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# Neighborhood characteristics and the location of HUD-subsidized housing in shrinking cities: an analysis to inform anchor-based urban revitalization strategies

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This article focuses on the manner in which affordable housing fits into anchor-based strategies for urban revitalization. It involves quantitative analysis of the location of existing HUD-subsidized housing in relation to neighborhood characteristics. The goal of the article is twofold. First, we examine the degree to which neighborhood characteristics associated with *neighborhoods of opportunity* correlate with the location of HUD-subsidized housing in shrinking cities. Second, we make recommendations for more equitable approaches to anchor-based urban revitalization. Our analysis uses a unique database developed to measure neighborhood characteristics in shrinking US cities. Our findings suggest that the location of affordable housing is not correlated with proximity to institutional and neighborhood amenities, where anchor-based revitalization is targeted. As a result, we make recommendations to link future affordable housing siting to anchor-based strategies for inner-city revitalization.

**Keywords:** urban planning; urban development; community organizing; grass-roots development; public policy



## The case for equitable urban revitalization in shrinking cities

In the wake of decades of deindustrialization and disinvestment, the anchor-based model for urban revitalization has emerged in shrinking cities.[1] As large manufacturers and other private sector investors have retreated from older industrial cities in the USA, place-based nonprofits like hospitals and universities have emerged as core anchor institutions that drive urban revitalization. Urban scholars, policy-makers, and economic development practitioners have taken note of this shift and defined strategies to catalyze revitalization through investments by these types of anchor institutions as following the so-called *eds and meds* model for community development (Adams, 2003; Bartik & Erickcek, 2008; Hahn, Coonerty, & Peaslee, 2003; Harkavy & Zuckerman, 1999; Nelson, 2009; Shaffer & Wright, 2010). Large anchor institutions like hospitals, universities, and other cultural and religious organizations have emerged as drivers for community and economic development in shrinking cities (Adams, 2014; Birch, 2010; Brophy & Godsil, 2009; Hobor, 2013; Murphy, 2011; Patterson & Silverman, 2014; Perry, Wiewel, & Menendez, 2009; Rae, 2006). They share common connections to the neighborhoods where they are located. Anchor institutions have substantial investments in their campuses and physical plants, and lack geographic mobility. Scholars have

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argued that anchor institutions bring leadership, resources, and expertise to neighborhood revitalization initiatives (Adams, 2014; Birch, 2009, 2010; Cantor, Englot, & Higgins, 2013; Perry et al., 2009; Silverman, 2014). They also fill a critical role in older core cities since they are among the few large institutions that remain in inner-city neighborhoods experiencing disinvestment and decline (Birch, 2010; Brophy & Godsil, 2009; Taylor & Luter, 2013).

Although some researchers argue that local development and investment by large anchor institutions has had a stabilizing influence, others raise concerns about the degree to which anchor-based development promotes equitable outcomes (Etienne, 2012; Hyra, 2012; Reese, Deverteuil, & Thach, 2010; Silverman, 2014; Silverman, Lewis, & Patterson, 2014; Worthy, 1977). In particular, critics of anchor-based strategies for urban revitalization have identified the displacement of low-income and minority residents as a possible negative externality. As a result, they have recommended that anchor-based revitalization strategies include provisions for the retention and development of affordable housing. In the past, we have argued for the siting of affordable housing near anchor institutions to enhance low-income and minority residents' access to benefits accruing from new development (Silverman et al., 2013, 2014).

This article was written to expand the debate about anchor-based revitalization, linking it to calls for the development of affordable housing and other equity measures. We explore two dimensions of this debate. First, we examine the manner in which the location of existing affordable housing correlates with institutional characteristics of neighborhoods in shrinking cities. In particular, we measure the degree to which existing affordable housing is located near anchor institutions and other amenities associated with anchor-based revitalization strategies. Second, we draw from that exploratory analysis to make recommendations for more equitable anchor-based revitalization strategies in shrinking cities.

In the next section, we elaborate on the emerging anchor-based model for urban revitalization in shrinking cities. After highlighting key characteristics of the anchor-based strategy, we turn to a discussion of other place-based strategies to promote greater social equity through the urban revitalization process. We frame this discussion by drawing from the concept of *neighborhoods of opportunity*. We embed our focus on siting affordable housing in this broader framework in order to highlight that the provision of affordable housing is one component of a comprehensive strategy needed to promote equitable community development outcomes.

## The emerging anchor-based urban revitalization model in shrinking cities

### *The anchor-based strategy*

The anchor-based model for urban revitalization coalesced during the early 2000s. The development of this model was spearheaded by university-based policy centers and nonprofit research institutes. The Penn Institute for Urban Research (Penn IUR) at the University of Pennsylvania was instrumental in the development of the anchor-based strategy for urban revitalization and it continues to serve as a lead organization for the national Anchor Institutions Task Force (http://www.margainc.com/initiatives/aitf/). The Penn IUR and the Anchor Institutions Task Force have organized national conferences and published white papers and other reports advocating for anchor institutions to take a lead role in inner-city revitalization efforts (Birch, 2010; Brophy & Godsil, 2009; Taylor & Luter, 2013).

Birch (2009), Adams (2014), and others distinguish the anchor-based strategy from past approaches to inner-city revitalization, highlighting the emphasis on a development process which is led by large nonprofits, geographically concentrated near downtowns of core cities, and driven by the expansion of the physical plants and campuses of anchor institutions. The anchor-based strategy is tied to a new paradigm for downtown revitalization focused on the development of walkable residential neighborhoods, mixed-use development, and neighborhood amenities clustered near anchor institutions like hospitals, universities, museums, and other large employers in the nonprofit sector (Birch, 2009).

The anchor-based model is complemented by other place-based urban revitalization strategies that target investments near large institutions and infrastructure hubs, such as strategies based on transit-oriented development, the conversion of public housing to mixed-income development, school rebuilding, and other mixed-use development strategies (Center for Transit Oriented Development, 2007; Cisneros, Engdahl, & Schmoke, 2009; Cowell & Mayer, 2013; Joseph, Chaskin, & Webber, 2007; Taylor, McGlynn, & Luter, 2013; Varady & Raffel, 1995; Vidal, 2013).

The anchor-based model has been critiqued for its relative lack of attention to equity issues and the negative externalities of new development experienced by inner-city residents. Our past research points out that many applied studies and reports dealing with anchor institutions pay little attention to issues like residential displacement (Silverman et al., 2013, 2014). Instead, proponents of anchor-based strategies argue that the benefits from anchor-based development eventually trickle down to inner-city residents in the form of jobs, access to services, and neighborhood amenities (Birch, 2010; Initiative for a Competitive Inner-City, 2011; Murphy, 2011; Taylor & Luter, 2013).

A small number of empirical studies have examined some of the impacts of anchor-based urban revitalization (Daniel & Schons, 2010; Deitrick & Briem, 2007; Hobor, 2013; Nelson, 2009; Vidal, 2013). On balance, these works suggest that the benefits from anchor-led urban revitalization are not as far reaching as proponents suggest. For instance, Deitrick and Briem (2007) examined the concentration of tax exempt properties associated with Pittsburgh's anchor-based *eds and meds* strategy and concluded that it has weakened the municipal tax base and increased stress on the delivery of local public services and social welfare programs. Likewise, Nelson (2009) suggested that the development of specialized hospitals, offering services that attract nonresidents seeking state-of-the-art medical treatments, may result in reduced access to general healthcare services for local indigent populations. Daniel and Schons (2010) examined the eds and meds strategy near Yale University and found only anecdotal evidence of benefits spilling over to neighborhoods surrounding areas where urban revitalization was pursued. Hobor (2013) developed a typology for urban revitalization strategies and found that the eds and meds strategy was adopted in cities that were the most negatively impacted by deindustrialization. Furthermore, he concluded that only a subset of those cities was able to successfully implement eds and meds revitalization strategies. Finally, Vidal (2013) examined the anchor-based model adopted in Detroit and concluded that revitalization efforts had produced modest successes against the broader backdrop of decline in the city. What is suggested across these studies is that the scope of benefits produced by anchor-based revitalization is relatively circumscribed and accrues primarily to larger institutions.

In order to promote more equitable outcomes, scholars have advocated for the inclusion of community benefits and other linkages in the anchor-based model. Largely, this literature focuses on the use of planning tools like community benefit agreements

(CBAs) to promote equity in anchor-based urban revitalization (Dobbie, 2009; Lowe & Morton, 2008; Parks & Warren, 2009; Patterson & Silverman, 2014; Silverman et al., 2014). CBAs are negotiated agreements between developers and coalitions of community-based groups that create linkages between new development and inner-city residents. Linkages to development include things like: set asides for minority and local procurement, pipelines for education and workforce development, the inclusion of affordable housing in revitalization plans, healthcare, and other services targeted to indigent groups, and other improvements to neighborhood amenities that are designed to enhance the quality of life for historically disenfranchised groups. Some of the more publicized CBAs include the agreement linked to the expansion of the Los Angeles International Airport (Parks & Warren, 2009), Los Angeles Staples Center CBA (Ho, 2008), and New York Yankees Stadium CBA (Gross, 2008). The successful negotiation of CBAs around high-profile projects has spurred interest in expanding the use of this tool to promote equity in the urban revitalization process. A unifying theme across all CBA's is the goal of expanding the scope of revitalization activities beyond the campuses and physical plants of local anchor institutions in order to redistribute their benefits to communities that surround them.

Efforts to negotiate for CBAs amount to a comprehensive strategy to community development since they add affordable housing, employment, education, and other social components to the anchor-based model. The adoption of comprehensive community development strategies is especially relevant to revitalization efforts in shrinking cities since the fabric of neighborhoods and the social institutions that support them have been weakened by long-term decline in the economy, population, and the built environment. One of the primary goals of comprehensive community development strategies in shrinking cities is the transformation of neighborhoods of despair into neighborhoods of opportunity.

### *Neighborhoods of opportunity*

Like the anchor-based strategy for urban revitalization, there is limited empirical analysis of the *neighborhoods of opportunity* approach. For the most part, the literature on this approach has been confined to policy briefs, case studies, and best practices. A 2011 White House report coined the term neighborhoods of opportunity in policy lexicon (The White House, 2011). The term was used to highlight a new comprehensive strategy for community development that channeled resources into high-poverty urban neighborhoods. This strategy entailed a neighborhood transformation approach that wedded investments in urban revitalization and physical redevelopment with enhanced social services and public assistance. It involved a variety of components such as infrastructure improvements, downtown revitalization, housing development, school reconstruction, tax incentive strategies, housing assistance, school reform, wrap-around social services, and other improvements to the built environment.

An underlying theme of the neighborhoods of opportunity approach is that inner-city revitalization should be geographically targeted and built on public–private nonprofit partnerships. The approach argues for federal community development funding to be "braided" with other sources of funding (The White House, 2011, p. 11). The concept of braiding is based on the acknowledgment that public funding for urban revitalization is limited. Consequently, it should be applied to targeted revitalization efforts that draw from diverse resources. The neighborhoods of opportunity strategy fits into a broader approach to urban revitalization that seeks to leverage the resources of anchor

institutions (particularly universities and hospitals) to promote inner-city revitalization (Bergen, 2011; Brophy & Godsil, 2009).

Our analysis offers extensions to the literature in two respects. First, we conceptually wed the anchor-based strategy to the neighborhoods of opportunity approach. We argue that by considering these two approaches to urban revitalization together, greater emphasis is placed on promoting social and economic equity as an outcome. Second, we operationalize measures of anchor-based urban revitalization strategies and apply them to an analysis of the degree to which the outcome of current affordable housing policies is complementary to them.



### *Conceptualizing and measuring equity outcomes*

By wedding anchor-based strategies to the neighborhoods of opportunity approach, we bring social equity back to the forefront of the dialog concerning inner-city revitalization. The adoption of this framework allows us to take an advocacy planning stance and argue that public subsidies and support for anchor-based revitalization should include linkages to community benefits, particularly in relation to affordable housing. Thus, we argue that it is the role of planners, public administrators, elected officials, and others in the public sector to advocate for linkages that promote an equitable distribution of benefits from urban revitalization. The rationale for such an advocacy stance is well established in the disciplines of urban planning, social work, and public administration (Davidoff, 1965; Krumholz & Forester, 1990; Needleman & Needleman, 1974; Patterson & Silverman, 2014; Silverman, 2014; Silverman et al., 2014). We start from the premise that anchor-based strategies should include provision to site-affordable housing in neighborhoods of opportunity. The adoption of such provisions is argued to enhance low-income and minority residents' access to resources that promote economic and social mobility.

Implicit in our argument is the assumption that to some degree, existing anchor-based strategies fall short of promoting equitable outcomes. Recognizing that there is a need for multilevel analysis of the benefits that anchor institutions bring to minority and low-income communities, this exploratory study provides a starting point. In this study, we examine the degree to which affordable housing is located in proximity to anchor institutions and neighborhood amenities that have been associated with place-based urban revitalization strategies. Our focus on affordable housing and neighborhood amenities is an extension of recent work done by Powell (2003); Keating (2011); Kucheva (2013); Massey, Albright, Casciano, Derickson, and Kinsey (2013); Talen and Koschinsky (2014); and others.

We hypothesized that a disconnect exists between where US Department of Housing and Urban Development (HUD)-subsidized affordable housing was located and where amenities associated with anchor-based revitalization strategies and neighborhoods of opportunity clustered. Instead, we expected the location of affordable housing to be correlated with socioeconomic isolation and neighborhood distress. We argue that evidence supporting our hypothesis will lend credence to advocacy planners' calls to link the future siting of affordable housing with anchor-based strategies for urban revitalization.

In order to test our hypothesis, we operationalized measures that capture key institutional characteristics and neighborhood amenities associated with anchor-based revitalization. These building blocks for inner-city revitalization were examined in relation to socioeconomic and housing characteristics in shrinking cities. Together, these data were

used to identify correlates with the location of subsidized housing in the 10 fastest shrinking cities in the USA between 2000 and 2010. Our findings suggest that the location of affordable housing is not correlated with proximity to institutional and neighborhood amenities, where anchor-based revitalization is targeted. As a result, we make recommendations to link future affordable housing siting to anchor-based strategies for inner-city revitalization. The recommendations that grow out of our analysis have particular applications to urban planning in shrinking cities, where other forms of urban revitalization are less prevalent. However, we believe this work can be elaborated upon and adapted to other urban geographies.



## Data and methods

Our analysis used a unique database developed to measure neighborhood characteristics in shrinking US cities. That database developed for our work was tied to a 2013 HUD Sustainable Communities Research Grant (SCRG) titled, "Sustainable affordable housing in shrinking US cities: Developing an analytic tool for siting subsidized housing and evaluating HUD program outcomes." We developed a comprehensive database for the following 10 metropolitan statistical areas (MSAs), which contained the fastest shrinking cities in the USA, measured through population loss between 2000 and 2010: Buffalo, NY; Cleveland, OH; Dayton, OH; Cincinnati, OH; Youngstown, OH; Toledo, OH, Detroit, MI; Pittsburgh, PA; Birmingham, AL; and New Orleans, LA (Frey, 2012). Our database includes measures of: population and housing characteristics, school performance, transit access, neighborhood amenities, anchor institutions, local job bases, and other spatial attributes.

Data were collected at the census tract level from the following sources: US Decennial Census, American Community Survey (ACS) 2012 five-year estimates, US Census 2011 Longitudinal Employer-Household Dynamics (LEHD) Origin-Destination Employment Statistics (LODES), US Department of Housing and Urban Development 2012 HUD Picture of Subsidized Households Database, and the National Center for Education Statistics, 2012. Address-level data points and lines for various institutions, parks, and transit lines were collected and verified using the following sources: Environmental Systems Research Institute (ESRI) Geographic Information System data; respective state's health departments, 2012; respective state's education department, 2012; National Center for Education Statistics, 2012; respective state and regional transit authorities, 2012; the Institute of Museum and Library Services, 2012; and Google Maps and Google Street View. Summary statistics for the variables used in this analysis are identified in Table 1.

Table 1 provides summary statistics for all of the census tracts ($N = 4{,}666$) in the 10 MSAs included in the analysis. It also compares the characteristics of tracts in the MSA's core cities ($N = 1{,}228$) and suburbs ($N = 3{,}438$). These data reflect broadly held perceptions about population, housing, and institutional characteristics of US shrinking cities. Some of the contrasts between core city and suburban tracts are particularly informative.

In terms of population characteristics in core cities: the black population, poverty levels, and public assistance use were noticeably higher; and educational attainment, employment levels, and incomes were noticeably lower. In terms of core city housing conditions: the housing stock was older and less likely to be composed of single-family homes, housing values and owner occupancy rates were lower, monthly renter costs as a percent of household income were higher, and vacancy rates were higher.

Table 1. 2012 population and housing characteristics of 10 fastest shrinking cities in the US[a].

| | Model 1 All tracts ($N$ = 4,666) | Model 2 Core city tracts ($N$ = 1,228) | Model 3 Suburban tracts ($N$ = 3,438) |
|---|---|---|---|
| Population | 16,355,397 | 3,092,497 | 13,262,900 |
| Average household size | 2.47 | 2.40 | 2.49 |
| Percent white | 71.3 | 37.2 | 83.4 |
| Percent black | 23.3 | 56.8 | 11.3 |
| Percent Latino | 3.9 | 5.7 | 3.3 |
| Percent of the population 25 and over, with less than a high school education | 13.1 | 19.5 | 10.8 |
| Average number of jobs per tract[b] | 1,527 | 1,407 | 1,569 |
| Ratio of jobs per tract[b] to total tract population | .68 | .92 | .60 |
| Percent of the civilian population 16 and over, who were unemployed | 12.1 | 19.2 | 9.6 |
| Percent of workers 16 and over, who took public transit to work | 4.1 | 10.7 | 1.8 |
| Median household income ($) | 50,721 | 32,588 | 57,152 |
| Median gross rent as a percent of household income | 32.7 | 38.5 | 30.7 |
| Median monthly owner cost as a percent of household income | 21.2 | 23.3 | 20.4 |
| Percent of the population below poverty | 17.7 | 32.7 | 10.8 |
| Percent of households with social security income | 30.7 | 28.8 | 31.3 |
| Percent of households with supplemental security income (SSI) | 5.9 | 6.9 | 4.0 |
| Percent of households with public assistance or food stamp/SNAP income | 16.8 | 30.3 | 12.0 |
| GINI index of income inequality | .42 | .47 | .41 |
| Housing units | 7,361,999 | 1,602,467 | 5,759,532 |
| Median year built | 1962 | 1948 | 1967 |
| Percent single-family homes | 72.7 | 61.5 | 76.7 |
| Median value ($) | 136,633 | 104,886 | 147,761 |
| Percent owner occupied | 66.5 | 48.4 | 73.0 |
| Percent renter occupied | 33.5 | 51.6 | 27.0 |
| Percent vacant | 12.8 | 22.3 | 9.6 |
| Percent vacant “other” | 46.5 | 54.8 | 43.5 |
| HUD-subsidized housing units 2012[c] | 341,915 | 163,292 | 178,623 |
| Percent of all units in tract subsidized | 5.4 | 11.4 | 3.2 |
| Percent of subsidized units receiving housing choice vouchers | 71.4 | 69.4 | 72.2 |
| Percent of subsidized units that were public housing | 10.1 | 12.2 | 9.1 |
| Institutional characteristics | | | |
| Percent of tracts with a hospital[d] | 8.3 | 12.5 | 6.8 |
| Percent of tracts with a college/university[d] | 4.6 | 4.6 | 4.6 |
| Percent of tracts with a public library[d] | 15.3 | 12.9 | 16.2 |
| Percent of tracts with a park[d] | 44.9 | 49.9 | 43.1 |
| Percent of tracts on a public transit line[d] | 51.0 | 97.2 | 34.5 |

(*Continued*)

Table 1. (*Continued*).

| | Model 1 All tracts ($N$ = 4,666) | Model 2 Core city tracts ($N$ = 1,228) | Model 3 Suburban tracts ($N$ = 3,438) |
|---|---|---|---|
| Percent of tracts with at least one school[e] | 59.5 | 53.1 | 61.9 |
| Percent of tracts with at least one school meeting AYP in 2012[e] | 39.3 | 18.7 | 46.7 |
| Percent of tracts with at least one school not meeting AYP in 2012[e] | 25.3 | 34.8 | 22.0 |

[a]Source: US Census, American Community Survey 2012 5 year estimates.
[b]Source: US Census, 2011 LEHD Origin-Destination Employment Statistics (LODES).
[c]Source: US Department of Housing and Urban Development, 2012 HUD Picture of Subsidized Households Database.
[d]Source: ESRI supplemented with sources from: respective federal, state and local agencies, 2012; and Google Maps.
[e]Source: Respective state's education department 2012.



There were also a few noteworthy institutional contrasts between core cities and suburbs: there was a noticeably higher percent of census tracts with hospitals in core cities, the level of access and use of public transit was higher in core cities, and school performance was lower in core cities. These characteristics suggest that conditions are ripe for the adoption of anchor-based revitalization in core cities, particularly when they are pursued in conjunction with medical campus expansion and transit-oriented development. Likewise, the data suggest that a need for linkages to community benefits and other equity measures is present.

We examined a correlation matrix for the variables displayed in Table 1 and found that there was a strong correlation between the population and housing characteristics from the ACS. Nineteen of these variables were subjected to principal component factor analysis, so that underlying factors from those variables could be isolated and incorporated in multivariate analysis.[2] Four components were extracted from the factor analysis. The components and loadings are summarized in Table 2.

The first component explained 39.6% of the variance in the variables modeled. This component, SOCIOECONOMIC DISTRESS, functioned as a measure of the combined effects of poverty, public assistance and SSI use, unemployment, low educational attainment, minority status, lower median income, lower median housing values, and property vacancy. The second component explained 12.9% of the variance in the variables modeled. This component, SINGLE-FAMILY SETTING, functioned as a measure of the combined effects of single-family homes, larger households, and owner-occupied housing. The third component explained 8.0% of the variance in the variables modeled. This component, SOCIAL SECURITY COHORT, functioned as a measure of the effects of households with social security income. The fourth component explained 5.8% of the variance in the variables modeled. This component, INCOME INEQUALITY, functioned as a measure of the effects of an elevated GINI index of income inequality.

The components derived from the factor analysis were used as independent variables in multivariate linear regression models. The models were used to identify correlations with a dependent variable measuring the percent of total housing units that were subsidized by HUD in a census tract.[3] Twelve other independent variables, described below, were examined in the regression analysis. A binary "dummy" variable, measuring

Table 2. Principal component factor analysis of 19 variables measuring census tract characteristics ($N = 4{,}666$) in shrinking US cities.

| Components extracted | Percent of variance accounted for by component | Eigenvalue |
|---|---|---|
| SOCIOECONOMIC DISTRESS[a] | 39.6 | 7.5 |
| SINGLE-FAMILY SETTING[b] | 12.9 | 2.5 |
| SOCIAL SECURITY COHORT[c] | 8.0 | 1.5 |
| INCOME INEQUALITY[d] | 5.8 | 1.1 |

[a]Loadings on SOCIOECONOMIC DISTRESS: percent of households with public assistance or food stamp/SNAP income (.927), percent of the population below poverty (.887), the natural log of median household income [$] (−.837), percent of the civilian population 16 and over, who were unemployed (.835), percent of the population 25 and over, with less than a high school education (.798), percent black (.766), percent of households with supplemental security income [SSI] (.765), percent vacant (.730), and the natural log of median housing value [$] (−.717).
[b]Loadings on SINGLE-FAMILY SETTING: average household size (.829), percent single-family homes (.782), and percent renter occupied (.704).
[c]Loading on SOCIAL SECURITY COHORT: percent of households with social security income (.799).
[d]Loading on INCOME INEQUALITY: GINI index (.891).



whether a census tract was located in a core city, was used as a control variable in the fully specified model of the regression analysis.

Two other independent variables measured the percent of HUD-subsidized units in a census tract that were HCV and public housing units, respectively. These variables were used as controls for the type of subsidized unit. Our assumption was that in census tracts where subsidized units were predominantly HCVs, there would be a lower percent of total housing units subsidized. Likewise, we assumed that in census tracts where subsidized units were predominantly public housing, there would be a higher percentage of total housing units subsidized.

Another independent variable measured the ratio of jobs to the total population in a census tract. This served as a measure of employment density at the neighborhood level. Two other independent variables were used in the analysis that measured neighborhood infrastructure. One was a dummy variable that indicated if a transit line ran through a census tract. The other was a dummy variable that indicated if a park was located in a census tract. Four dummy variables were used in the analysis that measured institutional characteristics of census tracts. Each indicated if a hospital, college or university, public library, or K-12 school was located in a census tract. In addition, a control variable was used in the analysis that indicated if at least one school in a census tract met its academic year progress (AYP) goals in 2012. Finally, a control variable was used in the analysis that indicated if at least one school in a census tract did not meet its AYP goals in 2012.

## Multivariate regression results

The variables described above were entered into multivariate linear regression models to determine if any meaningful and significant relationships existed between them and the percent of total housing units that were subsidized by HUD in a census tract. In addition to identifying significant effects, identifying variables with the greatest influence on the concentration of HUD-subsidized units in a census tract was a central interest to our hypothesis. Three models were examined. The first analyzed all of the census tracts in the MSAs, where the 10 fastest shrinking cities in the USA were located between 2000

and 2010. The second model analyzed the subset of core city census tracts. The third model analyzed the subset of census tracts for suburban census tracts. Combined, these models allowed us to examine the overall relationships between the independent and dependent variables, and we were able to distinguish between relationships in core cities and suburbs. The adjusted-$R^2$ and the unstandardized ($b$) and standardized ($\beta$) multivariate regression coefficients for the effects of the independent variables on the dependent variable in each of the models are reported in Table 3. The 95% confidence intervals for the unstandardized ($b$) multiple regression coefficients of variable in each model are reported in Appendix 1.



### *The fully specified model*

Model 1 represents the fully specified regression analysis for all census tracts. The most noticeable feature of this model is that 6 of the 16 independent variables were significantly related to the percent of total housing units that were HUD subsidized. Three variables were correlated with higher concentrations of HUD-subsidized housing units: the factor measuring socioeconomic distress ($p < .001$), the percent of HUD-subsidized units that were public housing ($p < .001$), and the presence of a park in a census tract ($p < .05$). In contrast, three variables were correlated with lower concentrations of HUD-subsidized housing units: the factor measuring characteristics of single-family settings ($p < .001$), the factor measuring characteristics of a social security cohort ($p < .01$), and the percent of HUD-subsidized units that were HCVs ($p < .001$). The adjusted-$R^2$ indicated that 49.3% of the variance in the percent of total housing units that were HUD subsidized was attributed to the variables used in Model 1.

These results corresponded with past research which found that subsidized housing, particularly traditional public housing, was concentrated in relatively isolated, distressed areas (Houston, Basolo, & Yang, 2013; Massey et al., 2013; Talen & Koschinsky, 2014; Varady & Walker, 2003). These findings were punctuated by the significant variables with the largest standardized coefficient ($\beta$), the factor measuring socioeconomic distress. The factor associated with socioeconomic distress had the strongest influence ($\beta = .482$) on where subsidized housing clustered. In contrast, the factor measuring characteristics of single-family settings ($\beta = -.281$) was negatively correlated with where HUD-subsidized housing clustered. This suggested that subsidized housing was less likely to cluster in residential neighborhoods characterized by owner-occupied, single-family homes. It is also noteworthy that the standardized coefficients associated with the percent of HUD-subsidized units that were HCVs ($\beta = -.295$) and the percent of HUD-subsidized units that were public housing ($\beta = .109$) were relatively large. These coefficients suggested that tracts with high percentages of HCVs had less concentrated HUD-subsidized housing, while tracts with high percentages of public housing had more concentrated HUD-subsidized housing.

Still, some results were not easily interpreted when examining the fully specified model in Table 3, such as the relationships between parks and the dependent variable. For instance, the location of parks in a census tract ($\beta = .028$) was correlated with more concentrated HUD-subsidized housing in the full model, but this variable was not significant in the core city or suburban models. More interestingly, after controlling for other variables, the location of a census tract in a core city was not correlated with the concentration of public housing in a census tract. Thus, the model suggests that the location of HUD-subsidized housing is more strongly correlated with socioeconomic distress and other characteristics of individual census tracts, than jurisdictional

Table 3. Multiple linear regression results for the percent of total housing units that were HUD subsidized in US shrinking cities 2012.

| | All tracts ($N = 4,666$) | | Core city tracts ($N = 1,228$) | | Suburban tracts ($N = 3,438$) | |
|---|---|---|---|---|---|---|
| Variable name | $b$ | $\beta$ | $b$ | $\beta$ | $b$ | $\beta$ |
| CONSTANT | 10.434*** | | 10.167*** | | 10.224*** | |
| SOCIOECONOMIC DISTRESS | 4.633*** | .482*** | 4.730*** | .368*** | 4.880*** | .508*** |
| SINGLE-FAMILY SETTING | −2.798*** | −.281*** | −3.459*** | −.297*** | −1.854*** | −.247*** |
| SOCIAL SECURITY COHORT | −.309** | −.031** | −1.018** | −.075** | .287** | .043** |
| INCOME INEQUALITY | −.323 | .018 | −1.306* | −.054* | .510 ** | .037** |
| Census tract in core city | −.338 | −.016 | – | – | – | – |
| Percent of HUD-subsidized units with housing choice vouchers (HCVs) | −.077*** | −.295*** | −.115*** | −.296*** | −.065*** | −.392*** |
| Percent of HUD-subsidized units that were public housing | .044*** | .109*** | .143*** | .245*** | −.004 | −.014 |
| Ratio of jobs per tract to total tract population | .023 | .003 | −.112 | −.019 | −.083 | −.011 |
| Public transit line in a tract | −.416 | −.022 | 1.664 | .018 | −.244 | −.019 |
| Hospital in a tract | .395 | .012 | .541 | .013 | −.025 | −.001 |
| College/university in a tract | .102 | .002 | .930 | .014 | −.135 | −005 |
| Public library in a tract | −.079 | −.003 | .952 | .024 | −.341 | −.021 |
| Park in a tract | .537* | .028* | −.265 | −.010 | .274 | .022 |
| At least one school in a tract | −.363 | −.019 | −1.596 | −.058 | .531 | .041 |
| At least one school in a tract that met AYP in 2012 | −.112 | −.006 | −.016 | −001 | −.827** | −.066** |
| At least one school in a tract did not meet AYP in 2012 | .229 | .011 | 1.158 | .041 | −.181 | −.013 |
| Adjusted $R^2$ | .493*** | | .494*** | | .542*** | |

*$p < .05$; **$p < .01$; ***$p < .001$.

boundaries. This finding highlights the need for future siting considerations to include an equity component since past siting of affordable housing has tended to be concentrated in socioeconomically distressed areas, regardless of their urban or suburban context. Insights into the results from the fully specified model are discussed further in relation to the partial models, isolating core city tracts from suburban tracts, particularly with respect to the results for the relationship between the factor associated with the social security cohort ($\beta = -.031$ in the fully specified model) and the location of HUD-subsidized housing. An examination of those models teases out the nuances of variables associated with the location of HUD-subsidized housing in different spatial and jurisdictional contexts.

It is noteworthy that institutional characteristics central to the anchor-based strategy for urban revitalization that were included in the full model were not significantly related to the percent of total housing units that were HUD subsidized. Specifically, the presence of hospitals, colleges/universities, libraries, and high-performing public schools was not correlated with the concentration of subsidized housing in a census tract. This suggests that at the metropolitan-level affordable housing did not cluster in locations that benefit from proximity to sites where eds and meds revitalization are targeted. Instead, the fully specified model supports the hypothesis that a disconnect exists between where HUD-subsidized affordable housing was located and where amenities associated with anchor-based revitalization strategies clustered. Moreover, the magnitude of the $\beta$s for the significant variables in the fully specified model suggests that the location of affordable housing was mainly correlated with socioeconomic isolation and neighborhood distress.

### *The core city model*

Model 2 represents the regression analysis for census tracts located in core cities. In this model, 6 of the 15 independent variables were significantly related to the percent of total housing units that were HUD subsidized. Two variables were correlated with higher concentrations of HUD-subsidized housing units: the factor measuring socioeconomic distress ($p < .001$) and the percent of HUD-subsidized units that were public housing ($p < .001$). In contrast, four variables were correlated with lower concentrations of HUD-subsidized housing units: the factor measuring characteristics of single-family settings ($p < .001$), the factor measuring characteristics of the social security cohort ($p < .01$), the factor measuring characteristics of income inequality ($p < .05$), and the percent of HUD-subsidized units that were HCVs ($p < .001$). The adjusted-$R^2$ indicated that 49.4% of the variance in the percent of total housing units that were HUD subsidized was attributed to the variables used in Model 2.

These results provide a more refined understanding of the relationship between the independent variables and the clustering of HUD-subsidized housing in the core cities that were shrinking between 2000 and 2010. Like the MSAs they are located in, the variable with the largest $\beta$ was the factor measuring socioeconomic distress. This factor had the strongest influence ($\beta = .368$) on where subsidized housing clustered in core cities. Likewise, the factor measuring characteristics of single-family settings had the second-strongest influence ($\beta = -.297$) in core cities. Similarly, the percent of HUD-subsidized units that were HCVs ($\beta = -.296$) and the percent of HUD-subsidized units that were public housing ($\beta = .245$) had relatively large standardized coefficients. As was the case at the MSA level, tracts with high percentages of HCVs had less concentrated HUD-subsidized housing, while tracts with high percentages of public

housing had more concentrated HUD-subsidized housing. Another significant relationship related to income inequality ($\beta = -.054$). Tracts with greater income inequality had less clustering of HUD-subsidized housing. In an inner-city context, this reflected the degree to which tracts segregated by income, particularly tracts with concentrated poverty, had higher concentrations of HUD-subsidized housing.

Finally, the standardized coefficient for the factor associated with the social security cohort ($\beta = -.075$) indicated that tracts where this cohort was more concentrated had less HUD-subsidized housing. This relationship was in the opposite direction than the fully specified model for the MSA as a whole. This finding suggests that a specific type of subsidized housing clientele is clustered in socioeconomically distressed census tracts in core cities, economically disadvantaged households from younger cohorts who are more likely to live in public housing.

Similar to the MSA level, institutional characteristics central to the anchor-based strategy for urban revitalization were not significantly related to the percent of total housing units that were HUD subsidized in core cities. Specifically, the presence of hospitals, colleges/universities, libraries, and high-performing public schools was not correlated with the concentration of subsidized housing in core city census tracts. Moreover, infrastructure and neighborhood amenities often associated with anchor-based strategies, like access to public transit and parks, were not correlated with the concentration of subsidized housing in core city tracts. These findings suggest that like the MSA level as a whole, affordable housing did not cluster in locations that benefit from proximity to sites where eds and meds revitalization is targeted in core cities. This is a particularly grim finding since the core city model suggests that households that might benefit the most from amenities associated with anchor-based revitalization and proximity to neighborhoods of opportunity, disenfranchised households composed of youth and working-age adults, were less likely to have access to them.

### *The suburban model*

Model 3 represents the regression analysis for census tracts located in suburbs. In this model, 6 of the 15 independent variables were significantly related to the percent of total housing units that were HUD subsidized. Three variables were correlated with higher concentrations of HUD-subsidized housing units: the factor measuring socioeconomic distress ($p < .001$), the factor measuring the social security cohort ($p < .01$), and the factor measuring income inequality ($p < .01$). In contrast, three variables were correlated with lower concentrations of HUD-subsidized housing units: the factor measuring characteristics of single-family settings ($p < .001$), the percent of HUD-subsidized units that were HCVs ($p < .001$), and the presence of a school in a tract that met AYP in 2012 ($p < .01$). The adjusted-$R^2$ indicated that 54.2% of the variance in the percent of total housing units that were HUD subsidized was attributed to the variables used in Model 3.

These results provide a clearer understanding of the relationship between the independent variables and the clustering of HUD-subsidized housing in the suburbs. Like the MSAs they are located in, the variable with the largest $\beta$ was the factor measuring socioeconomic distress. This factor had the strongest influence ($\beta = .508$) on where subsidized housing clustered in suburbs. The percent of HUD-subsidized units that were HCVs had the second-largest standardized coefficient ($\beta = -.392$) and was negatively correlated with the percent of HUD-subsidized housing units. The factor measuring

characteristics of single-family settings had the third-largest standardized coefficient ($\beta = -.247$) in the suburbs and was negatively correlated with the percent of HUD-subsidized housing units. Aside from these similarities, the findings suggest that the clustering of HUD-subsidized housing is distinct in suburbs along a couple dimensions.

Clustering was significantly related to the presence of a social security cohort ($\beta = .043$) and income inequality ($\beta = .037$) in a census tract. However, the relationship between these variables and the concentration of HUD-subsidized housing was in the opposite direction than was observed in core cities. Both a larger social security cohort and increased income inequality were correlated with an increase in subsidized housing in the suburbs. This suggests that the composition of subsidized housing is different in the suburbs, where it is more likely to be composed of affordable, senior housing located in mixed-income neighborhoods. Unlike core cities, where younger impoverished households clustered in distressed neighborhoods, older adults living in HUD-subsidized housing benefited from access to economically diverse residential settings.

Another feature stood out in the suburbs was less promising. One characteristic associated with anchor-based strategies and neighborhoods of opportunity, school performance ($\beta = -.066$), was correlated with the level of HUD-subsidized housing in a tract. However, there was a negative relationship between having a school that met AYP standards in a tract and the concentration of HUD-subsidized housing. This suggests that subsidized households clustered in suburban tracts where school performance was lower. Thus, they had less access to quality schools in the suburbs.

Other institutional characteristics central to the anchor-based strategy for urban revitalization were not significantly related to the percent of total housing units that were HUD subsidized in the suburbs. The presence of hospitals, colleges/universities, and libraries was not correlated with the concentration of subsidized housing in suburban tracts. Moreover, neighborhood amenities, like parks and public transit, were not correlated with the concentration of subsidized housing in suburban tracts. These findings suggest that like the MSA level, affordable housing did not cluster in locations that benefit from proximity to sites where eds and meds revitalization is targeted in suburbs.

### Recommendations for equitable anchor-based revitalization

Our analysis hypothesized that a disconnect exists between where HUD-subsidized affordable housing was located and where amenities associated with anchor-based revitalization strategies and neighborhoods of opportunity clustered. Instead of finding support for strategies that sited HUD-subsidized units near anchor institutions and in neighborhoods of opportunities, our findings suggest that the location of affordable housing continues to be correlated with socioeconomic isolation and neighborhood distress. At the metropolitan level and in core cities, no institutional characteristics central to the anchor-based strategy for urban revitalization were correlated with the location of HUD-subsidized housing. In the suburbs, this was also the general finding with one caveat. Access to high-performing schools was significantly correlated with lower concentrations of HUD-subsidized housing. Instead of finding a relationship between institutional characteristics central to the anchor-based strategy for urban revitalization and the location of HUD-subsidized housing, the $\beta$s in our models suggest that components of socioeconomic distress were the strongest predictors of where HUD-subsidized housing was located.

These findings offer some direction to those interested in using the anchor-based model as a tool for inner-city revitalization. In its most rudimentary form, the

anchor-based approach does not address social equity concerns, particularly as they relate to the development of affordable housing in proximity to eds and meds urban revitalization sites. More research is needed to understand why HUD-subsidized housing is not clustering near these sites. Some emerging research suggests that anchor-based revitalization has promoted gentrification and displacement (Adams, 2014; Silverman et al., 2014). Others have shown that tools like CBAs can be used to create more equitable outcomes by requiring affordable housing to be a component of anchor-based development strategies (Baxamusa, 2008; Bornstein, 2010; Saito & Truong, 2015; Simmons & Luce, 2009; Wolf-Powers, 2010).

In light of these findings, we argue that advocacy planners, social workers, public administrators, and other public officials need to be proactive about linking social equity goals to anchor-based revitalization strategies. One way to promote more equitable outcomes in the future would be to use tools like inclusionary zoning and CBAs to negotiate for linkages during the planning process for urban revitalization. These tools would be particularly beneficial to inner-city, low-income, and minority residents since they would facilitate the siting and sustainability of affordable housing near nodes for anchor-based development. This would represent a break from past siting policies for HUD-subsidized housing, which have not taken anchor-based development strategies into account and prioritized enhancing access to amenities associated with neighborhoods of opportunity.

Of course, our analysis is exploratory in nature and only focuses on one dimension of a more expansive equity-driven approach to anchor-based strategies for inner-city revitalization. In addition to linking affordable housing to the anchor-based model, future research needs to examine other elements of an equity-driven approach to urban revitalization. For instance, our models found no relationship between the concentration of jobs in a census tract and the location of HUD-subsidized housing. Further analysis of linkages between employment, workforce development, education, transportation, and anchor-based revitalization is needed. We suggest that merging the anchor-based model for urban development with the equity goals of the neighborhoods of opportunity approach would serve as a unifying framework for the development of a more comprehensive approach to inner-city revitalization.

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## Notes

1. The term shrinking cities describes the process of long-term population decline, property abandonment, fiscal stress, and the deterioration of infrastructure in large industrial cities during the late twentieth and early twenty-first centuries (Großmann, Beauregard, Dewar, & Haase, 2012; Haase, Rink, Grossmann, Bernt, & Mykhnenko, 2014; Pallagst, 2008; Silverman, Yin, & Patterson, 2013; Silverman, Yin, & Patterson, 2015). This concept has been used to describe the dilemma that declining cities face across the globe, particularly in older industrial centers in Europe and the USA.
2. The 19 variables subjected to principal component factor analysis were: average household size, percent black, percent of the population 25 and over, with less than a high school education, percent of the civilian population 16 and over, who were unemployed, percent of workers 16 and over, who took public transit to work, the natural log of median household income ($), median gross rent as a percent of household income, median monthly owner cost as a percent of household income, percent of the population below poverty, percent of households with social security income, percent of households with supplemental security income (SSI), percent of households with public assistance or food stamp/SNAP income, GINI index, median year housing built, percent single-family homes, the natural log of median housing value ($), percent renter occupied, percent vacant, and percent vacant "other."
3. The total number of housing units subsidized by HUD included the sum of all public housing units, housing choice voucher (HCV) units, moderate rehabilitation units, section 8 new construction and substantial rehabilitation units, section 236 units, and units classified as multifamily other. The source of this data was the 2012 HUD Picture of Subsidized Housing database.

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**Appendix 1. Unstandardized coefficients (b) and 95% confidence intervals from the multiple linear regression results.**

| | All tracts ($N = 4,666$) | | | Core city tracts ($N = 1,228$) | | | Suburban tracts ($N = 3,438$) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 95% confidence interval | | | 95% confidence interval | | | 95% confidence interval | |
| Variable name | *b* | Lower bound | Upper bound | *b* | Lower bound | Upper bound | *b* | Lower bound | Upper bound |
| CONSTANT | 10.434*** | 9.674 | 11.193 | 10.167*** | 5.838 | 14.969 | 10.224*** | 9.684 | 10.764 |
| SOCIOECONOMIC DISTRESS | 4.633*** | 4.353 | 4.912 | 4.730*** | 4.111 | 5.344 | 4.880*** | 4.635 | 5.125 |
| SINGLE-FAMILY SETTING | −2.798*** | −3.043 | −2.544 | −3.459*** | −4.086 | −2.831 | −1.854*** | −2.062 | −1.645 |
| SOCIAL SECURITY COHORT | −.309** | −.534 | −.084 | −1.018** | −1.632 | −.403 | .287** | .118 | .455 |
| INCOME INEQUALITY | −.323 | −.769 | .122 | −1.306* | −2.380 | −.232 | .510 ** | .154 | .866 |
| Census tract in core city | −.338 | −1.026 | .351 | – | – | – | – | – | – |
| Percent of HUD-subsidized units with housing choice vouchers (HCVs) | −.077*** | −.084 | −.070 | −.115*** | −.137 | −.094 | −.065*** | −.070 | −.060 |
| Percent of HUD-subsidized units that were public housing | .044*** | .034 | .055 | .143*** | .114 | .173 | −.004 | −.012 | .004 |
| Ratio of jobs per tract to total tract population | .023 | −.133 | .178 | −.112 | −.378 | .154 | −.083 | −.276 | .109 |
| Public transit line in a tract | −.416 | −.947 | .115 | 1.664 | −2.169 | 5.497 | −.244 | −.589 | .101 |
| Hospital in a tract | .395 | −.370 | 1.160 | .541 | −1.250 | 2.332 | −.025 | −.583 | .633 |
| College/university in a tract | .102 | −.887 | 1.092 | .930 | −1.741 | 3.602 | −.135 | −.861 | .592 |
| Public library in a tract | −.079 | −.657 | .500 | .952 | −.729 | 2.633 | −.341 | −.755 | .074 |
| Park in a tract | .537* | .110 | .964 | −.265 | −1.416 | .886 | .274 | −.042 | .590 |
| At least one school in a tract | −.363 | −.1.141 | .415 | −1.596 | −3.645 | .453 | .531 | −.064 | 1.127 |
| At least one school in a tract that met AYP in 2012 | −.112 | −.818 | .584 | −.016 | −1.923 | 1.892 | −.827** | −1.349 | −.304 |
| At least one school in a tract did not meet AYP in 2012 | .229 | −.427 | .885 | 1.158 | −.748 | 3.064 | −.181 | −.653 | .290 |

*$p < .05$; **$p < .01$; ***$p < .001$.