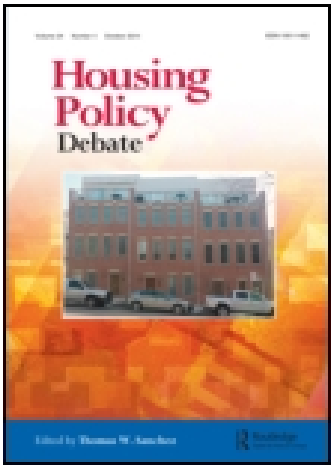

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Employment Accessibility Among Housing Subsidy Recipients

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Employment Accessibility Among Housing Subsidy Recipients

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This article estimates the extent to which different types of subsidized households live near employment, measuring the extent of spatial mismatch between these households and employment. Using census tract–level data from the U.S. Department of Housing and Urban Development on housing subsidy locations and employment data from the U.S. Census Bureau, this article uses a distance-decay function to estimate job-accessibility indices for census tracts in metropolitan statistical areas with 100,000 people or more. I use these data to create weighted job-accessibility indices for housing subsidy recipients (public housing, Low-Income Housing Tax Credit, Section 8 New Construction, and housing voucher households) and the total population and renter households earning below 50% of area median income as points of comparison. I find that of all these groups, by a large margin, public housing households live in census tracts with the greatest proximity to low-skilled jobs. However, they also live among the greatest concentration of individuals who compete for those jobs, namely, the low-skilled unemployed. These findings suggest that we pay close attention to the trade-offs that public housing residents are making as these units are demolished and replaced with vouchers.

Keywords: public housing; spatial mismatch; vouchers; low-income housing; labor markets

The Housing Choice Voucher Program (also known as the Section 8 Voucher Program) is the largest rental housing subsidy in the United States, helping over 2 million households secure housing each year (Schwartz, 2010). As U.S. housing policy has moved away from the traditional public housing model toward one that relies increasingly on vouchers and smaller-scale subsidized housing construction, a breadth of research has explored the effects of these policies on a number of outcomes. Of particular interest to policymakers (and participants) is the extent to which vouchers allow access to higher-opportunity neighborhoods. Given public housing's legacy of segregation into often dangerous and undesirable neighborhoods, there is a deserved focus on neighborhood quality for subsidized households.

Most commonly, neighborhood quality has been measured using poverty rates (McClure, 2006; Pendall, 2000), but recent research has also examined public safety (Lens, Ellen, & O'Regan, 2011) and school quality (Ellen & Horn, 2012), and research on the Gautreaux, Moving to Opportunity, and HOPE VI programs has shed light on some of the neighborhood and household effects of using vouchers to leave public housing, albeit for a small subset of the voucher population. We know from prior research that voucher

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households occupy relatively high-poverty neighborhoods (Pendall, 2000) and neighborhoods zoned for low-performing schools (Ellen & Horn, 2012), but that crime levels where the typical voucher household lives are higher than average—but lower than neighborhoods with public housing and Low-Income Housing Tax Credit (LIHTC) properties (Lens et al., 2011). An issue that has not been studied is the location of subsidized housing with respect to employment and job growth. With the U.S. Department of Housing and Urban Development (HUD) and local housing policymakers focused on allowing subsidized households access to greater opportunity, this is a vitally important consideration.

This article seeks to identify the extent to which housing subsidy recipients live near jobs, evaluating whether there is a spatial mismatch between these households and employment. Using HUD data on subsidized housing populations and U.S. Census Bureau employment files, I estimate job-accessibility indices for census tracts in metropolitan statistical areas (MSAs) with 100,000 people or more. I find strong evidence that public housing residents are typically much closer to employment opportunities than voucher and LIHTC households and the general population. However, they are also concentrated among the competition for the low-skilled job opportunities that they are likely to covet.

Thus, the extent to which subsidized households suffer from spatial mismatch depends on how that mismatch is defined. Public housing residents and other subsidized households that live in large employment centers (typically in central cities) benefit from this proximity, but they are also clustered among many low-skilled unemployed individuals who compete directly for these jobs. In the context of public housing demolitions—often in job-rich sections of central cities—these findings demand that we pay close attention to voucher locational outcomes in terms of employment. If public housing households are commonly shifting to the voucher program with decreasing access to jobs yet also decreasing proximity to the low-skilled unemployed who will serve as their competition, that could be a good thing. However, low-income and voucher households are more frequently moving to lower-income suburbs (Covington, Freeman, & Stoll, 2011), where job opportunities may be scarce. In these suburbs, housing policymakers and advocates need to help voucher (and LIHTC) households avoid the worst of both worlds: disadvantaged suburban areas with dispersed employment, low employment growth, and concentrations of low-skilled unemployed individuals competing for the few employment opportunities that exist.

Theory and Empirical Evidence

Research on employment accessibility for low-income households is wide-ranging, owing much to the pioneering work of Kain, who developed the spatial mismatch hypothesis.[1] This hypothesis states that a legacy of discriminatory housing markets and resulting segregation of racial minorities into central cities, combined with the flight of whites and businesses to the suburbs, has left low-skilled, low-income, and minority households clustered in areas with exceedingly low job prospects (Kain, 1968). Furthermore, this population's heavy reliance on public transportation that often does not provide access to suburban job clusters leaves these households unable to access employment in the suburban periphery (Raphael & Stoll, 2001; Stoll, 1999).

However, there is considerable disagreement over two important facets of spatial mismatch: the extent to which central-city residents live in areas with particularly poor employment prospects and whether spatial accessibility to employment affects employment outcomes at the household level. The first of these questions—whether spatial mismatch exists in central cities—is particularly relevant to subsidized housing households. Traditional public housing has long been heavily concentrated in central

cities, but housing vouchers and LIHTCs have increasingly located in the suburbs, to the point where about half of these households live in suburban areas (Covington et al., 2011; McClure, 2006). Thus, a plausible theory is that residents in these newer forms of subsidized housing will find themselves in better proximity to suburban jobs than will public housing households, unless voucher and LIHTC households tend to live apart from the more job-intensive suburban areas.

Early work on spatial mismatch was unequivocal in stating that the legacy of racial segregation, coupled with the restructuring and relocation of the manufacturing and other sectors that provide low-wage employment opportunities, has largely left minorities in job-poor areas (Kain, 1968; Wilson, 1986, 1996). As more researchers have empirically studied this phenomenon in U.S. cities, the picture has become more mixed. A number of authors find that populations who tend to live in central cities live farther from employment possibilities than do others, including African Americans (Stoll, 2006), welfare recipients (Blumenberg & Ong, 1998; Ong & Blumenberg, 1998), and recipients of housing subsidies (Bania, Coulton, & Leete, 2003). However, some research finds that employment opportunities in some metropolitan areas are strongest in the central city (Shen, 1998, 2001). Much of this disagreement stems from the use of different measures of spatial mismatch and different cities and metropolitan areas under study.

Whether spatial mismatch negatively impacts employment outcomes is also a well-studied source of contention. Stoll (1999) finds that Blacks and Latinos live in areas of Los Angeles with poor job growth and that this results in their searching for jobs more extensively; that is, they search in larger areas, and thus it takes them more time and effort to find work. Also in Los Angeles, Ong and Blumenberg (1998) find that welfare recipients are slightly more likely than the rest of the labor force to live in job-poor neighborhoods and less likely to live in neighborhoods with better job prospects and that this lack of job proximity makes it less likely that they will find work. On the other hand, Cervero, Sandoval, and Landis (2002) find no relation of regional job accessibility to employment outcomes for welfare recipients in Alameda County, California—a finding echoed by Sanchez, Shen, and Peng (2004), who look at Temporary Assistance for Needy Families recipients in six U.S. cities. Relevant to this article, results from the Moving to Opportunity program cast some doubt on the importance of employment accessibility, given that no employment impacts are seen from living closer to potential employment opportunities (Briggs, Popkin, & Goering, 2010; Kling, Liebman, & Katz, 2007).

The research by Shen is perhaps the most germane to this article, given its focus on low-income and subsidized households and that he constructs neighborhood-based measures of employment accessibility for these populations. A methodological strength of his work is the explicit treatment of the competition for jobs—that is, the low-skilled unemployed—in determining the employment accessibility of low-income households. He also calculates measures separately for those relying on auto and public transit modes. In work published in 1998, he uses data from the Boston metropolitan area to determine the employment accessibility of low-wage workers and finds that inner-city residents have much greater accessibility to employment than those outside the city. He also finds that while the majority of neighborhoods are highly accessible to jobs via auto travel, the opposite is true for public transit; in fact, residents were likely to be better off living in the suburbs and traveling by car rather than living in the job-rich inner city and traveling by public transit.

In a 2001 paper, Shen improves upon his previous measures by analyzing job openings rather than static employment numbers. Shen's methodology (discussed later in more detail) estimates job openings through two components: job growth and job turnover. Again

using data from the Boston Metropolitan Area, the results are consistent with his 1998 paper: Central-city locations offer greater employment accessibility than the suburbs do.

Data and Methods

This article builds on Shen's 1998 and 2001 papers, incorporating an additional methodological insight from Parks (2004). In addition to these methodological features, this article is novel in its use of multiple metropolitan areas and its focus on the full public housing, voucher, and LIHTC populations to get a comprehensive picture of the employment accessibility aspects of their residential locations.

The voucher and public housing data come from HUD's Picture of Subsidized Households, published online for 1996–1998, 2000, and 2004–2009 (U.S. Department of Housing and Development, 2013). LIHTC data come from the National Housing Preservation Database (NHPD) (PAHRC & NLIHC, 2013),[2] which covers over 2 million properties placed into service between 1987 and 2009. The NHPD also provides tract-level counts of Section 8 New Construction properties with current subsidies, which I also include as a comparison group. The tract-level employment data are from the U.S. Census Longitudinal Employer-Household Dynamics (LEHD) database (U.S. Department of the Census, 2013a). These are available annually from 2002 to 2009, include jobs per census tract and North American Industry Classification System codes, and are split into three income categories. For comparisons to the general population, and renter households below 50% of the area median income (AMI), I append data from the 2009 5-year American Community Survey estimates (U.S. Department of the Census, 2013b).

A simple measurement of employment accessibility might begin by counting the number of jobs located within a certain distance (say 15, 20, or 50 miles), and then create weighted averages or correlations for the residential locations of populations of interest. However, there are several limitations to this strategy. First, job seekers can only access jobs that are available; job growth and openings are more important than existing jobs. Second, all of the jobs located within the chosen mile marker will be treated equally, and those outside it ignored. Third, job openings are also coveted by other, similar employees, and this measure does not control for the competition for those jobs.

Addressing the first of these issues requires estimation. Unfortunately, to truly capture vacancies at a particular time would entail surveying businesses and/or a comprehensive scanning of job postings. Each of these efforts would require extensive resources, and even then the likelihood of capturing the universe of job openings or even a remotely unbiased sample would be quite small. Thus, I follow Shen (2001) and estimate job openings using multiple years of data from the Census LEHD. This strategy assumes that job openings are composed of vacancies plus new opportunities created by employment growth:

$$O_{jt} = O_{jt}(G) + O_{jt}(T) \tag{1}$$

where O_{jt} is the number of job openings, $O_{jt}(G)$ is net employment growth (measured in this article using data from 2007 to 2009), and $O_{jt}(T)$ is the number of jobs created by turnover (assuming Shen's estimate of 3% monthly), all measured in tract j and year t. Employment growth (O_{jt} (G)) is also estimated as a monthly rate:

$$O_{jt}(G) = \left[\frac{E_{j,2009} - E_{j,2007}}{24\,\text{months}}\right] \times 0.5\,\text{months} \tag{2}$$

The change in the number of jobs between 2007 and 2009 is divided by 24 months and multiplied by 0.5 months as an estimate of the length of time that the typical job is open

(Shen, 2001). Given that turnover is estimated from the universe of employment at a point in time, and growth is estimated from the growth in jobs, the turnover portion of this job-openings estimate is typically much larger than the growth portion. This keeps the number positive in the vast majority of cases, despite the analysis period encompassing the Great Recession. O_{jt}, $O_{jt}(G)$, and $O_{jt}(T)$ totals are summarized at the top of Table 1.

The second issue concerns the equivalence of jobs that are different distances away from residential locations. To weigh job openings spatially in a manner that a job seeker implicitly would when contemplating opportunities and commutes, I create distance-weighted job-accessibility indices for every census tract. This follows Parks (2004) and Raphael (1998) and takes the form of a gravity measure of accessibility that discounts job openings farther away using a distance-decay function:

$$A_{ki} = \sum_{j=1}^{N} O_{kjt} \exp(\gamma d_{ij}) \tag{3}$$

Table 1. Tract-level means.

	N	Mean	Standard deviation	Min.	Max.
Job openings, 2009 (monthly)	48,823	3,271.1	4,829.0	−24.6	37,899.0
Job growth, 2007–2009 (monthly)	48,823	−40.7	354.3	−1,187.1	3,419.7
Turnover, 2009 (monthly)	48,823	3,311.8	4,582.0	0.1	35,927.2
Nearby labor force, 2009	48,823	244,715.2	413,578.2	32.9	9,991,285.4
Nearby unemployed with no college degree, 2009	48,271	2,165.3	4,538.5	0.0	129,026.4
Population, 2009	48,823	4,794.4	2,971.3	6.0	55,283.0
Vouchers, 2009	48,823	34.1	53.0	0.0	1,629.0
Vouchers, 2004	48,823	26.8	42.9	0.0	787.0
Vouchers, 2000	48,823	22.7	37.9	0.0	690.0
LIHTC units, 2009	48,823	27.0	81.9	0.0	2,187.0
LIHTC units, 2004	48,823	20.9	69.8	0.0	1,898.0
LIHTC units, 2000	48,823	12.1	49.5	0.0	1,240.0
Public housing units, 2009	48,823	15.1	80.3	0.0	3,292.0
Public housing units, 2004	48,823	16.5	92.2	0.0	5,859.0
Public housing units, 2000	48,823	18.5	97.7	0.0	3,852.0
Section 8 New Construction, 2009	48,823	17.2	61.6	0.0	1,689.0
Section 8 New Construction, 2005	48,823	12.2	51.0	0.0	1,689.0
Section 8 New Construction, 2000	48,823	8.9	42.0	0.0	1,654.0
Renters below 50% AMI, 2009	48,823	364.7	342.9	0.0	4,252.0
Renters below 50% AMI, 2005	48,823	340.9	319.9	0.0	4,011.0
Renters below 50% AMI, 2000	48,823	317.2	311.4	0.0	3,872.0
Total jobs, 2009	48,823	220,783.9	305,467.3	4.6	2,395,146.3
Total jobs, 2007	48,823	222,737.0	294,213.6	4.1	2,303,241.6
Total jobs, 2002	47,775	215,468.0	285,778.2	1.1	2,208,500.2
Low-skilled jobs, 2009[a]	48,823	83,474.4	97,075.2	1.2	711,379.7
Low-skilled jobs, 2007	48,823	90,373.6	100,748.1	0.9	722,648.8
Low-skilled jobs, 2002	47,775	89,058.3	100,444.4	0.8	713,342.4
Lower-income jobs, 2009[b]	48,823	50,402.8	61,992.3	1.2	435,533.3
Lower-income jobs, 2007	48,823	54,032.8	64,874.9	1.1	462,854.6
Lower-income jobs, 2002	47,775	59,134.1	72,257.6	0.4	507,548.6

Note. AMI = area median income. LIHTC = Low-Income Housing Tax Credit.
[a] Low-skilled jobs are those in the following North American Industry Classification System sectors: 11 (agriculture), 23 (construction), 31–33 (manufacturing), 44–45 (retail), 56 (administrative and support and waste management), 72 (accommodation and food services), and 81 (other services).
[b] Lowest income category reported in Census Longitudinal Employer-Household Dynamics files is income < $1,250 per month.

Mechanically, a straight line is drawn between the centroid of every residential census tract i and potential employment census tract j within 50 miles, and the distance d_{ij} between those two centroids is measured. The job-accessibility index A_{ki} is the accessibility index of tract i to job openings of type k in surrounding census tract j. O_{kjt} is the number of job openings of type k in census tract j in a given year t, and γ_{ij} is a distance-decay parameter.[3]

With these weights applied to jobs in surrounding census tracts and the job-accessibility indices calculated, I then calculate the job-accessibility indices of voucher, public housing, and LIHTC households, in addition to Section 8 New Construction, renters below 50% of the AMI, and the total population, and compare them with one another. To do this, I simply compute weighted averages of the form:

$$\sum_{i=1}^{N}\left[A_{ki}\left(\frac{v_i}{V}\right)\right] \tag{4}$$

where the job index for each subgroup (in this case vouchers) is calculated by weighting the proportion of each subgroup that occupies a tract with a given job index, or A_{ki}. Thus, v_i is the number of voucher households in that tract, V is the number of voucher households in the entire sample, and A_{ki} is a tract's job-accessibility index. This results in the job-accessibility index of the typical household in a given MSA or the entire sample of MSAs. To address the substantial heterogeneity between MSAs, I report the results for each population group as a ratio between that group and the total population. I am thus able to take advantage of a large, heterogeneous sample of MSAs without having that heterogeneity bias the results.

The third issue concerns the competition for jobs. Job seekers do not search in a vacuum; employment opportunities are sought by many others. Therefore, I divide the number of job openings (O_{jt}) by the number of low-skilled individuals who are near the households of interest. To do this, I create a gravity measure for the competition, where Equation (3) is applied to the number of low-skilled unemployed individuals. Thus, I am not just measuring how many low-skilled unemployed potential job seekers may be in the same tract as a set of voucher or public housing households (who I also assume to be relatively low-skilled), but those who are in surrounding tracts. The farther those households are from the residential location tracts of interest, the less weight they carry in the job-openings denominator. As we will see, how the competition is defined radically changes how we conceive job accessibility between different types of subsidized households. Given that public housing, voucher, and LIHTC households tend to live near clusters of low-skilled unemployed households, the use of this denominator greatly reduces their observed job accessibility when compared with the use of other potential denominators, such as the entire labor force.

Finally, given the limitations of a Euclidean distance–based measure of proximity to employment, I utilize travel-time estimates for a subset of cities (Atlanta, Georgia; Augusta, Georgia; Baltimore, Maryland; Chicago, Illinois; Fresno, California; Houston, Texas; Los Angeles, California; New York, New York; and Spokane, Washington).[4] These estimates are derived from a Stata utility developed by Ozimek and Miles (2011) that creates time estimates using Google Maps queries over the road network. Using these estimates, I calculate job-accessibility estimates using time rather than distance measures, which better capture commuting realities with their variances in road access and traffic. However, it should be noted that the drive-time estimates do not necessarily reflect traffic conditions at peak commuting times. Furthermore, these measures are not able to capture differences

between public transit and auto travel times, although buses run on the road network and comprise the vast majority (or the entirety) of public transit in most cities.

Results

Table 1 provides census tract–level means on the key employment and population-group variables for 2000 (2002 for employment numbers), 2004, and 2009. The sample is all tracts in the 300 MSAs with greater than 100,000 people as of the 2000 U.S. Census. At the top of the table are job openings (O_{it}), openings due to growth ($O_{it}(G)$), and openings due to turnover ($O_{it}(T)$). As expected, job growth was negative from 2007 to 2009, but there is still an average of 3,271 distance-weighted openings, thanks to employment turnover. In terms of subsidized housing, there were steady declines in the public housing stock and substantial increases in households in LIHTC and voucher units between 2000 and 2009. Below the subsidized housing variables, I provide distance-weighted jobs in 2002, 2007, and 2009 (these data are not available for 2000) to observe how these numbers change before and during the recession. For employment (total jobs, low-skilled jobs, and lower-income jobs), those numbers reflect the distance-weighted number of jobs that the average census tract has within the 50-mile radius. The years 2002–2007 reflect strong job growth; then, in the next 2 years, the mean jobs per tract declines during the Great Recession. The mean number of lower-income jobs (where income is less than $1,250 per month) actually declined throughout the data period, potentially through income growth (resulting in some low-income jobs passing the $1,250 threshold) or a sagging labor market at the lower tail of the income distribution. Interestingly, the number of low-skilled jobs declined at a much higher rate between 2007 and 2009 than did the total number of jobs, although the mean tract had an increase in such jobs, suggesting that tracts that had an increase had particularly large increases.

Table 2 presents job-accessibility estimates for six population groups: the total population; households using vouchers, in LIHTC properties, in public housing, and in Section 8 New Construction; and renter households below 50% of the AMI. The last is an informative comparison group because this is the typical income threshold for public housing and voucher program qualification. The estimates are job-accessibility measures calculated using the growth estimates, distance-decay function and weighted averages described in Equations 1–4 for the largest 300 MSAs. These estimates are expressed as ratios between the job accessibility of the listed population group within an MSA and the total MSA population in order to treat each MSA as a distinct labor market. It is important to note that these job-accessibility estimates should not be compared directly with the distance-weighted employment numbers in Table 1. They are MSA-specific ratios, and they are divided by the distance-weighted estimate of the number of low-skilled unemployed in the surrounding area.

Included in the table are three job accessibility measures. The table lists the total job openings per low-skilled unemployed at the top, then low-skilled job openings per low-skilled unemployed in the middle, and low-income jobs per low-skilled unemployed on the bottom—all measured using 2007 and 2009 employment figures. The results in this table will differ from those presented in Table 3 as a result of a change in the denominator used to control for the competition for jobs. In this table, the denominator is the distance-weighted low-skilled unemployed, whereas the entire (distance-weighted) labor force is the denominator in Table 3. Estimates of the low-skilled unemployed come from the 5-year 2009 American Community Survey.

I analyze the three job categories separately to address the likelihood that the low-skilled and/or low-paying jobs often obtained by subsidized household members are not

Table 2. Job-accessibility measures: Jobs per low-skilled unemployed, 2009.

Group	*N*	Weighted mean	Weighted standard deviation	Significantly different from total population?
Job openings per low-skilled unemployed, 2009				
Total population	46,034	1.00	1.30	N/A
Vouchers	46,034	0.75	1.02	Yes
LIHTC	46,034	0.80	1.03	Yes
Public housing	46,034	0.68	0.90	Yes
Section 8 New Construction	46,034	0.81	1.09	Yes
Renters below 50% AMI	46,034	0.86	1.16	Yes
Low-skilled job openings per low-skilled unemployed, 2009				
Total population	46,034	1.00	1.29	N/A
Vouchers	46,034	0.74	1.01	Yes
LIHTC	46,034	0.79	1.01	Yes
Public housing	46,034	0.66	0.86	Yes
Section 8 New Construction	46,034	0.79	1.06	Yes
Renters below 50% AMI	46,034	0.84	1.13	Yes
Low-income job openings per low-skilled unemployed, 2009				
Total population	46,034	1.00	2.03	N/A
Vouchers	46,034	0.74	1.19	Yes
LIHTC	46,034	0.83	2.60	Yes
Public housing	46,034	0.66	1.05	Yes
Section 8 New Construction	46,034	0.79	1.91	Yes
Renters below 50% AMI	46,034	0.85	1.68	Yes

Note. AMI = area median income. LIHTC = Low-Income Housing Tax Credit. Sample: U.S. metropolitan statistical areas with population > 100,000. Variables measured as ratio between each group and total population.

Table 3. Job-accessibility measures: Jobs per labor-force member, 2009.

Group	*N*	Weighted mean	Weighted standard deviation	Significantly different from total population?
Job openings per low-skilled unemployed, 2009				
Total population	48,823	1.00	1.74	N/A
Vouchers	48,823	1.19	1.28	Yes
LIHTC	48,823	1.33	2.33	Yes
Public housing	48,823	2.04	8.27	Yes
Section 8 New Construction	48,823	1.52	2.59	Yes
Renters below 50% AMI	48,823	1.16	1.31	Yes
Low-skilled job openings per low-skilled unemployed, 2009				
Total population	48,823	1.00	1.71	N/A
Vouchers	48,823	1.17	1.22	Yes
LIHTC	48,823	1.30	2.15	Yes
Public housing	48,823	1.97	8.11	Yes
Section 8 New Construction	48,823	1.46	2.41	Yes
Renters below 50% AMI	48,823	1.13	1.24	Yes
Low-income job openings per low-skilled unemployed, 2009				
Total population	48,823	1.00	2.12	N/A
Vouchers	48,823	1.17	1.31	Yes
LIHTC	48,823	1.31	2.80	Yes
Public housing	48,823	1.93	7.46	Yes
Section 8 New Construction	48,823	1.48	2.76	Yes
Renters below 50% AMI	48,823	1.14	1.58	Yes

Note. AMI = area median income. LIHTC = Low-Income Housing Tax Credit. U.S. metropolitan statistical areas with population > 100,000. Ratio to total population.

distributed equally across cities and metropolitan areas. In fact, Stoll (2005) finds that central cities contain a disproportionate share of high-skilled jobs. Given that, looking at all job types in the aggregate may inflate job-accessibility estimates for subsidized households through their concentration in central cities. The low-skilled job category includes the following North American Industry Classification System sectors: agriculture, construction, manufacturing, retail, administrative and support and waste management, accommodation and food services, and other services. I also identify low-income jobs using the LEHD's lowest income category of less than $1,250 per month.

The estimates are expressed as ratios between the different population groups' job accessibility and that for the entire MSA population: The value for the total population is 1 and provides a standard point of comparison. Looking at each job type, what stands out is that all of the populations under investigation—voucher, LIHTC, public housing, Section 8 New Construction, and renters below 50% of the AMI—live in areas with lower accessibility to jobs than the total population does. The gap between each of these relatively less-advantaged groups and the overall population is the same for low-skilled and low-income jobs, and the groups' rank in job accessibility is the same regardless of job type. It is also notable from a housing policy standpoint that all of the housing subsidy groups live in areas that are less accessible to jobs than does the full population of renters below 50% of the AMI. Public housing households are a subset of this population and are in areas with roughly 25% fewer job openings per low-skilled unemployed. Generally speaking, public housing households are in areas with fewer job openings per low-skilled unemployed than for all of the subsidized housing groups—roughly 10–12% fewer job openings per low-skilled unemployed than voucher households. Voucher and LIHTC households are more similar in terms of job accessibility.

Although these results suggest that subsidized households live in areas with low job accessibility, this depends upon how that accessibility is measured. Given the tendency for subsidized and low-skilled households to cluster in particular neighborhoods within metropolitan areas, this clustering may be driving the observed results, as the denominator (or competition for jobs) is the nearby low-skilled unemployed. Therefore, in Table 3, I present results using the entire labor force as the denominator (job openings per member of the labor force). These results are strikingly different. First, all of the relatively disadvantaged subgroups are near more jobs per labor-force member than the entire population is. Second, public housing households are closer to substantially more job openings per labor-force member than any other group is. The difference is quite large: Public housing households are closer to roughly 2 times as many job openings as the total population, 35% more than the nearest subgroup (Section 8 New Construction, like public housing a supply-side subsidy, Check word space. with dwindling numbers of new units) and about 88% more than all renters below 50% of the AMI. Public housing households are located near 72% more job openings per labor-force member than the voucher population is, an important consideration given the growth of the voucher program, often as a result of public housing demolition. We can further conclude that public housing displays wild swings in comparison to the other subgroups when changing the job-seeking competition denominator. This is because public housing is more highly concentrated in areas with high employment growth and large numbers of low-skilled workers and because public housing is not as proximate to the entire labor force as to voucher households and the other groups.

The results in Tables 2 and 3 may suffer from a couple of limitations. First, I have reported weighted averages for a large set of tracts, which obscures differences between metropolitan areas and the cities within them. Second, these estimates report Euclidean

distance–based measures of accessibility that may not be ideal approximations for how prospective employees commute to and from jobs using cars or public transit. Although I do not have public transit data, I have data in nine cities that utilize Google Maps queries over the road network to create time-based job-accessibility measures that account for differences in road coverage and, in a limited way, traffic conditions. Again, buses run on the road network and comprise a substantial (or in some cases the entire) portion of public transit. For the time-based measures, I use the decay parameter of 0.058 that was empirically derived by Parks (2004; see Note 3).

In Table 4, estimates of job openings per labor-force member are provided for these nine cities, with the distance and time measurements on the left and right side of the table, respectively. One thing that stands out from these estimates is that the distance and time measures produce similar results. In nearly every city, the estimates differ very little

Table 4. Distance- and time-based measures of job accessibility in nine U.S. cities: Jobs per labor-force member, 2009.

	Distance			Time		
	N	Mean	SD	*N*	Mean	SD
Atlanta, Georgia						
Total population	752	0.004	0.003	752	0.004	0.003
Vouchers	752	0.006	0.007	752	0.007	0.008
LIHTC	752	0.006	0.005	752	0.006	0.006
Public housing	752	0.007	0.005	752	0.007	0.006
Section 8 New Construction	752	0.008	0.006	752	0.009	0.007
Renters below 50% AMI	752	0.005	0.004	752	0.005	0.004
Augusta, Georgia						
Total population	72	0.006	0.005	72	0.006	0.005
Vouchers	72	0.008	0.007	72	0.008	0.007
LIHTC	72	0.008	0.003	72	0.008	0.003
Public housing	72	0.015	0.013	72	0.016	0.014
Section 8 New Construction	72	0.017	0.014	72	0.017	0.014
Renters below 50% AMI	72	0.009	0.008	72	0.009	0.008
Baltimore, Maryland						
Total population	1,443	0.003	0.010	1,443	0.004	0.010
Vouchers	1,443	0.004	0.003	1,443	0.004	0.004
LIHTC	1,443	0.004	0.003	1,443	0.004	0.003
Public housing	1,443	0.007	0.009	1,443	0.007	0.009
Section 8 New Construction	1,443	0.004	0.003	1,443	0.004	0.003
Renters below 50% AMI	1,443	0.004	0.003	1,443	0.004	0.003
Chicago, Illinois						
Total population	1,912	0.004	0.004	1,912	0.004	0.005
Vouchers	1,912	0.005	0.006	1,912	0.006	0.007
LIHTC	1,912	0.006	0.008	1,912	0.007	0.009
Public housing	1,912	0.008	0.009	1,912	0.008	0.009
Section 8 New Construction	1,912	0.006	0.004	1,912	0.006	0.005
Renters below 50% AMI	1,912	0.005	0.005	1,912	0.005	0.006
Fresno, California						
Total population	265	0.006	0.012	265	0.006	0.012
Vouchers	265	0.006	0.003	265	0.006	0.003
LIHTC	265	0.011	0.032	265	0.011	0.033
Public housing	265	0.010	0.014	265	0.010	0.014
Section 8 New Construction	265	0.037	0.078	265	0.037	0.080
Renters below 50% AMI	265	0.007	0.014	265	0.007	0.015

(*Continued*)

Table 4 – *continued*

	Distance			Time		
	N	Mean	SD	*N*	Mean	SD
Houston, Texas						
Total population	909	0.006	0.012	909	0.007	0.011
Vouchers	909	0.008	0.005	909	0.008	0.005
LIHTC	909	0.007	0.005	909	0.008	0.005
Public housing	909	0.011	0.005	909	0.011	0.005
Section 8 New Construction	909	0.010	0.006	909	0.010	0.006
Renters below 50% AMI	909	0.007	0.005	909	0.007	0.005
Los Angeles, California						
Total population	3,069	0.004	0.007	3,069	0.005	0.007
Vouchers	3,069	0.004	0.003	3,069	0.005	0.003
LIHTC	3,069	0.006	0.017	3,069	0.006	0.016
Public housing	3,069	0.010	0.005	3,069	0.010	0.005
Section 8 New Construction	3,069	0.005	0.002	3,069	0.005	0.002
Renters below 50% AMI	3,069	0.005	0.003	3,069	0.005	0.003
New York, New York						
Total population	3,524	0.004	0.005	3,524	0.004	0.004
Vouchers	3,524	0.004	0.004	3,524	0.004	0.004
LIHTC	3,524	0.006	0.006	3,524	0.005	0.006
Public housing	3,524	0.008	0.056	3,524	0.008	0.050
Section 8 New Construction	3,524	0.005	0.012	3,524	0.005	0.012
Renters below 50% AMI	3,524	0.004	0.006	3,524	0.004	0.006
Spokane, Washington						
Total population	145	0.005	0.003	145	0.005	0.003
Vouchers	145	0.006	0.004	145	0.006	0.004
LIHTC	145	0.005	0.002	145	0.005	0.003
Public housing	145	0.011	0.006	145	0.012	0.007
Section 8 New Construction	145	0.008	0.005	145	0.009	0.005
Renters below 50% AMI	145	0.006	0.004	145	0.006	0.004

Note. AMI = area median income. LIHTC = Low-Income Housing Tax Credit. SD = standard deviation.

between distance- and time-based measures of job openings per low-skilled unemployed. Further, the public housing population continues to be nearest the highest number of jobs per labor-force member (in all cities except for Augusta and Atlanta). Additionally, in Table A1, we see that when job accessibility is defined as job openings per low-skilled unemployed, results are reversed and public housing is most often the least accessible. We can conclude from these results that the distance- and time-based results provide similar answers, and looking specifically at a subset of cities in isolation also confirms what we observed when looking at the United States as a whole.

The recent trend in public housing demolition makes Atlanta and Chicago particularly interesting cities because they are by far the most active participants in the HOPE VI program and have demolished and transformed more public housing than any other city (Popkin, Rich, Hendey, Parilla, & Galster, 2012). Given this, I wanted to look at how job-accessibility numbers have changed for public housing households in these two cities. In Table 5, I provide the time-based low-skilled jobs per worker estimates in 2000, 2004, and 2009 for Atlanta and Chicago, using the 2009 job-openings estimates with subgroup population locations from the listed years. With these data, I answer the question, Assuming that employment growth varied over space but not over time, how has the changing spatial distribution of subsidized households altered their accessibility to such employment growth? In the first three data

Table 5. Atlanta, Georgia, and Chicago, Illinois, job-accessibility measures: 2009 low-skilled job openings with 2000, 2004[a] and 2009 residential locations.

	Jobs per low-skilled unemployed			Jobs per labor-force member		
	2000	2004[a]	2009	2000	2004	2009
Atlanta						
Total population[a]	1.44	1.43	1.43	0.005	0.005	0.004
Vouchers	0.84	0.82	0.80	0.006	0.006	0.007
LIHTC	0.90	0.98	1.01	0.006	0.005	0.006
Public housing	1.09	1.01	1.22	0.011	0.011	0.007
Section 8 New Construction	1.02	0.84	0.81	0.009	0.009	0.009
Renters (50% AMI)[a]	1.27	1.27	1.27	0.006	0.006	0.005
Chicago						
Total population	0.90	0.91	0.92	0.005	0.004	0.004
Vouchers	0.49	0.54	0.54	0.005	0.005	0.006
LIHTC	0.44	0.44	0.50	0.006	0.006	0.007
Public housing	0.46	0.45	0.51	0.023	0.011	0.008
Section 8 New Construction	0.88	0.79	0.72	0.006	0.006	0.006
Renters (50% AMI)[a]	0.66	0.68	0.70	0.006	0.005	0.005

[a] For the total population and renter households below 50% AMI, 2005 estimates were used in lieu of 2004 numbers.

columns, I present low-skilled jobs per low-skilled unemployed. What we see here is that in both cities, public housing displays the greatest change over time, where at each point public housing becomes more and more accessible to jobs (LIHTC households in Chicago show a slightly higher increase over the 9 years). What this suggests is that the demolition and dispersion of public housing households in these two cities over this near-decade resulted in public housing households being less concentrated among the low-skilled unemployed, and thus subject to less competition for low-skilled jobs.

However, the final three data columns in Table 5 paint the opposite picture when we look at job openings per member of the labor force. Every population group other than public housing households remained constant at the three points in time. Public housing households saw a sharp decline in job accessibility in both cities, falling to just over one-third of the job accessibility level in Chicago in 2009 versus Chicago in 2000.

I can go further and identify the source of these changes: a change in proximity to low-skilled jobs, the low-skilled unemployed, and/or the overall labor force. In Table A2, I present percentage changes in these spatial proximities from 2000 to 2009. We see here that in Atlanta, the public housing population moved away from the low-skilled unemployed and low-skilled jobs at roughly equivalent rates (30% and 35%, respectively). In Chicago, however, the movement away from the low-skilled unemployed was more drastic than the movement away from low-skilled jobs (33% and 53%, respectively). In neither city did labor-force proximity change a great deal (5% increase in Atlanta, 5% decrease in Chicago). Thus, in Chicago, public housing demolition moved these households away from the low-skilled unemployed more intensively than it moved them away from jobs, which is a positive outcome. Figures 1 (Atlanta) and 2 (Chicago) depict these trends visually. It is clear that there were a large number of public housing units located close to the central business districts in both cities. Voucher households, on the other hand, are largely dispersed in both cities, with clusters in the low-income and job-poor South and West Sides of Chicago. In Chicago, thousands of the demolished units were located in well-known developments such as Cabrini Green, Henry Horner, and Ida B. Wells, and the Robert Taylor Homes; all of these were within five miles of the Loop

Figure 1. Atlanta, Georgia, employment density, public housing, and vouchers, 2000 and 2009.

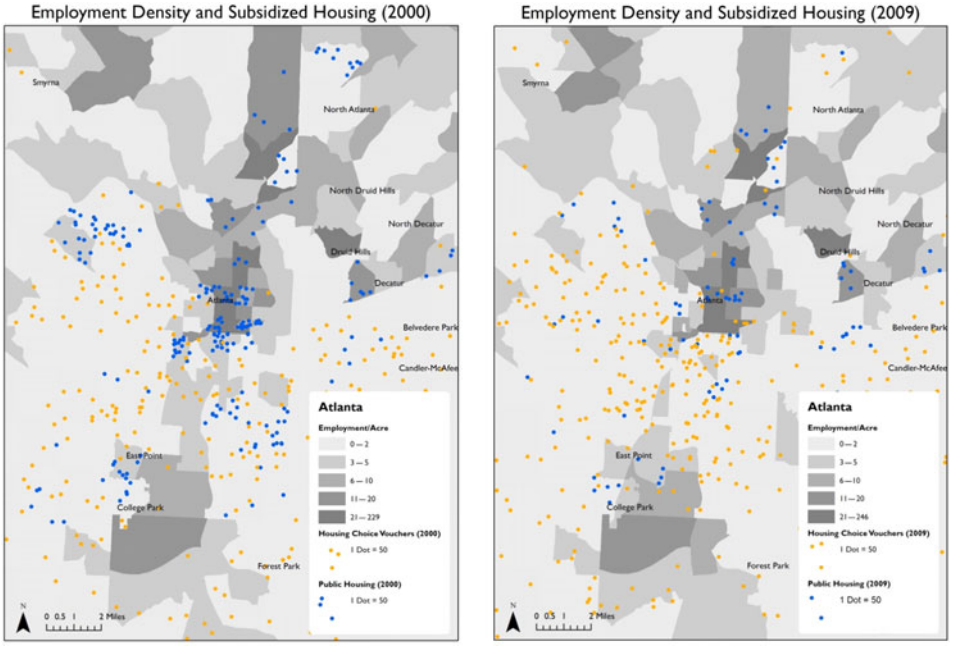
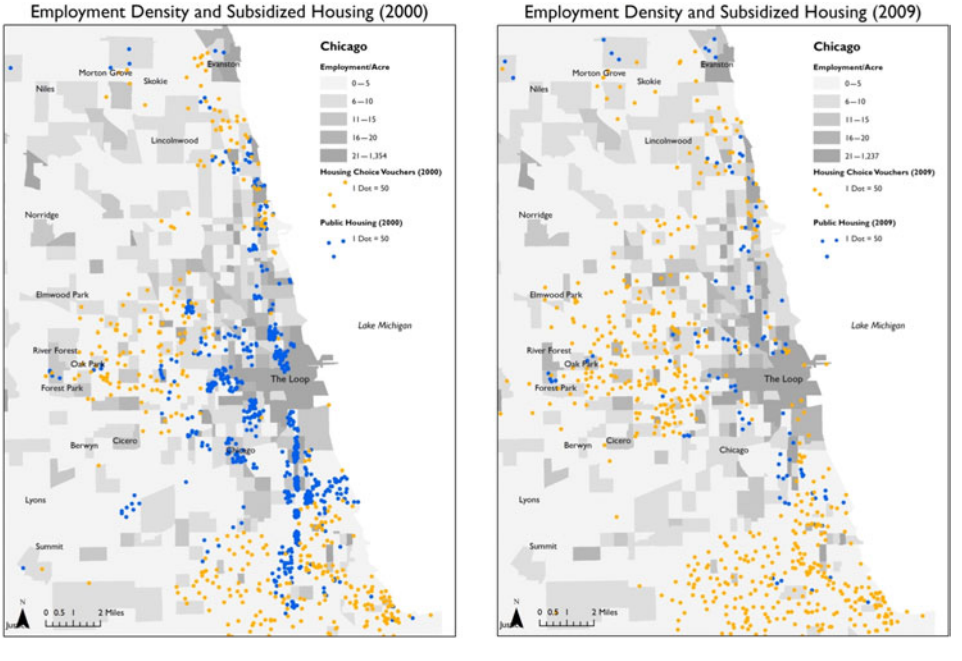


Figure 2. Chicago, Illinois, employment density, public housing, and vouchers, 2000 and 2009.



(Chicago's central business district), and all were demolished in the 2000s. It is worth noting, however, that unemployment rates in these housing developments were extremely high despite their proximity to Chicago's business core (Popkin, Levy, & Buron, 2009). Such high unemployment rates among public housing households may become less common through changes in the target population for public housing. Vale and Freemark (2012) contend that the concentration of the very poor in public housing projects is becoming a thing of the past, with public–private partnerships for public housing increasingly targeting the working poor. This suggests that spatial proximity to employment among the public housing population will become even more important, but provides a grim outlook for housing situations among the very poor.

Discussion

These results paint a mixed picture when considering spatial proximity to jobs for subsidized households. On the one hand, when controlling for the number of low-skilled unemployed in the surrounding area, it appears that subsidized households—and public housing households in particular—exhibit patterns that are typical of spatial mismatch. These households live in areas where many low-skilled unemployed also reside, making nearby low-skilled employment opportunities highly competitive.

On the other hand, it is also clear that subsidized households—and public housing households in particular—live in areas that are much more likely to be near employment centers and job growth than the general population does. The most obvious explanation for this is the fact that public housing was typically built in central cities, in closer proximity to central business districts. However, this turns much of the negative criticism about public housing on its head. The criticism contends that the suburbanization of jobs has left public housing households far from job opportunities and trapped in job-poor central cities. These findings concur with recent research by Shen (1998, 2001) that finds that job openings are more concentrated in central cities than previously concluded in other studies of spatial mismatch.

I am able to split the sample of census tracts into central-city and suburban areas. Table A3 summarizes a portion of these results, looking only at the low-skilled job openings, with openings per low-skilled unemployed on the left side of the table and openings per labor-force member on the right. Job openings per low-skilled unemployed estimates are identical in central cities and suburbs. Openings per labor-force member, on the other hand, look much more favorable for subsidized households (and low-income renters) than they do in the suburbs. This suggests that these population groups live closer to the rest of the labor force and/or farther from job opportunities in the suburbs.

Given the large sample of MSAs included in the analyses, the findings in this article are clearly generalizable to U.S. urban areas. However, it could be argued that 2007–2009 represents an atypical time in the history of the U.S. labor market. I replicated these analyses for 2004–2006 and found very similar results. These results are summarized in Tables A4 and A5. I also split the country into the four census regions (northeast, midwest, south, and west) and ran the analysis for each region separately (see Table A6). For the northeast, midwest, and south, the results are very consistent with the overall results. In the west, while the low-skilled job openings per labor-force member are similar to what we see in the other regions, the job openings per low-skilled unemployed are quite different. The gap between subsidized households and the total population is not as large, and public housing is no longer different from the other subsidized households in terms of job accessibility. This suggests that public housing is not as concentrated among the low-skilled unemployed in western metropolitan areas.

Recent policy changes in public housing are well exemplified by Atlanta and Chicago. In both of these cities, it is likely that centrally located public housing demolitions led to the typical public housing unit being located farther from centers of employment. While many of these units may have been located in distressed public housing developments, they were also likely to offer close proximity to employment opportunities for public housing residents. These findings echo research by Goetz (2013) that concludes that much of the housing demolished under HOPE VI was located in very job-accessible areas. But again, these housing units are now less concentrated within the competition for low-skilled work, and in Chicago the loss in job proximity during the 2000s for public housing households was smaller than the accompanying deconcentration among the low-skilled unemployed.

As a result of these recent policy changes, the comparison between public housing and voucher household proximity to jobs is illuminating and important. Voucher households tend to be more dispersed around metropolitan areas—in part by the design of the program. What these results suggest is that they are also farther away than public housing from employment. However, they are also farther away from low-skilled workers that may compete with them for work.

Given that housing policymakers are attempting to connect subsidized households to work, and are increasingly relying on vouchers as a means of providing such households better access to these opportunities, these findings suggest some reflection on which aspect of residential location—proximity to employment or a lack of clustering near other low-skilled potential workers—is more likely to result in better employment opportunities. Helping voucher households access areas that have high job growth and low concentrations of low-skilled unemployed should be the goal of housing policymakers.

Which aspect of residential location matters most? Or, put differently, what if the only way to reduce clustering among other low-skilled workers results in poorer proximity to jobs? Although more research needs to be done to tease out the comparative benefits and costs of concentrated poverty, social networks, and spatial proximity in employment outcomes, an individual job seeker is most concerned that there will be a job opening within a reasonable commuting distance. Proximity to the competition is important but probably a secondary concern. The most necessary condition for obtaining employment is that an opportunity exists. However, across all of the MSAs under analysis, subsidized households—and public housing households in particular—are more concentrated among the low-skilled unemployed than they are among employment opportunities.[5] Thus, while spatial proximity to employment may be more important, subsidized households are more intensely concentrated among the competition than among jobs. As we saw in Chicago, it is possible to alter the spatial concentration of public housing among low-skilled unemployed households to a greater degree than the accompanying reduction in concentration among job openings. This should be the goal.

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Notes

1. In fact, work on the spatial mismatch hypothesis is so extensive that it makes little sense to attempt a full review here. For such reviews, see Ihlanfeldt and Sjoquist (1998) and Kain (1992, 2004).

2. The NHPD contains expiration dates for subsidies such as the LIHTC and Section 8 New Construction, which are important for keeping subsidized housing data up to date (PAHRC & NLIHC, 2013).
3. Parks (2004) empirically estimated this parameter using household-level data on employment and residential locations for low-skilled females and arrived at an estimate of -0.058. With that, her estimate weighs jobs at distance k from tract i by 0 minutes $= 1$, 5 minutes $= 0.75$, 10 minutes $= 0.56$, and 20 minutes $= 0.31$. Using national surveys, I estimate the distance-to-time ratio for commuting as approximately 3 to 1. That is, roughly the same proportion of people work 15 minutes away that work 5 miles away; 30 minutes corresponds to 10 miles; etc. Thus, I arrived at a decay parameter of $-0.058 \times 3 = -0.174$, where 0 miles $= 1$, 3 miles $= 0.59$, 5 miles $= 0.42$, 15 miles $= 0.07$, 30 miles $= 0.005$, and 50 miles $= 0.0002$. Only jobs within 50 miles are included.
4. For these cities, researchers had already applied the time-intensive methodology developed by Ozimek and Miles for a study on cities that served as Moving to Opportunity and Welfare to Work Vouchers sites and generously provided these estimates to the author.
5. Table A7 displays this by summarizing the distance-weighted numbers of job openings, low-skilled unemployed, and labor-force members for the total population and each subgroup. These results show that public housing households live near 78% more low-skilled unemployed than the total population does, 32% more job openings, and 16% fewer members of the labor force.

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Appendix

Table A1. Distance- and time-based measures of job accessibility in nine U.S. cities: Jobs per low-skilled unemployed, 2009.

	Distance			Time		
	N	Mean	SD	*N*	Mean	SD
Atlanta, Georgia						
Total population	721	1.41	1.46	721	1.43	1.50
Vouchers	721	0.75	0.93	721	0.80	0.97
LIHTC	721	0.94	1.37	721	1.01	1.58
Public housing	721	1.14	1.36	721	1.22	1.56
Section 8 New Construction	721	0.76	0.69	721	0.81	0.68
Renters below 50% AMI	721	1.24	1.39	721	1.27	1.46
Augusta, Georgia						
Total population	72	1.11	1.27	72	1.06	1.25
Vouchers	72	0.77	0.36	72	0.76	0.35
LIHTC	72	0.83	0.64	72	0.80	0.58
Public housing	72	0.68	0.36	72	0.66	0.30
Section 8 New Construction	72	0.79	0.42	72	0.79	0.44
Renters below 50% AMI	72	0.80	0.49	72	0.78	0.45

(*Continued*)

Table A1 – *continued*

	Distance			Time		
	N	Mean	SD	*N*	Mean	SD
Baltimore, Maryland						
Total population	1,338	0.96	1.18	1,338	1.00	1.25
Vouchers	1,338	0.61	0.74	1,338	0.63	0.76
LIHTC	1,338	0.56	0.70	1,338	0.57	0.73
Public housing	1,338	0.43	0.72	1,338	0.44	0.67
Section 8 New Construction	1,338	0.70	1.22	1,338	0.73	1.29
Renters below 50% AMI	1,338	0.71	0.98	1,338	0.74	1.04
Chicago, Illinois						
Total population	1,771	0.97	2.02	1,771	0.92	1.79
Vouchers	1,771	0.54	1.60	1,771	0.54	1.43
LIHTC	1,771	0.49	0.59	1,771	0.50	0.56
Public housing	1,771	0.50	0.52	1,771	0.51	0.50
Section 8 New Construction	1,771	0.73	1.37	1,771	0.72	1.26
Renters (50% AMI	1,771	0.70	1.65	1,771	0.70	1.49
Fresno, California						
Total population	257	1.01	1.40	257	1.03	1.47
Vouchers	257	0.71	0.99	257	0.73	1.02
LIHTC	257	0.68	0.39	257	0.65	0.35
Public housing	257	0.93	0.94	257	0.90	0.91
Section 8 New Construction	257	0.79	1.28	257	0.79	1.28
Renters below 50% AMI	257	0.76	0.99	257	0.77	1.04
Houston, Texas						
Total population	857	2.23	2.79	857	2.33	2.98
Vouchers	857	1.50	1.85	857	1.55	1.87
LIHTC	857	1.51	1.82	857	1.55	1.77
Public housing	857	1.39	1.46	857	1.42	1.64
Section 8 New Construction	857	1.58	3.29	857	1.65	3.20
Renters below 50% AMI	857	1.78	2.22	857	1.81	2.25
Los Angeles, California						
Total population	2,907	1.09	1.40	2,907	1.13	1.44
Vouchers	2,907	0.87	1.04	2,907	0.90	1.08
LIHTC	2,907	0.99	1.79	2,907	1.02	1.81
Public housing	2,907	0.83	0.89	2,907	0.84	0.89
Section 8 New Construction	2,907	0.84	1.05	2,907	0.87	1.07
Renters below 50% AMI	2,907	0.98	1.41	2,907	1.01	1.45
New York, New York						
Total population	3,223	0.79	0.97	3,223	0.80	0.98
Vouchers	3,223	0.62	0.78	3,223	0.61	0.75
LIHTC	3,223	0.58	0.69	3,223	0.57	0.66
Public housing	3,223	0.52	0.69	3,223	0.50	0.72
Section 8 New Construction	3,223	0.60	0.58	3,223	0.58	0.54
Renters below 50% AMI	3,223	0.68	0.86	3,223	0.67	0.83
Spokane, Washington						
Total population	142	1.15	1.02	142	1.21	1.06
Vouchers	142	1.07	1.07	142	1.11	1.10
LIHTC	142	1.13	0.95	142	1.19	0.95
Public housing	142	0.98	1.34	142	1.00	1.35
Section 8 New Construction	142	1.16	1.18	142	1.22	1.19
Renters below 50% AMI	142	1.11	0.96	142	1.17	1.01

Note. AMI = area median income. LIHTC = Low-Income Housing Tax Credit. SD = standard deviation.

Table A2. Decomposing changes in job accessibility for public housing households in Atlanta, Georgia, and Chicago, Illinois: Changes in proximity to low-skilled job openings, low-skilled unemployed, and total labor force, 2000–2009.

	Low-skilled job openings	Low-skilled unemployed	Labor force
Atlanta	−29.6%	−34.5%	4.3%
Chicago	−32.7%	−53.4%	−5.0%

Table A3. Low-skilled job accessibility in central cities and suburbs.

	Low-skilled jobs per low-skilled unemployed		Low-skilled jobs per labor-force member	
Group	Central cities	Suburbs	Central cities	Suburbs
Total population	1.00	1.00	1.00	1.00
Vouchers	0.79	0.78	1.10	1.05
Low-Income Housing Tax Credit	0.83	0.86	1.32	1.04
Public housing	0.74	0.75	1.89	1.30
Section 8 New Construction	0.87	0.85	1.40	1.15
Renters below 50% area median income	0.90	0.87	1.08	1.05

Note. U.S. metropolitan statistical areas with population > 100,000. Ratio to total population.

Table A4. Jobs per low-skilled unemployed, 2006.

	N	Weighted mean	Weighted standard deviation	Significantly different from total population?
Job openings per low-skilled unemployed, 2009				
Total population	46,034	1.00	1.30	N/A
Vouchers	46,034	0.75	1.02	Yes
LIHTC	46,034	0.80	1.03	Yes
Public housing	46,034	0.68	0.90	Yes
Section 8 New Construction	46,034	0.81	1.09	Yes
Renters below 50% AMI	46,034	0.86	1.16	Yes
Low-skilled job openings per low-skilled unemployed, 2009				
Total population	46,034	1.00	1.29	N/A
Vouchers	46,034	0.74	1.01	Yes
LIHTC	46,034	0.79	1.01	Yes
Public housing	46,034	0.66	0.86	Yes
Section 8 New Construction	46,034	0.79	1.06	Yes
Renters below 50% AMI	46,034	0.84	1.13	Yes
Low-income job openings per low-skilled unemployed, 2009				
Total population	46,034	1.00	2.03	N/A
Vouchers	46,034	0.74	1.19	Yes
LIHTC	46,034	0.83	2.60	Yes
Public housing	46,034	0.66	1.05	Yes
Section 8 New Construction	46,034	0.79	1.91	Yes
Renters below 50% AMI	46,034	0.85	1.68	Yes

Note. AMI = area median income. LIHTC = Low-Income Housing Tax Credit. U.S. metropolitan statistical areas with population > 100,000. Ratio to total population.

Table A5. Jobs per labor-force member, 2006.

	N	Weighted mean	Weighted standard deviation	Significantly different from total population?
Job openings per labor force member, 2009				
Total population	48,823	1.00	1.74	N/A
Vouchers	48,823	1.19	1.28	Yes
LIHTC	48,823	1.33	2.33	Yes
Public housing	48,823	2.04	8.27	Yes
Section 8 New Construction	48,823	1.52	2.59	Yes
Renters below 50% AMI	48,823	1.16	1.31	Yes
Low-skilled job openings per labor force member, 2009				
Total population	48,823	1.00	1.71	N/A
Vouchers	48,823	1.17	1.22	Yes
LIHTC	48,823	1.30	2.15	Yes
Public housing	48,823	1.97	8.11	Yes
Section 8 New Construction	48,823	1.46	2.41	Yes
Renters below 50% AMI	48,823	1.13	1.24	Yes
Low-income job openings per labor force member, 2009				
Total population	48,823	1.00	2.12	N/A
Vouchers	48,823	1.17	1.31	Yes
LIHTC	48,823	1.31	2.80	Yes
Public housing	48,823	1.93	7.46	Yes
Section 8 New Construction	48,823	1.48	2.76	Yes
Renters below 50% AMI	48,823	1.14	1.58	Yes

Note. AMI = area median income. LIHTC = Low-Income Housing Tax Credit. U.S. metropolitan statistical areas with population > 100,000. Ratio to total population.

Table A6. Low-skilled job accessibility by U.S. Census region.

	Northeast	Midwest	South	West
Low-skilled job openings per low-skilled unemployed, 2009				
Total population	1.00	1.00	1.00	1.00
Vouchers	0.75	0.65	0.73	0.80
LIHTC	0.80	0.72	0.81	0.83
Public housing	0.65	0.56	0.66	0.86
Section 8 New Construction	0.77	0.79	0.76	0.82
Renters below 50% AMI	0.82	0.78	0.85	0.89
Low-skilled job openings per labor-force member, 2009				
Total population	1.00	1.00	1.00	1.00
Vouchers	1.14	1.28	1.26	1.01
LIHTC	1.29	1.49	1.25	1.21
Public housing	1.89	1.97	2.13	1.79
Section 8 New Construction	1.29	1.58	1.56	1.37
Renters below 50% AMI	1.08	1.19	1.18	1.05

Note. AMI = area median income. LIHTC = Low-Income Housing Tax Credit. U.S. metropolitan statistical areas with population > 100,000. Ratio to total population.

Table A7. Proximity to job openings, low-skilled unemployed, and labor force.

Group	*N*	Weighted mean	Weighted standard deviation	Significantly different from total population?
Job openings, 2009				
Total population	48,893	1.00	0.54	N/A
Vouchers	48,903	1.17	0.50	Yes
LIHTC	48,903	1.18	0.56	Yes
Public housing	48,903	1.32	0.54	Yes
Section 8 New Construction	48,893	1.18	0.54	Yes
Renters below 50% AMI	48,903	1.19	0.54	Yes
Low-skilled unemployed, 2009				
Total population	48,347	1.00	1.24	N/A
Vouchers	48,347	1.44	1.39	Yes
LIHTC	48,347	1.42	1.51	Yes
Public housing	48,347	1.78	1.62	Yes
Section 8 New Construction	48,347	1.25	1.41	Yes
Renters below 50% AMI	48,347	1.33	1.44	Yes
Labor-force members, 2009				
Total population	48,893	1.00	0.65	N/A
Vouchers	48,893	1.01	0.59	Yes
LIHTC	48,893	0.99	0.64	Yes
Public housing	48,893	0.84	0.55	Yes
Section 8 New Construction	48,893	1.09	0.68	Yes
Renters below 50% AMI	48,893	1.05	0.65	Yes

Note. AMI = area median income. LIHTC = Low-Income Housing Tax Credit. U.S. U.S. metropolitan statistical areas with population > 100,000. Ratio to total population.