Do Shrinking Cities Allow Redevelopment without Displacement? An Analysis of Affordability Based on Housing and Transportation Costs for Redeveloping, Declining, and Stable Neighborhoods

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Abstract:

Plans and policies to combat or mitigate gentrification typically pursue affordable housing production and preservation as the primary mechanism to avoid displacement. However, as this manuscript argues, funding for subsidized housing does not produce units affordable to the poor in declining cities, limiting the efficacy of a housing-only approach. Furthermore, we find that the additional affordability challenge encountered by families living in declining neighborhoods, relative to households in stable neighborhoods of shrinking cities, stems from transportation affordability rather than from housing affordability. Moreover, transportation costs are most affordable for shrinking cities' residents living in redeveloped neighborhoods, indicating that some of the redevelopment-induced displacement commonly assumed by gentrification scholars might be mitigated through greater transportation affordability. As such, we question whether the housing-only approach is a complete one. Our results suggest that transportation improvements – particularly those aimed at bicycling and pedestrian accessibility – may be the most efficient approach to mitigating displacement and improving quality of life for low-income households in shrinking cities.

Introduction: Gentrification and Affordability in Shrinking Cities

Gentrification is typically defined as, "The process by which higher income households displace lower income residents of a neighborhood, changing the essential character and flavor of that neighborhood" (Kennedy & Leonard, 2001, 2). When discussed in the urban planning literature, gentrification is nearly synonymous with the displacement of poor and minority groups from neighborhoods where they have lived for some time (Kennedy & Leonard, 2001; Marcuse et. al., 1986; Newman & Wyly, 2006; Wyly & Hammell, 2001). While some authors (Duany, 2001; Freeman, 2005, 2006; Vigdor, 2010; Vigdor et. al., 2002) argue for a more nuanced understanding of gentrification that highlights its benefits, most researchers publishing in planning and related fields approach the issue of gentrification as one of harming low-income communities, displacing vulnerable households, and rewarding the middle and upper classes at the expense of the poor (Curran, 2007; Lees, Slater & Wyly, 2013; LeGates & Hartman, 1982; Newman & Wyly, 2006; Slater, 2011).

Plans and policies to combat or mitigate gentrification typically pursue affordable housing production and preservation as the primary mechanisms to avoid displacement (Betancur, 2002; Freeman & Braconi, 2004; Lees, 2008; Shaw, 2008; Wyly & Hammel, 1999). In most cases, the fight to build or preserve affordable housing is an ongoing one. While no city can claim to have "solved" its affordable housing problem, many cities and regions have employed inclusionary zoning, linkage programs, impact fees and other programs to produce and preserve affordable housing (Levy et. al., 2007). Other cities have implemented tax abatements or circuit breaker programs to mitigate the tax hikes that often spur displacement of low-income (particularly elderly) homeowners (Lemons, 2012;

Petrovic, 2007). Community land trusts and other cooperative housing agreements have been used in a number of cities with great success (Lawrence, 2001; Rose, 2002; Saegert & Benitez, 2005) to counter displacement.

For the most part, these policies and approaches designed to combat gentrification and preserve affordability were developed with stable or growing cities in mind. In weak market cities such as Cleveland, St. Louis, or Buffalo, gentrification has not been considered a problem until recently, as press coverage and academic work have begun to highlight an emerging hypothesis that downtown revitalization in shrinking cities is creating a loss of affordable housing (e.g., Silverman et. al., 2013). While such increases in housing costs are not occurring city-wide in weaker-market cities, it is certainly the case that, amid decline, pockets of prosperity flourish (Tighe & Ganning, 2015). While it may be the case that in shrinking cities, housing supply is more than adequate to serve not only the existing population, but an influx of people on a city-wide scale, individual neighborhoods may be experiencing gentrification in terms of increasing housing costs, constrained housing supply, and potential displacement of the poor.

The shrinking city context has been the focus of considerable recent scholarship (e.g., Großmann et al., 2012; Hollander, 2011; Hollander et al., 2009; Martinez-Fernandez et al., 2012; Pallagst, 2009; Ryan, 2012). Initially, this body of literature largely focused on techniques to implement "smart decline" strategies rather than the ad-hoc, scattered approaches common in cities struggling with declining tax bases (Hollander, 2011; Mallach, 2011; Schwartz & Hoombeek, 2009; Sousa & Pinho, 2013). Some research calls for top-down planning strategies (Leanard, 2009), while others (Hollander, 2010; Ryan, 2012) propose more grassroots approaches. Increasingly, researchers have begun to focus more

specifically on neighborhoods within shrinking cities and how there is considerable

variation among them (Tighe & Ganning, 2015; Johnson & Hollander, 2013; Mallach, 2014;

Silverman et al., 2013; Weaver & Holkamp, 2015).

Recognizing that some neighborhoods in "shrinking cities" such as Buffalo

(Silverman, 2013), St. Louis (Tighe & Ganning 2015), Detroit (Williams, 2013) and

Cleveland (Piiparinan & Russel, 2013) are experiencing losses in terms of housing

affordability, we question whether the housing-only approach is a complete one. Thus,

rather than the traditional housing-only measure, rating "affordable" as paying less than

30% of household income, we employ the housing plus transportation (henceforth H+T)

approach, which allows 45% of income to go toward housing and transportation combined.

While neighborhood redevelopment and reinvestment may increase housing costs, we

hypothesize that such costs may be offset by improvements in access to public

transportation, cycling, and walking options.

By opening up the question of affordability to a conceptualization inclusive of

both housing and transportation, we acknowledge that revitalization changes more than

just housing, that its influence on transportation costs may provide a boon to low-income

households, and that scholars have recently identified transportation costs as a legitimate

issue for overall housing affordability (Center for Neighborhood Technology, N.D). Parsing

these results and providing a more comprehensive view of "location affordability" in

shrinking cities may allow decision-makers to leverage downtown redevelopment for

social equity gains through reduced transportation costs, and identify cases where housing

cost changes exceed the transportation savings. In doing so, we anticipate that planners

and policymakers can leverage both subsidized housing dollars and transit funding more

efficiently and effectively in a way that maximizes the benefits to low-income households.
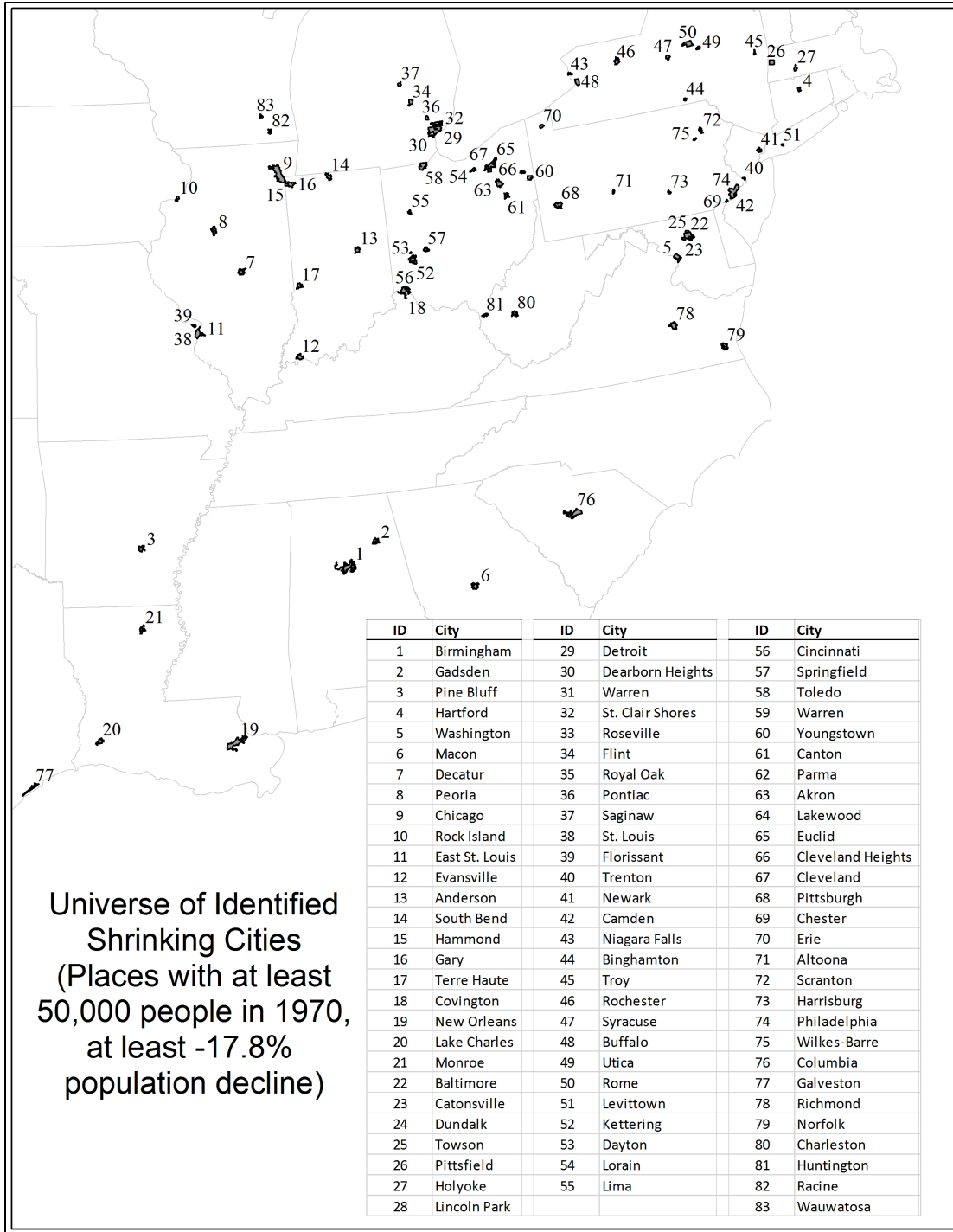
Approach

The Location Affordability Index (LAI) published by the Department of Housing and Urban Development (HUD) was established to estimate the total affordability for different income levels for every block group in the U.S., taking into account both housing and transportation costs. We analyze the block groups in a sample of 83 shrinking cities to determine whether neighborhood-level redevelopment in shrinking cities may support, rather than diminish, affordability when it is assessed as the costs of housing and transportation combined, rather than housing alone.

On the housing side of the equation, recent research shows that in weak market cities, excess real estate supply prior to downtown redevelopment is able to absorb new demand without displacing arts-based employment, an industry traditionally vulnerable to gentrification (Ganning 2015). It stands to reason, then, that adequate supplies of affordable housing might remain as well. On the transportation side of this equation, redevelopment often includes employment growth, which can reduce or eliminate commuting costs in surrounding neighborhoods. Neighborhood-level investments also often pay for safety and public space upgrades that, among other things, facilitate walking and biking. Increased neighborhood density can also provide the necessary population to support public transportation improvements. We thus hypothesize that the transportation savings realized through redevelopment may improve affordability conditions for neighborhood residents.

The sample for this paper was drawn from Ganning, Tighe & Buchart (forthcoming). Following the logic argued in that paper, we selected cities with at least 50,000 people in 1970 that lost at least 17.8% population by 2010, keeping boundaries fixed as they were in 1980[1]. The 17.8% reflects the average population decline threshold that resulted in losses in occupied housing units over that time. The number is so large due to demographic shifts nationally that resulted in a lower average household size—a number which changed drastically from 1970 through 2000, but which is changing very slowly today. The westernmost city is Galveston, Texas; the majority are in or near the Rust Belt (Figure 1).

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[1] No 1970 place-level boundary exists. For a full analysis of implications, see Ganning, Tighe & Buchart (forthcoming).

ID	City		ID	City		ID	City
1	Birmingham		29	Detroit		56	Cincinnati
2	Gadsden		30	Dearborn Heights		57	Springfield
3	Pine Bluff		31	Warren		58	Toledo
4	Hartford		32	St. Clair Shores		59	Warren
5	Washington		33	Roseville		60	Youngstown
6	Macon		34	Flint		61	Canton
7	Decatur		35	Royal Oak		62	Parma
8	Peoria		36	Pontiac		63	Akron
9	Chicago		37	Saginaw		64	Lakewood
10	Rock Island		38	St. Louis		65	Euclid
11	East St. Louis		39	Florissant		66	Cleveland Heights
12	Evansville		40	Trenton		67	Cleveland
13	Anderson		41	Newark		68	Pittsburgh
14	South Bend		42	Camden		69	Chester
15	Hammond		43	Niagara Falls		70	Erie
16	Gary		44	Binghamton		71	Altoona
17	Terre Haute		45	Troy		72	Scranton
18	Covington		46	Rochester		73	Harrisburg
19	New Orleans		47	Syracuse		74	Philadelphia
20	Lake Charles		48	Buffalo		75	Wilkes-Barre
21	Monroe		49	Utica		76	Columbia
22	Baltimore		50	Rome		77	Galveston
23	Catonsville		51	Levittown		78	Richmond
24	Dundalk		52	Kettering		79	Norfolk
25	Towson		53	Dayton		80	Charleston
26	Pittsfield		54	Lorain		81	Huntington
27	Holyoke		55	Lima		82	Racine
28	Lincoln Park					83	Wauwatosa

Universe of Identified Shrinking Cities (Places with at least 50,000 people in 1970, at least -17.8% population decline)

To study the effects of redevelopment on H+T affordability in shrinking cities, we had to first identify neighborhoods undergoing redevelopment. Importantly, we chose to focus on neighborhoods rather than downtowns (as Silverman et al. (2013) does) due to

our inability to systematically identify downtowns. To measure change in neighborhoods, we created a Redevelopment Index, which is the average of the standardized values of population change (2000-2010) and employment change (2002-2010) at the block group level for all 2010 block groups whose centroid falls within the 1980 boundary of our sample of 83 cities.

To calculate the population change component of the Index, we apportioned 2000 block-level population data to the 2010 block group boundaries, then calculated population change, and standardized the values to z-scores. The employment change sub-index was calculated using the Census Bureau's Longitudinal Employer-Household Dynamics (LEHD) program's database. Importantly, Massachusetts does not participate in the LEHD program, which removes Pittsfield and Holyoke from our sample. Also, the initial year of data for all states in our sample is 2002, except Arkansas, which is 2003. To accommodate this issue, while retaining data covering the fullest extent possible of the decade, we calculated block group-level employment change as $(E_{t1}-E_{t0})/\Delta t$, where E=employment, t1=final year of employment data, t0=initial year of employment data. Normally the Average Annual Rate of Change (AARC) would be preferable, but it works best with non-negative values, which is not the context of employment data in shrinking cities. As in the case of population change, the values were standardized into z-scores. The Redevelopment Index is a simple average of the two sub-indices, calculated for each block group in our 81-city sample (after removing the MA cities).

Having calculated the Redevelopment Index value for each block group, we then used the Local Indicator of Spatial Association (LISA) tool (with k-nearest weights, where k=4, and a confidence level of 95%) in GeoDa to identify the centers of clusters

experiencing low or high index values, or values not statistically significantly low or high. We then designated the cluster centers with low values as "declining" neighborhoods, those with high values as "redeveloping" neighborhoods, and those with insignificant values as "stable" neighborhoods. We then were able to analyze housing and transportation affordability comparatively across neighborhoods experiencing these different change scenarios.

A few methodological details warrant discussion. First, LISA statistics actually produce five types of cluster centers. Redeveloping neighborhoods are comprised of "high-high" and "high-low" neighborhoods. "High-high" neighborhoods refer to those that have high redevelopment index values and are surrounded by other neighborhoods with high values. "High-low" refer to neighborhoods with high index values that are surrounded by neighborhoods with low values. Declining neighborhoods are made up of "low-high" and "low-low" neighborhoods. "Low-high" refers to declining neighborhoods surrounded by redeveloping ones. "Low-low" neighborhoods are those most disadvantaged by change; they are declining neighborhoods surrounded by declining neighborhoods. The non-significant block groups represent the fifth type. While we present results for all five LISA types, for simplicity we also group high-high and high-low together into "redeveloped", and low-low and low-high together into "declined". Additionally, "block group" and "neighborhood" are used interchangeably, although we recognize that municipalities often have locally produced neighborhood definitions which are incompatible with Census defined block groups, and in some cities, Census tracts are geographically small enough to be perceived as a reasonable neighborhood proxy.

Using data taken from the HUD LAI for those neighborhoods, we analyzed housing, transportation, and total affordability, comparing results across the redevelopment types (redeveloped, declined, or stable), and according to three household income levels (median-income family, moderate-income family (80% of regional median income), and single-parent family (50% of regional median)) within each redevelopment type of block group. The LAI data is built from 2008-2012 5-year ACS data, thus not cleanly reflecting any single year, but the LAI methodology document suggests an effort to represent 2012. One significant weakness of our approach is that it inadequately controls for affordability differences between these neighborhoods prior to the period of change being studied (2000-2010). This is difficult to control for due to the fact that block group boundaries changed, in some cases, between 2000 and 2010, and the data needed to assess affordability is not available at the block level in 2000, which would allow us to aggregate to 2010 block group boundaries with a small margin of error due to apportioning. An effort to estimate affordability conditions in 2000 could rely on a spatial apportioning technique, or a simple spatial join of 2000 block group centroids to 2010 block groups. Both methods introduce spatial error, and neither method would allow an evaluation of transportation-based affordability in 2000, as the data do not exist. As such, an effort at establishing such an affordability baseline is not additive for our central argument, which is that redevelopment does not appear to cause displacement once transportation costs are accounted for, and that the struggle for affordability is being felt more acutely in declining neighborhoods than in redeveloping ones.

There are additional methodological weaknesses that lie beyond the scope of this paper, but which warrant ongoing research. First, the LAI dataset provides estimates of

H+T for eight prototype households which include: regional median income family, very low-income individual, working individual, single professional, retired couple, single-parent family, moderate-income family, and dual-professional family. In each case, income is given as a percentage of the median household income for the CBSA (or county in rural areas). While this presentation format affords researchers an estimate of what a regional prototypical household (of any of the eight types) would spend on housing and transportation in a given neighborhood, it does not allow researchers to evaluate H+T costs for the average or median household that actually lives in a given neighborhood. As demonstrated by the LIHTC analysis below, this difference can cause significant issues in regional affordability analyses.

Yet, changing this aspect of the LAI dataset is not simple. The LAI models are based on a complex series of regression models that take into account the feedback effects between variables (for more information, see the online methodology document: http://www.locationaffordability.info/LAPMethodsV2.pdf). Changing the model ad hoc must be done with extreme caution, if at all. Additionally, the technical documentation for the LAI data specifies that several variables in the models are constructed from block group-level 5-year ACS data, but when the same tables were inspected for possible use in this manuscript, we rejected them due to unacceptable margins of error. A full disclosure of margin of error for the LAI data is not given in the technical documentation, leaving this potential issue unaccounted for.

Results & Discussion

Preliminary data analysis offers some face validity for the LAI data, in that

households at the regional median income level experience H+T costs at less than 45% of

household income in shrinking cities, meaning that these costs are affordable (Table 1). In

contrast, households at half of the median pay 63% of household income for these costs,

which follows expectations that lower-income households pay a higher percentage of

income for basic necessities. Table 1 also reveals that housing is less affordable in

neighborhoods experiencing redevelopment, lending an initial measure of support to the

hypothesis that redevelopment does cause gentrification in shrinking cities through

reducing housing affordability. This finding holds for both owners and renters in all three

income groups.

Central to this manuscript is the question of whether redevelopment can occur in

shrinking cities without causing displacement, as is increasingly discussed in the shrinking

cities literature. While we have no way to track displacement of individuals, unaffordable

costs (housing + transportation) at the end of a period marked by redevelopment form a

key indicator of gentrification. Table 1 reveals that regardless of income group, housing is

least affordable in high-high neighborhoods, but housing and transportation costs together

are most affordable in redeveloped neighborhoods, compared to stable or declining

neighborhoods. Total affordability is consistently the hardest to find in declining

neighborhoods, and especially "low-low" neighborhoods (that is, declining neighborhoods

amid other declining neighborhoods). A series of single-factor ANOVA tests confirm that

H+T costs as a percentage of income are higher in declining neighborhoods (inclusive of

both low-high and low-low) than in stable neighborhoods (analysis not shown[2]), for all three household types tested.

Additionally, virtually all of the difference in total affordability found in low-low declining neighborhoods when compared to stable neighborhoods can be accounted for by differences in transportation affordability; this finding holds across income groups. For households at the regional median income, the difference in transportation affordability, when compared to stable neighborhoods, makes up 128% of the total affordability gap between the two types of neighborhoods (housing is actually more affordable in low-low declining neighborhoods than in stable neighborhoods, by a small margin, as seen in Table 1). Among households earning 80% of the regional median, the difference in transportation affordability between low-low declining and stable neighborhoods makes up 93% of the difference in total affordability; among households earning 50% of the regional median, this statistic is 78%.

The affordability statistics reported in Table 1 refer to costs associated with all modes of transportation. While we do not have data by which to assess the financial burden imposed by public transit through direct costs, we can analyze the extent to which public transportation worsens the affordability challenge (beyond the data reported in Table 1) through time loss and thus lost wages. Nationally, according to data from the U.S. Census Bureau, commutes taken via private vehicle average 24.4 minutes in duration, compared to 48.7 by public transit. Over a 50 week/year work schedule, this amounts to just over five

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[2] This series of ANOVA tests was completed in Excel as Single Factor tests. In each case, the p-value was well below 0.01. The tests were completed to compare block groups by Redevelopment Index type for each of the three prototypical households we analyzed. The same is true of the ANOVA tests mentioned further below in this manuscript.

weeks of full time employment (at 40 hours/week) lost due to excess commuting time. According to American Community Survey data (ACS 2011 3-year data, Tables S1902 and S2001), in our sample of 81 cities (excluding the two in MA), the average worker earned $51,184, and the average household earned $55,307 (each household had, on average, 1.08 workers). If we assume this is earned over 52 weeks, and if we assume that workers using public transportation have an income distribution mirroring the larger population, then an additional five weeks of work would yield $4,922 for an individual and $5,318 for a household. This increased work time could allow households to pay an additional $133 per month for housing, which, as the following section demonstrates, could drastically change the efficacy of Federal affordable housing policies.

This is not an issue that applies to only a few people in shrinking cities. Among non-telecommuters in shrinking cities, 15.1% commute via public transportation, compared to 5.0% nationally. If public transportation use were held at the national rate of 5.0% in each of our shrinking cities, and assuming that there was enough labor demand for all hours released from excess commuting time, cumulatively workers would earn an additional $3.87 billion per year, in 2011 dollars, or $4.02 billion in 2015 dollars (using the BLS CPI Inflation Calculator). Thus, to the extent that public transportation plays a role in the lower transportation costs of redeveloped neighborhoods, it has simultaneously not served declining neighborhoods enough. For those (in any neighborhood) who do lower household financial outlays via use of public transportation, the time costs incurred are staggering. As we argue further below, strategies to link declining neighborhoods to neighborhoods with a greater density of opportunities, may prove efficient.