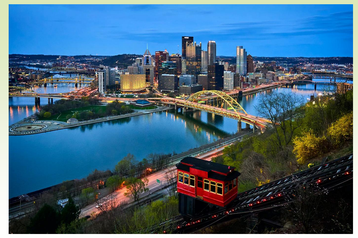
Greening the Steel City: Testing for Environmental Gentrification in Allegheny County, PA

Gregory Mitchell, MS



Research Question

Did the cleanup of the EPA's Toxic Release Inventory (TRI) facilities lead to the displacement of Black households in Allegheny County, PA from 1990-2010?

Abstract

Improvements in environmental quality are generally seen as an absolute positive, and there is rarely a consideration for the possibility that these improvements could lead to inequitable outcomes. However, there is a growing body of evidence to suggest that the benefits of environmental improvements are not distributed equally. Environmental, green, or ecological gentrification is the process whereby improvements in local environmental quality—such as through new green spaces or the cleanup of a locally undesirable land use (LULU)—cause or exacerbate gentrifying processes.

This paper investigates the following question: did the cleanup of the EPA's Toxic Release Inventory (TRI) facilities lead to the displacement of Black households in Allegheny County, PA from 1990-2010? Using a differences-in-differences design, this paper measures the effect of environmental cleanups in Allegheny County, PA on neighborhoods' racial composition. Specifically, by tracking the cleanup of the TRI facilities, this paper finds evidence of racialized displacement in Allegheny County from 1990-2010.

The complete removal of all TRI facilities in a neighborhood was associated with a statistically significant 1.1 percentage point decrease in the growth rate of Black households and a 1.1 percentage point increase in the growth rate of white households. In comparison, the average community in Allegheny County experienced only a 0.6 percentage point increase in the growth rate of Black households. Relative to the marginal changes in racial composition across Allegheny County, the estimated effect of environmental cleanups on Black households is notable.

Overall, there is a lack of literature focused on the negative consequences of environmental improvements, and there is even less research focused on the effects for communities of color. As planners and practitioners rightfully work to create more environmentally sustainable cities, it is important that we continue to keep an eye towards equity to ensure that everyone can benefit from cleaner, greener cities.

Keywords

Sustainability; Environmental Justice; Gentrification; Tiebout Sorting

What is environmental gentrification?

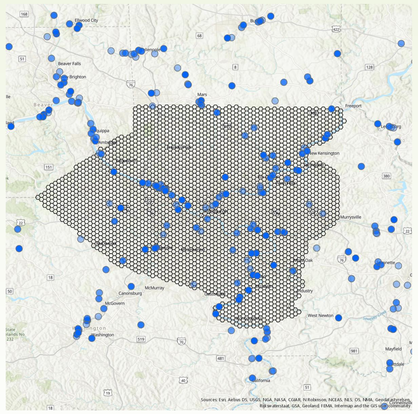
Environmental gentrification is the process by which improvements in environmental quality, including, but not limited to "cleanup[s] and [the] reuse of undesirable land uses make a neighborhood more attractive and drive up real estate prices" (Curran and Hamilton, 2012; Kern, 2014). Environmental, green, or ecological gentrification, more specifically, happens when an improvement in local environmental amenities—such as, large green development projects (LGDP), the cleanup of a locally undesirable land use (LULU), or increases in sustainability capital (McClintock, 2018)—either cause or exacerbate gentrification (Rigolon & Németh, 2018; Gould & Lewis, 2017).

Toxic Release Inventory

The EPA's Toxic Release Inventory (TRI) is a program that tracks the pollution of certain chemicals released from industrial activities in the United States, and has done so since 1987 (EPA, 2019). The chemicals under consideration by the TRI program are those that have been found to be carcinogenic or have been deemed to be considerably hazardous to human and/or the environment's health (EPA, 2019). The EPA's Risk-Screening Environmental Indicators (RSEI) model is designed to assign hazard and risk weights to the chemicals under the jurisdiction of the TRI program. The hazard-weighted measure of pollution is calculated by taking the three-year lagged average of TRI data and multiplying it by RSEI's assigned toxicity weight for each chemical given its medium of release. Half-mile buffers were then created around each facility representing the area of influence.

Spatial analysis

Obtaining the correct scale of analysis is vital to studying migratory trends and the localized effects that define gentrification. Similar studies have used a number of different levels of analysis, including block groups, census tracts, and locally defined neighborhoods (Banzhaf & Walsh, 2008; Eckerd, 2011). Due to the potential issues raised by these other methods, including inconsistent geographies over time, and endogeneity and bias due to gerrymandering, this study constructs a new geographical unit as defined by quarter square mile area hexagons The hexagons, more specifically, have an approximate area of .2465 mi^2.

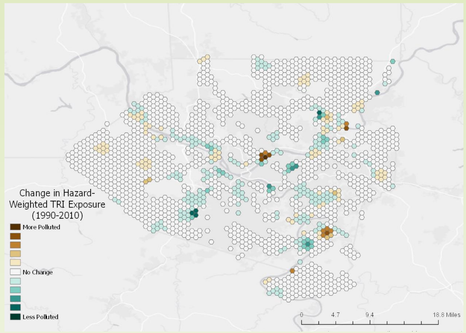


Model

i: hexagon community
t: year

$$\Delta y_{it} = \alpha_t \text{ Discrete Indicators}_{it} + \beta_t \textit{ Continuous Measures}_{it} + \delta \text{ Controls}_{it} + \varepsilon_{it}$$

Δy_{it}	Discrete Indicators$_{it}$	$\textit{Continuous Measures}_{it}$	Controls$_{it}$
Δ Population	Exposed in baseline (previous) year	Baseline Exposure	Baseline Demographic controls
Δ Avg. Population Density	Newly Exposed	Increase in Exposure	Individual fixed effects
Δ Median Income	Cleanup/No longer exposed	Decrease in Exposure	Year fixed effects
Δ Percent white			
Δ Percent black			



Results

	Baseline Exposure (2000-2010)	New Exposure (1990-2000)	New Exposure (2000-2010)	Exit/Cleanup 1990-2000	Exit/Cleanup (2000-2010)	N/ R^2
Share white	-0.025***	-0.015	-0.014*	0.011*	0.001	3430
	(0.009)	(0.016)	(0.008)	(0.007)	(0.012)	0.821
Share black	0.023***	0.027***	0.008	-0.011**	-0.002	3430
	(0.008)	(0.010)	(0.007)	(0.005)	(0.010)	0.837

* P<.1, ** p<.05, *** p<.01

Discussion

The results here regarding the effects of cleanups on racial displacement mirror the result found in Banzhaf and Walsh's discussion paper (2006), with similar levels of significance and magnitude. However, unlike Banzhaf and Walsh's 2006 discussion paper, this result provides statistically significant evidence with regard to cleanups. This presents evidence that black households experience less of the benefits of environmental cleanups or TRI firm exits than white households.

The findings here are exactly in line with the theoretical expectations from the Racial Income-Inequality Thesis. Black households, due to systematically having less access to resources, appear to move to communities with TRI exposure (either preexisting or new). In contrast, white households tend to leave communities that have preexisting exposure or gain exposure. From 1990 to 2000, white households moved into communities that experienced an environmental cleanup at the same rate that the share of black households decreased. This is the opposite of the result found in one of the few other environmental gentrification studies of this type that test for racial composition effects. Economists, Gamper-Rabindran and Timmins, found that the share of blacks and Hispanics increases following the cleanup of Superfund sites (2011). These results for the racial composition effect have been under analyzed in the literature, and these results work to fill a gap.

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Contact Information

Gregory Mitchell, MS
gmitchjunior@gmail.com