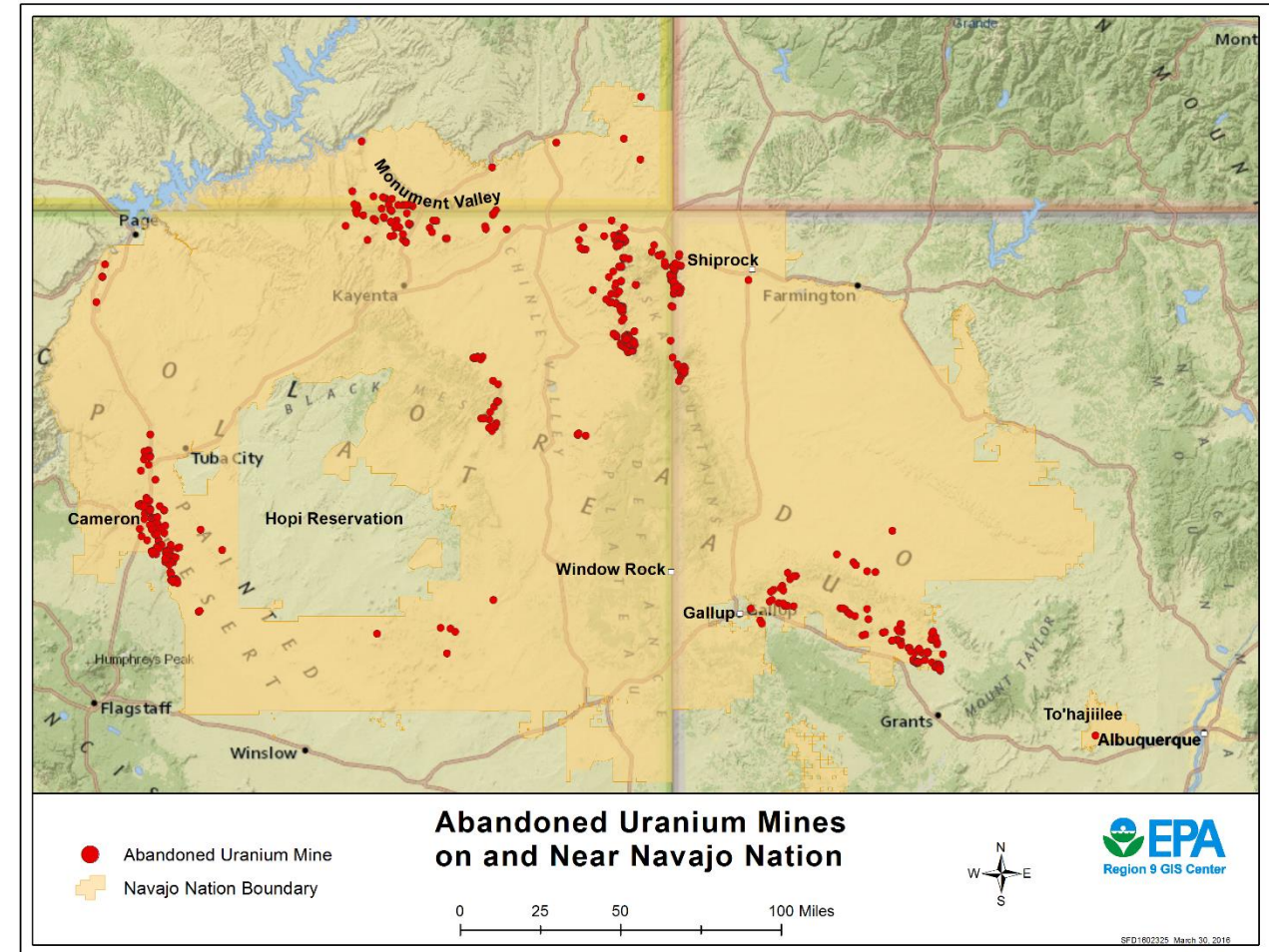
Source: [Reuters \(2017\)](#).

Internal Colonialism

Ongoing concerns, but legacy pollution from extraction is still relevant.

Uranium extraction on Navajo nation alone left over 1,000 abandoned uranium mines.

Spent nuclear fuel and [weapons testing near Skull Valley Goshute reservation](#).



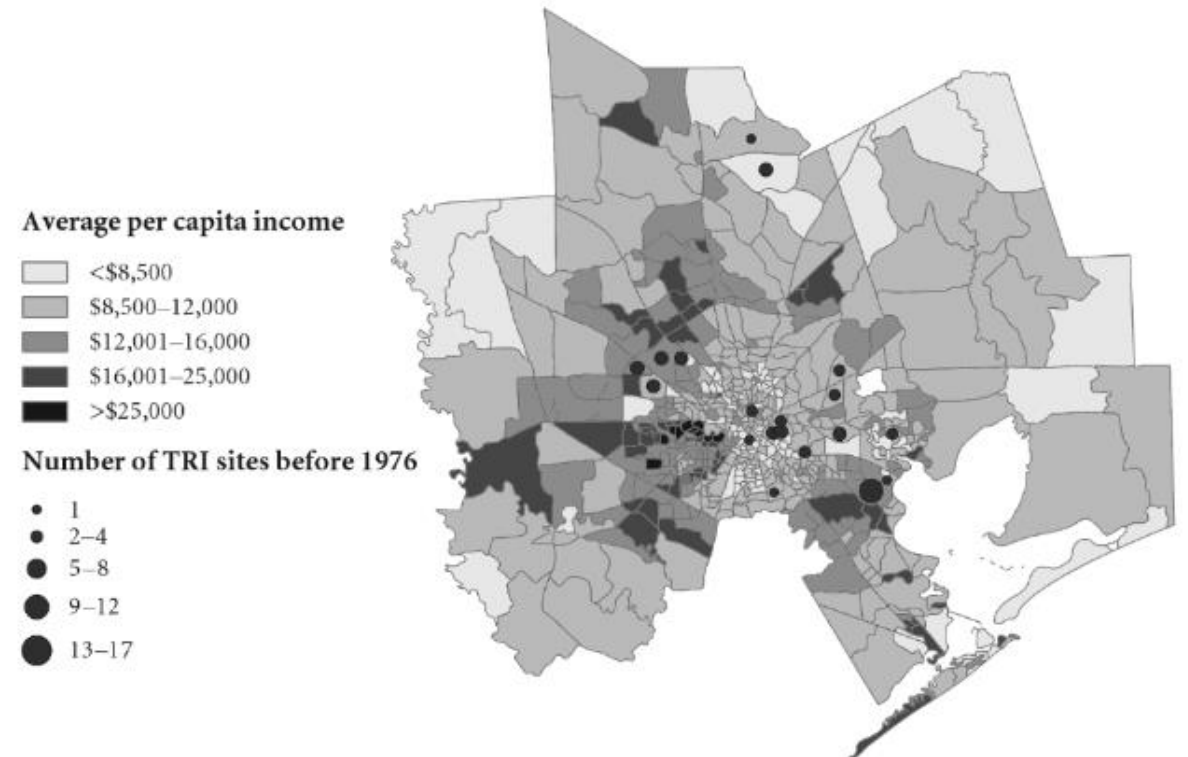
Source: [EPA \(2016\)](#).

Wolverton (2009)

Research Questions:

- Are correlations between firm location decisions and demographics robust to using demographics at the time of siting?
- How do local economic conditions affect firm siting decisions?

Methods: Predict location of TRI sites in Houston and Dallas census tracts given demographic characteristics near the facility at the time the facility was sited.



Source: [The Political Economy of Environmental Justice \(2012\)](#)

Wolverton (2009)

Table 1: Logit Regressions Using All TRI Plants and 1990 Socioeconomic Characteristics

Variable	Goldman and Fitton	Davidson and Anderton	Kriesel et al
	Coefficient Estimates		
CONSTANT	5.78 ***	-2.63 ***	-6.14 **
NONWHT (percent nonwhite residents)	0.49 **	0.59 **	0.44 *
FOREIGN (percent foreign residents)	1.44 **	1.29 **	1.09 *
POVERTY (percent persons living in poverty)	-2.19 ***	0.25	0.45
LNINCOME (log of median household income)	-0.73 ***		
URBAN (percent persons living in urbanized area)	-0.35 **		
HIGHSCH (percent with high school degrees)		1.67 **	1.60 **
LNVALUE (log of average housing value – owner occupied)		-0.05 **	-0.05 **

Findings:

1) TRI site location is strongly correlated with *current* demographics.

Wolverton (2009)

Findings:

2) TRI site location not significantly correlated with % non-white *at the time of siting*.

Still negatively correlated with income.

Table 3: Conditional Logit Estimation – 50 choices

Variable	(1)	(2)	(3)	(4)	(5)	(6)
	Davidson and Anderton	Kriesel et. al	Been and Gupta	Without Input Costs	With Input Costs	With Input Costs
NONWHT	-0.03 (0.28)	0.09 (0.28)	-0.12 (0.28)	-0.28 (0.29)	0.52 (0.33)	0.44 (0.28)
FOREIGN	0.25 (0.80)	-0.46 (0.85)	0.08 (0.83)	-0.16 (1.02)	0.46 (0.97)	1.20 (1.02)
INCOME			-0.23 *** (0.06)	-0.21 *** (0.05)	-0.16 *** (0.06)	-0.21 *** (0.06)
POVERTY	-0.56 (0.69)	-1.83 *** (0.71)	-0.50 (0.71)	- 0.95 (0.67)	-2.21 *** (0.83)	
NOPHONE						1.10 (0.85)
HIGHSCH	1.90 *** (0.67)	1.43 ** (0.68)	1.98 *** (0.63)	2.27 *** (0.67)	0.61 (0.76)	1.74 ** (0.84)

Wolverton (2009)

Findings:

3) TRI site location strongly predicted by local economic characteristics such as wages, distance to railroad, manufacturing share of the local workforce, and pre-existing TRI sites.

Variable	(1)	(2)	(3)	(4)	(5)	(6)
	Davidson and Anderton	Kriesel et. al	Been and Gupta	Without Input Costs	With Input Costs	With Input Costs
WAGE		-0.92 *** (0.24)			-1.08 *** (0.32)	-0.93 *** (0.31)
PLANT SIZE					0.36 *** (0.08)	0.36 *** (0.08)
OLDSITE					0.27 *** (0.03)	0.26 *** (0.03)
URBAN					-1.00 *** (0.14)	-0.77 *** (0.15)
MANUF	5.27 *** (0.53)	6.03 *** (0.60)	5.95 *** (0.54)		4.11 *** (0.70)	3.89 *** (0.76)
RAIL					-0.14 ** (0.04)	-0.18 *** (0.04)
Pseudo R ²	0.05	0.05	0.06	0.03	0.18	0.19
Log L	-1,350.05	-1,342.11	-1,339.59	-1,377.86	-1,171.45	-1,155.62

2. Coming to or Fleeing the Nuisance

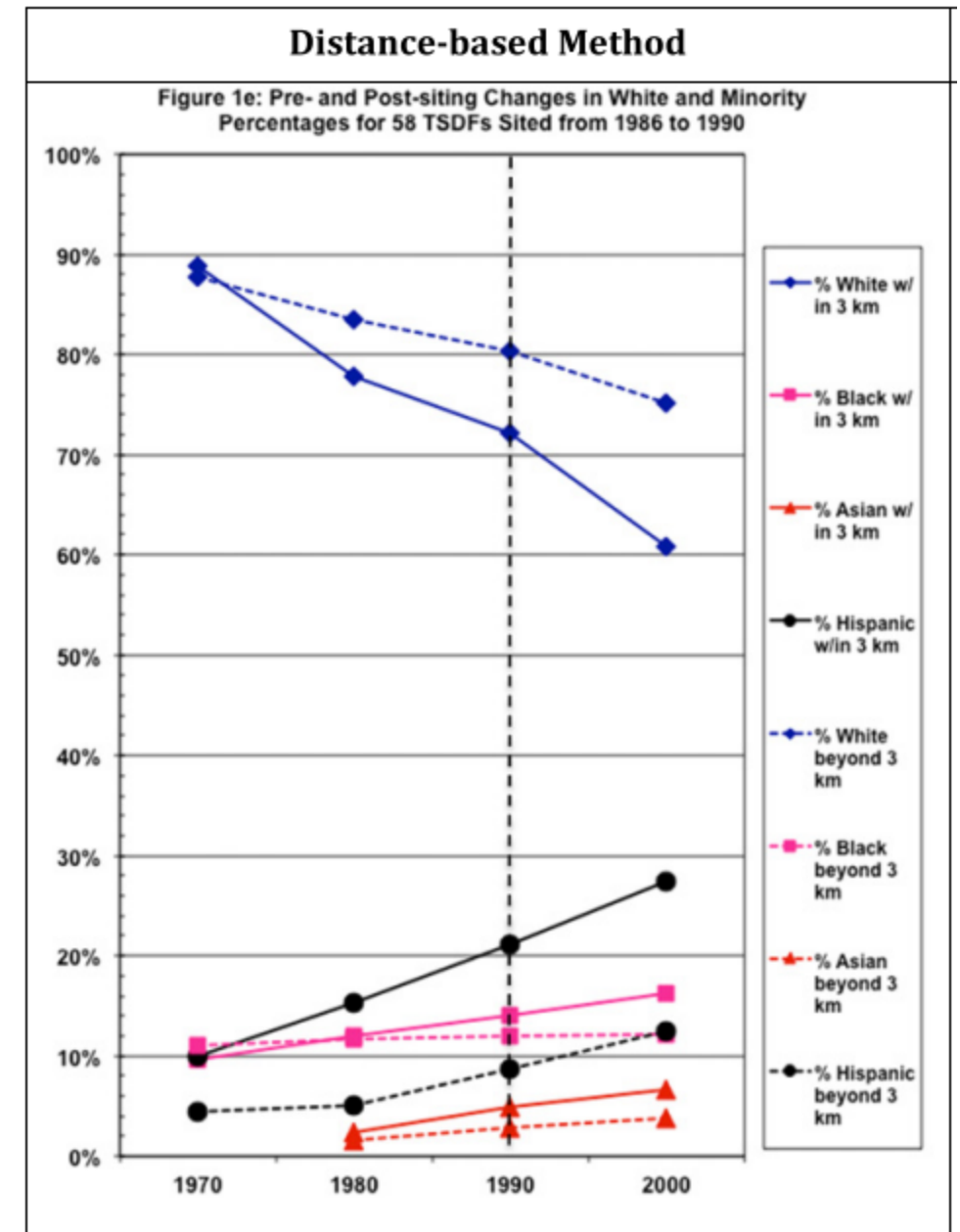
Tiebout sorting: Households move based on their willingness and ability to pay for local amenities including environmental quality.

- Households “vote with their feet” for neighborhood characteristics.
- Stratification of amenity provision across income levels.
 - Areas with more amenities are more expensive, hence pricing lower income individuals out of the community.
 - Areas with worse pollution are cheaper, hence attracting lower-income renters.

Evidence for Tiebout Sorting

Some evidence that new siting of polluting firms \downarrow %white and \uparrow %minority:

- [Mohai and Saha \(2015\)](#) look at demographics before and after siting of hazardous waste treatment, storage, and disposal facilities.



More Evidence for Tiebout Sorting

Effects to changes in local pollution:

- [Banzhaf and Walsh \(2007\)](#): changes in the emissions of toxic air pollutants in California associated with emigration of high-income households and immigration of low-income households.
- [Gamper-Rabindran and Timmins \(2011\)](#) offer further evidence on the effect of Superfund site cleanups.

Gamper-Rabindran and Timmins (2011)

Using restricted-use census data that allows summarizing characteristics of households before and after cleanup.

- More owner occupied.
- Higher income and college educated.
- Greater housing density.

TABLE 1—THE EFFECT OF CHANGES IN EXPOSURE TO HAZARDOUS WASTE SITES PROPOSED, LISTED, AND DELETED FROM THE NPL ON CHANGES IN NEIGHBORHOOD COMPOSITION BETWEEN 1990 AND 2000

	Mean [SD]	Counts of sites within 3 km		
		Proposed	Listed	Deleted
<i>Panel A. Housing supply and population</i>				
Population density (1,000 people per km ²)	2.911 [4.181]	0.265** (0.116)	0.437*** (0.083)	0.533*** (0.092)
Housing unit density (1,000 units per km ²)	1.182 [2.15]	0.070 (0.047)	0.143*** (0.037)	0.199*** (0.044)
<i>Panel B. House prices</i>				
Median house price (\$10,000)	7.034 [4.816]	−0.847*** (0.175)	0.825*** (0.130)	1.690*** (0.148)
<i>Panel C. Income and educational attainment</i>				
Mean HH income (\$1,000)	37.9 [1.6]	−0.426 (0.774)	5.842*** (0.685)	10.02*** (0.759)
Share HH below poverty line	0.127 [0.117]	−0.001 (0.006)	−0.018*** (0.005)	−0.028*** (0.006)
Share HH with public assistance	0.078 [0.072]	−0.007*** (0.002)	−0.019*** (0.002)	−0.037*** (0.002)
Share college educated	0.185 [0.131]	−0.005 (0.004)	0.039*** (0.004)	0.057*** (0.004)
Share high school dropout	0.253 [0.128]	−0.023*** (0.005)	−0.041*** (0.005)	−0.071*** (0.005)
<i>Panel D. Demographics</i>				
Share black	0.118 [0.226]	0.022*** (0.002)	0.013*** (0.002)	0.030*** (0.002)
Share Hispanic	0.054 [0.105]	0.063*** (0.004)	0.106*** (0.003)	0.173*** (0.004)
Share female headed HH	0.237 [0.160]	0.012*** (0.003)	0.017*** (0.003)	0.030*** (0.003)
<i>Panel E. Housing unit characteristics</i>				
Share occupied units	0.922 [0.067]	0.004** (0.002)	0.011*** (0.002)	0.012*** (0.002)
Share owner occupied units	0.661 [0.214]	−0.011*** (0.003)	0.016*** (0.002)	0.024*** (0.003)
Share mobile homes	0.064 [0.114]	−0.005*** (0.001)	−0.009*** (0.001)	−0.015*** (0.001)

Environmental Gentrification

[Gamper-Rabindran and Timmins \(2011\)](#) suggest that that environmental quality changes may lead to more than coming to the nuisance or emigrating to cleaner areas.

Environmental improvements → environmental gentrification.

- Rising property values, renovation, conversion from rental to owner-occupied, population turnover, provision of other services.
- Residents are priced out.

Environmental Gentrification

[Qiang, Timmins, and Wang \(2021\)](#) study
LA using the Family and Neighborhood
Survey.

Probit model: how do housing value
increases in LA >10% from 2000-2006
increase the likelihood of out-migration
by renters?

Move	(1) Housing Price
Gentrification	-0.337** (0.161)
Gentrification×Renter	0.500*** (0.190)
Renter	0.340*** (0.083)
Hispanic	0.009 (0.102)
Black	0.356*** (0.130)
Asian	-0.130 (0.161)
Kids	0.277*** (0.099)
Age	-0.016*** (0.013)
Education	0.014 (0.009)
Income	-0.016 (0.013)
constant	0.294 (0.256)

Environmental Gentrification

[Qiang, Timmins, and Wang \(2021\)](#) also show where displaced renters move.

Table 10: SUR Results for Amenity Choices among Movers

Dependent Variable	Increase in Housing Price	Increase in Pollution	Increase in School Quality	Increase in Crime Rate
Gentrification	28.246 (19.408)	-16.219 (16.471)	2.905 (1.905)	-1.384 (1.628)
Gentrification × Renter	-33.845* (20.275)	17.316 (17.207)	-4.228** (1.991)	3.156* (1.700)

Tiebout Sorting

Housing sorting behavior:

- Evidence for coming to the nuisance and fleeing the nuisance.
- Cleanup has been linked to environmental gentrification.

Welfare implications for EJ communities?

- Less pollution is a welfare improvement, but could be negated if low-income households are priced out and move to more polluted regions.
- Contextual factors complicate efficiency considerations of sorting.
Hysteresis, steering, housing discrimination, etc.

3. Coasean Bargaining

1. Communities may be willing to accept some pollution exposure in exchange for benefits of local employment, investments in the community, gifts, etc.
2. Communities may also prevent facilities from polluting through protest, legal actions, local government decisions, etc.

Implication: It is efficient to site firms in poorer communities because lower WTA for pollution exposure, lower WTP for jobs and development.

➤ Giving rights over pollution to communities → environmental justice?

Two Sides of Coasean Bargaining

Giving rights over pollution to communities → environmental justice?

- Prohibiting polluting firms from siting in minority or low-income communities denies the benefits of economic development. This precludes meaningful involvement (*procedural justice*, EJ Principles 5 and 7).
 - Procedural justice ≠ distributive justice
- Jobs and economic development do not always flow to lower-income individuals within the community, property rights over pollution may not belong to less-advantaged individuals within a community, and language barriers or institutional factors may prevent meaningful involvement in the process.

Evidence from Fracking Lease Negotiations

[Timmins and Vessing \(2022\)](#) ask how private lease negotiations for hydraulic fracturing wells vary with measures of wealth, race, ethnicity, and language.

Failure to negotiate protections in leases leads to increased risk of drilling violations. Suggests a “breakdown of efficient Coasian bargaining.”

Table 12

Coase seemingly unrelated regressions with U.S. Census tract FE & BISG predi

(a) Part I	Royalty	Term Length	Environ.
Pred. Black (%)	−0.002*** (0.000)	−0.046 (0.173)	−0.018*** (0.007)
Pred. Asian (%)	−0.000 (0.000)	0.129 (0.144)	0.004 (0.007)
Pred. Hispanic (%)	−0.001* (0.000)	0.630*** (0.140)	−0.006 (0.006)
Pred. Hispanic x % Spanish Speaking	−0.006*** (0.002)	0.943 (0.664)	−0.137*** (0.022)

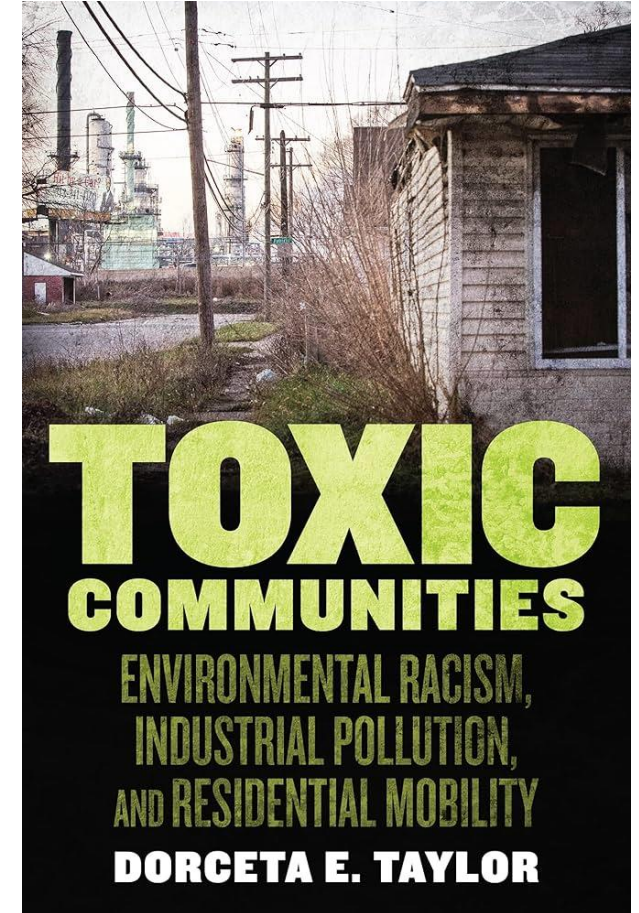
4. Discriminatory Policies and Enforcement

Previously covered some examples in class:

- Steering behaviors and discrimination in the housing market.

More examples:

- Zoning practices
- Housing covenants
- Expulsive urban renewal
- Longer time to return to compliance in SDWA violations (*will cover in module 4*)



[Recommended reading to learn more.](#)

Discriminatory Zoning

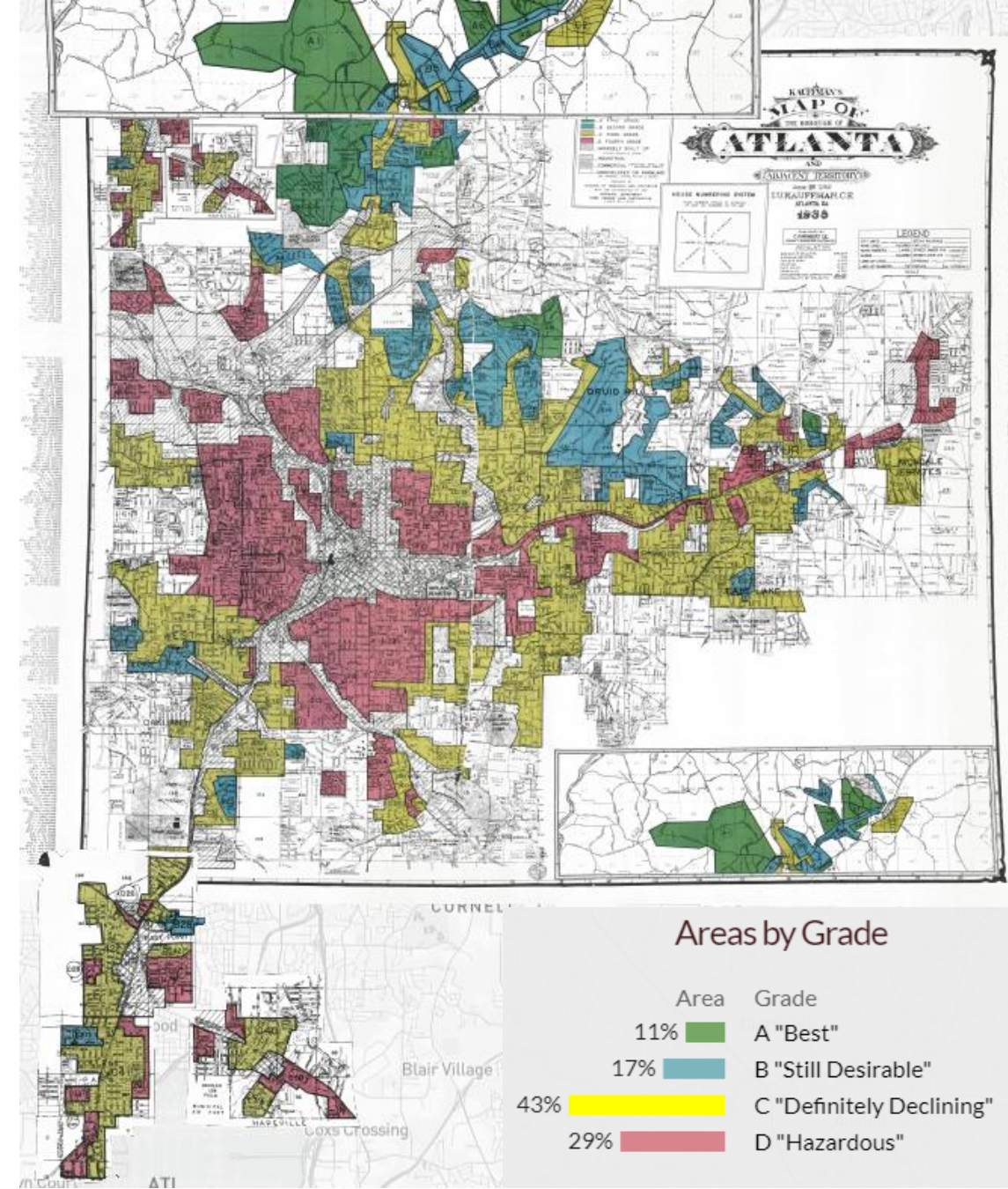
Zoning practices are rules on the use of land. They establish parking lot requirements, building heights, housing types, etc.

- Zoning rules define where polluting facilities can legally operate.
- In the US, zoning laws were also used to create and enforce housing segregation.
- Redlining practices, encouraged by the Federal Housing Administration, were underwriting criteria for mortgages. Criteria were explicitly based on race and environmental hazards.

Redlining in Atlanta

Redlined areas often correspond to segregated zones with greater minority share and more pollution.

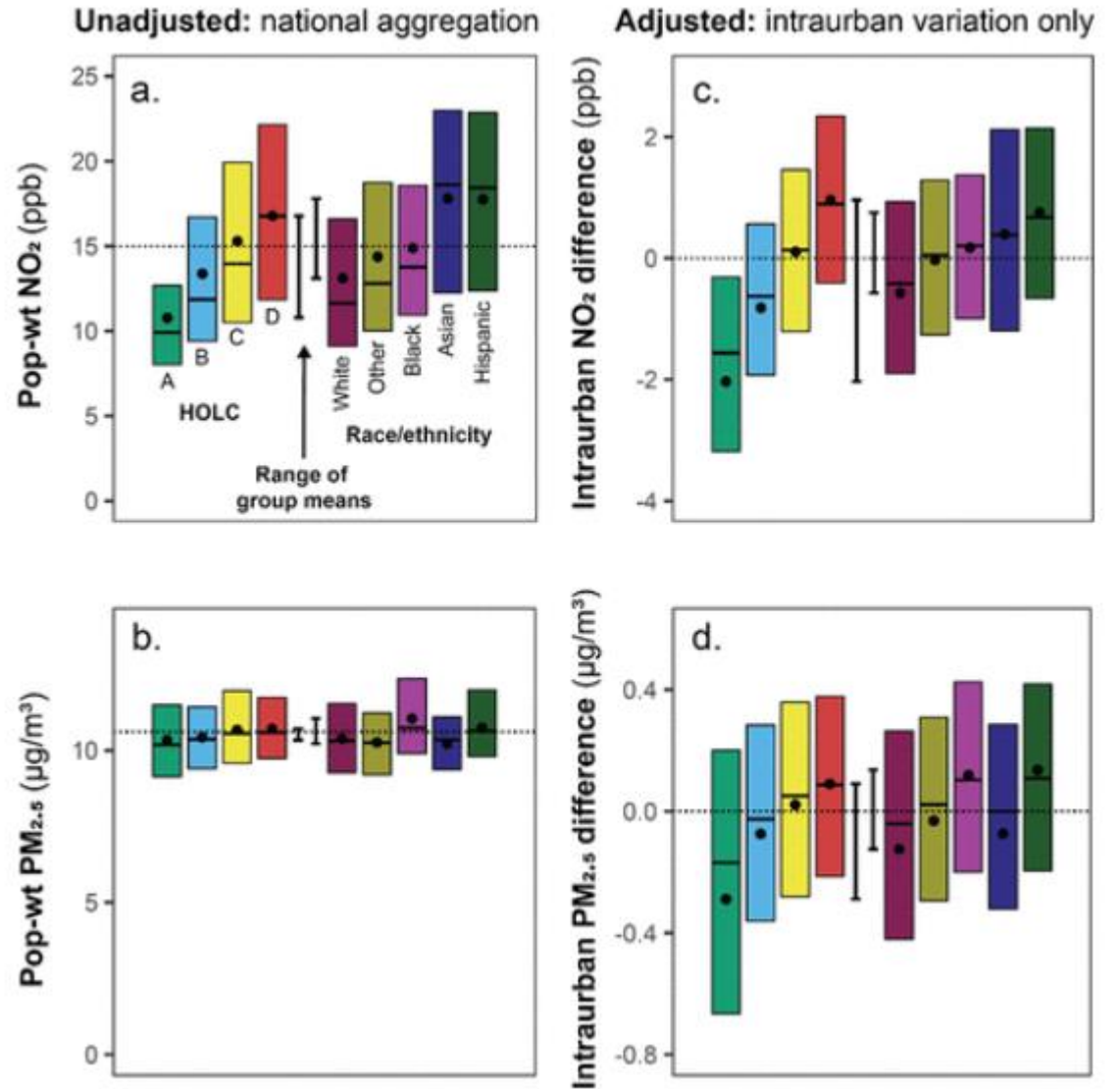
- Minority neighborhoods pay a premium for access to credit or don't receive it at all.
- Less investment led to food deserts, lack of healthcare access, and disinvestment.
- Contributed to the race wealth gap.
- See "[Mapping Inequality...](#)" for other cities.



Effects of Redlining Today

Redlining created persistent gaps in air pollution exposure that are still evident today.

- Figure displays exposure differentials in 202 redlined cities with population of 45 million.



Source: [Lane, Morello-Frosch, Marshall, Apte \(2022\)](#).

Housing Covenants

Housing covenants were house- or neighborhood-level agreements not to sell homes to specific minority groups.

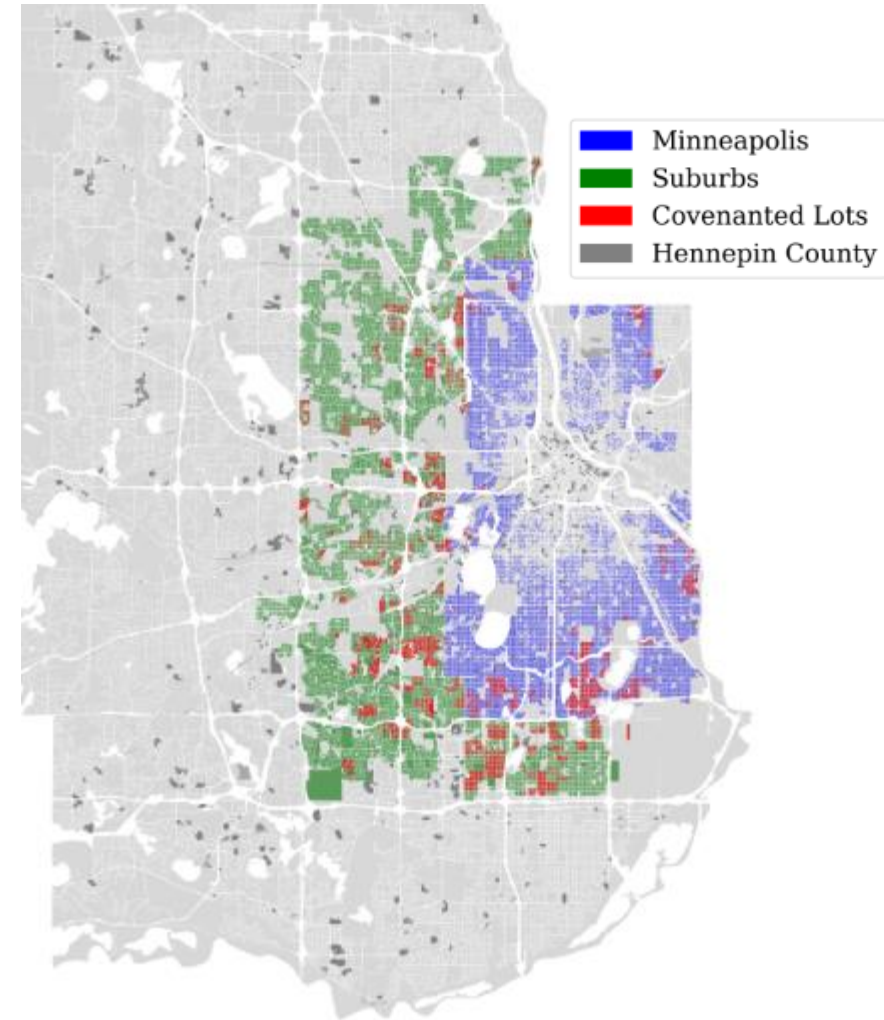
- Limited potential for people of color to flee the nuisance to newer homes constructed away from industrial zones.
- [Lorraine Hansberry](#) and [George Bush's](#) experiences with racial housing covenants.



Long-term Impact

Using 120,000 properties in Minnesota, [Sood et al. \(2021\)](#) find that:

- Covenanted houses in 1948 have 3.4% higher *present* values.
- Census blocks with 1% increase in covenanted homes in a census block reduces current % Black by 14% and Black homeownership by 19%.



Expulsive Urban Renewal

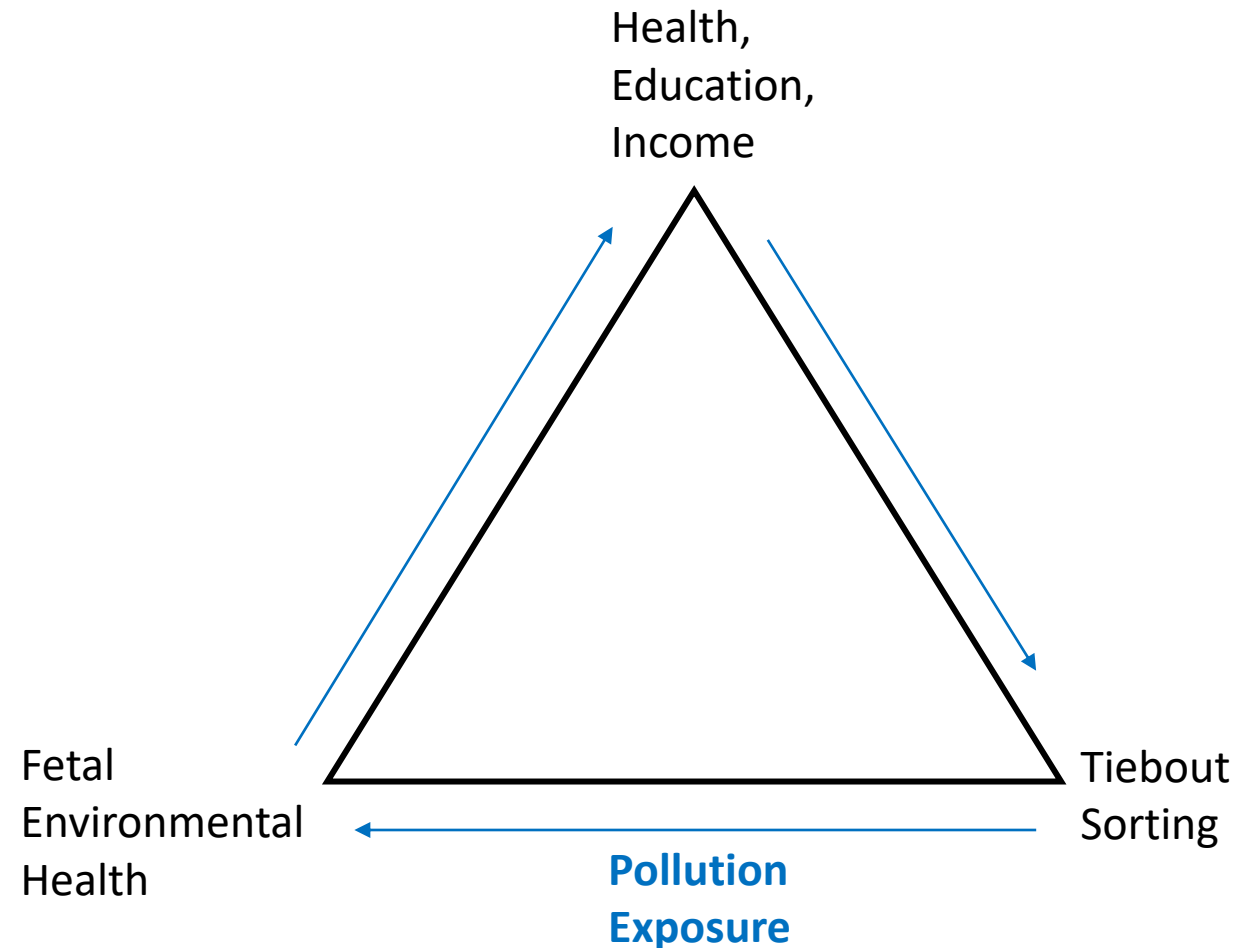
Eminent domain takes private property for public use in exchange for just compensation.

- Eminent domain, urban renewal, and urban planning differentially target properties inhabited by people of color.
- Of 2,500 cases of eminent domain in 992 cities from 1949 to 1973, one million people were displaced and two thirds were Black ([Fullilove, 2015](#)).
- In combination with zoning, redlining, housing covenants, and hysteresis, limits options for escaping pollution.

5. Intergenerational Transmission

The **fetal origins hypothesis** suggests that pollution exposure in utero has lifelong effects on physical health, educational attainment, and income.

- [Almond and Currie, “Killing me Softly: The Fetal Origins Hypothesis” \(2011\)](#) overview.
- [Follow-up in 2018](#) with more evidence.



Concluding Remarks

From an economics and EJ perspective, important to disentangle causes to determine policy implications, but often current causes are not easily separable from past causes.

Even with good causal inference, equity/efficiency trade-offs often remain:

- Differential sorting might imply economic efficiency if equal access and no discrimination.
 - Environmental gentrification, red-lining, housing covenants, steering, and hysteresis.
- Differential siting might imply economic efficiency if meaningful community involvement and fair negotiations.
 - Internal colonialism, firm enticement and manipulation, bargaining power, and coordination problem.

Next class

No class on Monday, October 9th.

Next Wednesday we will cover how to conduct an EJ analysis and walk through some examples. I will post your case study assignment in the next few days.

Readings for Wednesday:

- [Andarge et al. \(2023\)](#)
- *(optional)* [EJ Technical Guidance Ch. 2-4](#)