

Employment Accessibility Among Housing Subsidy Recipients

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Abstract:

This paper 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 (HUD) on housing subsidy recipients and employment data from the U.S. Census Bureau, this paper uses a distance decay function to estimate job accessibility indices for census tracts in Metropolitan Statistical Areas (MSAs) 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 (LIHTC), and housing voucher households) and the total population, renter households, and people in poverty as points of comparison. I find that public housing households live in census tracts with the greatest proximity to low-skilled jobs of all these groups by a large margin. However, they also live among the greatest concentration of individuals that 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

Introduction

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 neighborhood poverty rates (McClure 2006; Pendall 2000), but recent research has also examined neighborhood safety (Lens, Ellen, and O'Regan 2011) and school quality (Ellen and Horn 2012), and research on the Gautreaux, Moving to Opportunity, and HOPE VI programs have 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 households occupy relatively high poverty neighborhoods (Pendall 2000), and neighborhoods zoned for low-performing schools (Ellen and 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, Ellen, and O'Regan 2011). Something that has not received a lot of attention 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 policy makers focused on allowing subsidized households access to greater opportunity, this is a vitally important consideration.

This paper 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 tract-level data from HUD on subsidized housing populations and tract-level employment files from the U.S. Census Bureau, 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 is typically located much more closely to employment growth 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 that serve as direct competition 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 and decreasing access to jobs yet also decreasing proximity to the low-skilled unemployed that will serve as their competition, that is probably a good thing. However, low-income and voucher households are moving to lower income suburbs more frequently than higher income suburbs (Covington et al 2011), where job opportunities may be scarce. In these suburbs, housing policy makers 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 scant 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 John 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 preceded by a flight by whites and businesses 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 does not provide access to suburban job clusters – leaves these households unable to access employment in the suburban periphery (Raphael and 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 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 the stating that the legacy of racial segregation, coupled with the restructuring and relocation of the manufacturing and other sectors

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), Kain (1992), and Kain (2004).

that provide low-wage employment opportunities have largely left minorities in job-poor areas (Kain 1968; Wilson 1986; Wilson 1996). As more researchers empirically studied this phenomenon in U.S. cities, the picture has become more mixed. A number of authors have found that populations that tend to live in central cities live further from employment possibilities than others, including African-Americans (Stoll 2006), welfare recipients (Blumenberg and Ong 1998; Ong and Blumenberg 1998), and recipients of housing subsidies (Bania et al 2003). However, some research has found employment opportunities in some metropolitan areas are strongest in the central city (Shen 1998; Shen 2003). Much of this disagreement likely stems from the use of different measures of spatial mismatch and different cities.

Whether spatial mismatch negatively impacts employment outcomes is also well-studied yet a source of contention. Stoll (1999) found that Blacks and Latinos live in areas of Los Angeles with poor job growth, and that this results in them searching for jobs more extensively – they search in more areas, and it thus takes them more time and effort to find work. Also in Los Angeles, Ong and Blumenberg (1998) found that welfare recipients were 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 et al (2002) found that regional job accessibility has no relationship to employment outcomes for welfare recipients in Alameda County, CA – a finding echoed by Sanchez et al (2004), who looked at Temporary Assistance for Needy Families (TANF) recipients in six U.S. cities. Relevant to this paper, results from the Moving to Opportunity (MTO) program cast some doubt on the importance of employment accessibility, given there were no employment impacts from living closer to potential employment opportunities (Briggs, Popkin, and Goering 2010; Kling, Liebman, and Katz 2007).

Research by Qing Shen is perhaps the most germane to this paper, given its focus on low-income and subsidized households and that he constructed neighborhood-based measures of employment accessibility for these populations. A methodological strength of his work was the explicit treatment of the competition for jobs – i.e. the low-skilled unemployed – in determining the employment accessibility of low-income households. He also calculated measures for those relying on auto and public transit modes separately. In Shen (1998), he used data from the Boston metropolitan area to determine the employment accessibility of low-wage workers and found that inner-city residents have much greater accessibility to employment than those outside the city. He also found that while the majority of neighborhoods are highly accessible to jobs via auto travel, the opposite is true for public transit – in fact, he found residents were likely 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 improved upon his previous measures by analyzing job openings rather than static employment numbers. Shen's methodology (discussed later in more detail) estimated job openings through two components – job growth and job turnover. Again using data from the Boston Metropolitan Area, his results are consistent with his 1998 paper – that central city locations offer greater employment accessibility than the suburbs.

Data and Methods

This paper will build from Shen's 1998 and 2001 papers, incorporating an additional methodological insight from Parks (2003). In addition to these methodological features, this paper is novel due to the use of multiple metropolitan areas, and the 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. LIHTC data comes from the LIHTC database, which covers over 2 million properties placed into service between 1987 and 2009. The tract-level employment data are from the U.S. Census Longitudinal Employer-Household Dynamics (LEHD) database. These are available annually from 2002 to 2009 and include jobs per census tract, North American Industry Classification System (NAICS) Code, and are split into three income categories. For comparisons to the general population, renter households, and people in poverty, I append data from the 2009 5-year American Community Survey (ACS) estimates.

A simple measurement of employment accessibility may begin by counting the number of jobs located within a certain distance (i.e. 15, 20, or 50 miles), and 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 the mile marker will be ignored entirely. 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 survey of businesses and/or a comprehensive scanning of job postings. Each of these efforts would not only require extensive resources, but the likelihood of capturing the universe of job openings or even a remotely unbiased sample is 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 and new opportunities created by employment growth. Here:

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

where O_{it} is the number of job openings due to net employment growth ($O_{it}(G)$ – measured in this paper as growth from 2007 to 2009) and $O_{it}(T)$ is the number of jobs created due to turnover (assuming Shen’s estimate of 3 percent monthly), all measured in tract i and year t .

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:

$$(2) A_{ki} = \sum_{j=1}^N O_{kjt} \exp(\gamma d_{ij})$$

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 between those two centroids is measured, denoted d_{ij} . 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, and γ_i is a distance decay parameter.²

² 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 k distance from tract i by 0 minutes = 1, 5 minutes = .75, 10 minutes = .56, and 20 minutes = .31. Using national surveys, I estimate that the distance to time ratio for commuting to be 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 $-0.058*3 = -0.174$, where 0 miles = 1, 3 miles = .59, 5 miles = .42, 15 miles = .07, 30 miles = .005, and 50 miles = .0002. Only jobs within 50 miles are included.

With those 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 renters below the poverty line and the total population, and compare them to one another. To do this, I simply compute weighted averages that take the following form:

$$(3) \sum_{i=1}^N [A_{ki} (\frac{v_i}{V})]$$

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. And to address the substantial heterogeneity between MSAs, I report the results for each population group as deviations from the MSA mean. 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 – job opportunities are sought by many others. Therefore, I standardize the number of job openings (O_{kji}) by the number of low-skilled individuals that are nearby the households of interest. To do this, I create a gravity measure for the competition – equation (2) 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 that are in surrounding tracts. The further 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 public housing, voucher, and LIHTC households tend to live nearby clusters of low-skilled unemployed households, the use of this denominator greatly reduces their observed job accessibility when compared with 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, Augusta (GA), Baltimore, Chicago, Fresno, Houston, Los Angeles, New York City, and Spokane (WA)).³ 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 job commute realities due to 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 voucher, public housing, and LIHTC households in 2000, 2004, and 2009, in addition to people in poverty and households who rent in 2009, for the 300 MSAs with greater than 100,000 people as of the 2000 U.S. Census. I also provide the number of distance-weighted jobs in 2002, 2007, and 2009 (these data are not

³ For these cities, researchers had already applied the time-intensive methodology developed by Ozimek and Miles for a study on cities that served as MTO and WtWV sites and generously provided these estimates to the author.

available in 2000), in order to observe how these numbers change before and during the recession. For employment (total jobs, low-skilled jobs, lower income jobs, and jobs with no college degree), those numbers reflect the distance-weighted number of jobs that the average census tract has within the 50 mile radius. The years 2002 to 2007 reflected years of strong job growth, then in the next two 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 due to income growth (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 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. Below the jobs numbers, I include 2009 means for the distance-weighted labor force and number of unemployed without a college degree. In terms of subsidized housing, between 2000 and 2009, there were steady declines in the public housing stock and substantial increases in households in LIHTC and voucher units.

[Insert table 1 about here]

Table 2 presents job accessibility estimates for 6 population groups – the total population, households using vouchers, in LIHTC properties, public housing, and in rental properties, and people below the poverty line. The estimates are job accessibility measures calculated using the growth estimates, distance-decay function and weighted averages described in equations 1, 2, and 3, respectively, for the largest 300 MSAs. These estimates are expressed as deviations from the MSA mean for each tract, 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 to the

distance-weighted employment numbers in table 1. In addition to the fact that they are MSA-specific deviations, these measures are standardized by a distance-weighted estimate of the number of low-skilled unemployed in the surrounding area. Included in the table are three job accessibility measures – total job openings per low-skilled unemployed, low-skilled job openings per low-skilled unemployed, and low-income jobs per low-skilled unemployed – all measured using 2007 and 2009 employment figures. Estimates of the low-skilled unemployed come from the 2009 ACS.

[Insert table 2 about here]

Given the estimates control for the entire MSA's accessibility to jobs, the value for the total population is zero and provides a standard point of comparison. Looking at each job type, what stands out is the fact that all of the populations under investigation – voucher, LIHTC, public housing, and renter households, and people in poverty – live in areas with lower accessibility to jobs than the total population. The gap between each of these relatively less-advantaged groups is smaller for low-skilled and low-income jobs, reflecting perhaps the tendency for these opportunities to locate near such populations or vice versa. It is also notable from a housing policy standpoint that each of the housing subsidy groups live in areas that are less accessible to jobs than the renter and poverty population. Public housing households, for example, are in areas with roughly one-third as many job openings per low-skilled unemployed. Generally speaking, public housing households are in areas with fewer job openings per low-skilled unemployed than all of the subsidized housing groups – ranging from 20 to 30 percent fewer job openings per low-skilled unemployed than voucher households. Voucher and LIHTC households are roughly equivalent in terms of job accessibility.

However, these findings are limited in a couple of ways. 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 data on public transit, I do have data in 9 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 very limited way – traffic conditions. And 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 0.058 that was empirically derived by Parks (2004) (see fn 1).

In table 3, job openings per low-skilled unemployed estimates are provided for these 9 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 the distance and time measures produce similar results. In nearly every city, the subgroup rankings do not differ between distance and time-based measures of job openings per low-skilled unemployed. Further, the public housing population continues to score low job accessibility estimates. There are small exceptions to each of these conclusions, as in New York City the public housing population has the greatest job accessibility using the distance-based (but not the time-based) measure, and in Spokane LIHTC households have the greatest accessibility using each measure, which differs from the aggregate findings in table 2.

[Insert table 3 about here]

Although these results are clear that subsidized households live in areas with low job accessibility, this likely depends heavily upon how that accessibility is measured. Given the

tendency for subsidized and low-income households to cluster in metropolitan areas, and the fact that these are the very populations that comprise the denominator (or competition for jobs – the low-skilled unemployed), there is much reason to believe that this clustering is driving the observed results. Therefore, in table 4, 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 nearby more jobs per labor force member than the entire population. Second, public housing households are closer to substantially more jobs per labor force member than any other group. The magnitude is quite large – public housing households are closer to roughly 3 times as many jobs as the nearest subgroup (LIHTC households) and about 10 to 15 times as many jobs as the full renter population. Public housing households are located near over 5 times as many jobs as the voucher population, 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, as a result of its concentration in areas with high employment growth and large numbers of low-skilled workers and the fact that public housing is not as proximate to the entire labor force as voucher households and the other groups

[Insert table 4 about here].

The recent trend in public housing demolition makes Atlanta and Chicago particularly interesting cities, as 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 et al 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 distance-based low-skilled jobs per

worker estimates in 2000, 2004, and 2009 for Atlanta and Chicago, using the 2009 employment growth numbers with subgroup population locations from the listed years. Thus, we answer the question: assuming 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 columns, I present 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.

[Insert table 5 about here]

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 the job accessibility level in Chicago 2009 versus Chicago 2000. The declines in job accessibility using the openings per labor force measure are much larger than the increases in job accessibility when looking at jobs per low-skilled unemployed – a 44 percent decrease compared to a 12 percent increase in Atlanta and a 276 percent increase compared to a 10 percent increase in Chicago. This suggests that while public housing demolition in these cities moved these households away from the low-skilled unemployed, they moved public housing away from jobs (and closer to the larger labor force) much more intensively. 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 which were located within just five miles of The Loop (Chicago's central business district) and were demolished in the 2000s.

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 is clear that subsidized households – and public housing households in particular – exhibit patterns typical of spatial mismatch. These households clearly 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. 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. Namely, this criticism contends that the suburbanization of jobs has left public housing households far from job opportunities and trapped in job-poor central cities.

Given the large sample of MSAs included in the analyses, the findings in this paper are clearly generalizable to U.S. urban areas. However, it could be argued that 2007 to 2009 represented a special (in a very negative sense) time in the history of the U.S. labor market. I replicated these analyses for 2004 to 2007 and found very similar results.

Recent policy changes in public housing are well exemplified by Atlanta and Chicago. In each of these cities, it is likely that centrally located public housing demolitions led to the typical public housing unit being located farther away 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. But again, these housing units are now less concentrated among the competition for low-skilled work, although the loss in job proximity during the 2000s for public housing households was much greater in these cities than the deconcentration among the low-skilled unemployed.

Due to 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 as a 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 housing policy makers have been attempting to connect subsidized households to work, and are increasingly relying on vouchers as a means of providing these households better access to these opportunities, these findings suggest some reflection on what 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 policy makers.

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Reference List

- Bania, Neil, Claudia Coulton, and Laura Leete. 2003. Public housing assistance, public transportation, and the welfare-to-work transition. *Cityscape* 6, no. 2: 7-44.
- Bloom, Howard, James A. Riccio, and Nandita Verma. 2005. *Promoting work in public housing: The effectiveness of Jobs Plus*. MDRC: New York City.
- Blumenberg, Evelyn, and Paul Ong. 1998. Job accessibility and welfare Usage: Evidence from Los Angeles. *Journal of Policy Analysis and Management* 17, no. 4: 639-657.
- Briggs, Xavier de Souza, Susan J. Popkin, and John Goering. 2010. *Moving to opportunity: The story of an experiment to fight ghetto poverty*. Oxford University Press: New York.
- Cervero, Robert, Onesimo Sandoval, and John Landis. 2002. "Transportation as a stimulus of welfare-to-work: Private versus public mobility." *Journal of Planning Education and Research* 22, no. 1: 50-63.
- Covington, Kenya, Lance Freeman, and Michael Stoll. 2011. *The suburbanization of housing choice voucher recipients*. Washington, D.C.: Brookings Institution.
- Dujardin, Claire and Florence Goffette-Nagot. 2009. "Does public housing occupancy increase unemployment?" *Journal of Economic Geography* 9, no. 6: 823-851.
- Ellen, Ingrid Gould, and Keren Mertens Horn. 2012. "Do federally assisted households have access to high performing public schools?" Washington, D.C.: Poverty and Race Research Action Council.
<http://furmancenter.org/files/publications/PRRACHousingLocationSchools.pdf>. Accessed August 5, 2013.
- Goetz, Edward G. 2013. *New deal ruins: race, economic justice, and public housing policy*. Ithaca: Cornell University Press.
- Ihlanfeldt, Keith R., and David L. Sjoquist. 1998. The spatial mismatch hypothesis: A review of recent studies and their implications for welfare reform. *Housing Policy Debate* 9, no. 4: 849-892.
- Ihlanfeldt, Keith. 2006. A primer on spatial mismatch within urban labor markets. In *A companion to urban economics* (Richard J. Arnott and Daniel P. McMillen, eds.). Malden, MA: Blackwell: 404-417.
- Kain, John. 1968. Housing segregation, negro employment, and metropolitan decentralization. *Quarterly Journal of Economics* 82, no. 2: 175-197.
- Kain, John F. 1992. The spatial mismatch hypothesis: Three decades later. *Housing Policy Debate* 3, no. 2: 371-460.
- Kain, John F. 2004. A pioneer's perspective on the spatial mismatch literature. *Urban Studies* 41, no. 1: 7-32,

- Kling, Jeffrey R., Jeffrey B. Liebman, and Lawrence F. Katz. 2007. "Experimental analysis of neighborhood effects." *Econometrica* 75, no. 1: 83–119.
- Kneebone, Elizabeth and Emily Garr. 2011. *The suburbanization of poverty: Trends in metropolitan America, 2000 to 2008*. Washington, D.C.: Brookings Institution.
- Lens, Michael C., Ingrid Gould Ellen, and Katherine M. O'Regan. 2011. Do vouchers help? Low-income households live in safer neighborhoods? Evidence on the housing choice voucher program. *Cityscape* 13, no. 3: 135-159.
- McClure, Kirk. 2010. The prospects for guiding housing choice voucher households to high-opportunity neighborhoods. *Cityscape* 12, no. 3: 101-122.
- McClure, Kirk. 2006. The low-income housing tax credit program goes mainstream and moves to the suburbs. *Housing Policy Debate* 17, no. 3: 419-446.
- Ong, Paul, and Evelyn Blumenberg. 1998. Job access, commute and travel burden among welfare recipients. *Urban Studies* 35, no. 1: 77-93.
- Ozimek, Adam, and Daniel Miles. 2011. Stata utilities for geocoding and generating travel time and travel distance information. *Stata Journal*, 11, no. 1: 106.
- Pendall, Rolf. 2000. Why voucher and certificate users live in distressed neighborhoods. *Housing Policy Debate* 11, no. 4: 881-910.
- Popkin, Susan J., Michael J. Rich, Leah Hendey, Joseph Parilla, and George Galster. 2012. "Public Housing Transformation and Crime: Making the Case for Responsible Relocation." *Cityscape* 14, no. 3: 137-160.
- Raphael, Steven. 1998. The spatial mismatch hypothesis and black youth unemployment: Evidence from the San Francisco bay area. *Journal of Urban Economics* 43:79–111.
- Raphael, Steven, and Michael Stoll. 2001. Can boosting minority car ownership rates narrow inter-racial employment gaps? *Brookings-Wharton Papers on Urban Affairs* 2: 99-137.
- Schwartz, Alex F. 2006. *Housing policy in the United States*. New York: Routledge.
- Sanchez, Thomas W., Qing Shen, and Zhong-Ren Peng. 2004. Transit mobility, jobs access and low-income labour participation in U.S. metropolitan areas. *Urban Studies* 41, no. 7: 1313–1331.
- Shen, Qing. 1998. Location characteristics of inner-city neighborhoods and employment accessibility of low-wage workers. *Environment and Planning B: Planning and Design* 25: 345-365.
- Shen, Qing. 2001. A spatial analysis of job openings and access in a U.S. metropolitan area. *Journal of the American Planning Association* 67:1, 53-68.
- Shen, Qing, and Thomas W. Sanchez. 2005. Residential location, transportation, and welfare-to-work in the United States: A case study of Milwaukee. *Housing Policy Debate* 16, nos. 3-4.

- Shoup, Donald C. 2011. *The high cost of free parking*. Chicago: APA Press.
- Stoll, Michael. 1999. Spatial job search, spatial mismatch, and the employment and wages of racial and ethnic groups in Los Angeles. *Journal of Urban Economics* 46, no. 1:129-155.
- Stoll, Michael A. 2006, Job sprawl, spatial mismatch, and black employment disadvantage. *Journal of Policy Analysis and Management*, 25: 827–854.
- U.S. Department of the Census. Census business patterns: How the data are collected and methodology. <http://www.census.gov/econ/cbp/methodology.htm>. Accessed May 21, 2013.
- Wilson, William Julius. 1986. *The truly disadvantaged*. Chicago: Chicago University Press.
- Wilson, William Julius. 1996. *When work disappears: The world of the new urban poor*. New York: Random House.

Table 1: Tract-level Means

Variable	N	Mean	Std Dev	Minimum	Maximum
Population, 2009	48,563	4,813.3	2,974.2	0.0	55,283.0
Vouchers, 2009	48,563	34.4	53.2	0.0	1,629.0
Vouchers, 2004	48,563	27.1	43.0	0.0	787.0
Vouchers, 2000	48,563	22.9	38.0	0.0	690.0
LIHTC Units, 2009	48,563	31.4	95.5	0.0	2,616.0
LIHTC Units, 2004	48,563	23.7	79.1	0.0	2,067.0
LIHTC Units, 2000	48,563	15.8	60.9	0.0	1,516.0
Public Housing Units, 2009	48,563	15.2	80.5	0.0	3,292.0
Public Housing Units, 2004	48,563	16.6	92.5	0.0	5,859.0
Public Housing Units, 2000	48,563	18.7	98.1	0.0	3,852.0
Renters, 2009	48,563	616.6	548.4	0.0	8,332.0
Households in Poverty, 2009	48,563	411.5	208.7	7.0	4,023.0
Total Jobs, 2009	48,501	220,163.7	306,660.2	0.1	2,395,146.3
Total Jobs, 2007	48,563	221,977.1	295,156.4	4.1	2,303,241.6
Total Jobs, 2002	47,469	214,801.0	286,868.0	0.1	2,208,500.2
Low-Skilled Jobs, 2009*	48,501	83,191.4	97,419.7	0.0	711,379.7
Low-Skilled Jobs, 2007	48,563	90,025.7	101,028.7	0.9	722,648.8
Low-Skilled Jobs, 2002	47,469	88,742.9	100,797.1	0.1	713,342.4
Change in Nearby Low-Skilled Jobs, 2007-09	48,501	1,103.7	1,397.5	-663.8	10,438.2
Lower Income Jobs, 2009**	48,501	50,264.9	62,230.8	0.0	435,533.3
Lower Income Jobs, 2007	48,563	53,867.0	65,078.9	1.1	462,854.6
Lower Income Jobs, 2002	47,469	58,960.9	72,534.2	0.1	507,548.6
Jobs w/ no College Degree	48,501	58,009.8	74,257.6	0.0	531,045.2
Nearby Labor Force, 2009	48,563	244,702.2	414,599.4	0.0	9,991,285.4
Nearby Unemployed with No College Degree, 2009	48,563	2,154.0	4,527.3	0.0	129,026.4

* Low-Skilled Jobs are defined as 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).

**Lowest income category reported in Census LEHD files is Income < \$1,250 per month.

Table 2: Job Accessibility Measures – Jobs per Low-Skilled Unemployed

U.S. MSAs with Population > 100,000 People

Deviations from MSA Mean

Job Openings per Low-Skilled Unemployed, 2009				
Group	N	Weighted Mean	Weighted SD	Significantly different from Total Population?
Total Population	46,191	0.00	4.8	N/A
Vouchers	46,191	-0.82	4.0	Yes
LIHTC	46,191	-0.72	3.6	Yes
Public Housing	46,191	-0.99	3.3	Yes
Renter Households	46,191	-0.28	4.5	Yes
Households in Poverty	46,191	-0.24	4.6	Yes
Low-Skilled Job Openings per Low-Skilled Unemployed, 2009				
Group	N	Weighted Mean	Weighted SD	Significantly different from Total Population?
Total Population	46,191	0.00	1.9	N/A
Vouchers	46,191	-0.32	1.6	Yes
LIHTC	46,191	-0.29	1.3	Yes
Public Housing	46,191	-0.38	1.3	Yes
Renter Households	46,191	-0.13	1.7	Yes
Households in Poverty	46,191	-0.10	1.8	Yes
Low-Income Job Openings per Low-Skilled Unemployed, 2009				
Group	N	Weighted Mean	Weighted SD	Significantly different from Total Population?
Total Population	46,191	0.00	1.1	N/A
Vouchers	46,191	-0.19	1.0	Yes
LIHTC	46,191	-0.18	0.8	Yes
Public Housing	46,191	-0.24	0.8	Yes
Renter Households	46,191	-0.08	1.0	Yes
Households in Poverty	46,191	-0.06	1.1	Yes

Table 3: Distance and Time-based Measures of Job Accessibility, 9 U.S. Cities

	Baltimore Distance			Baltimore Time		
	N	Mean	Stdev	N	Mean	Stdev
Total Population	1200	1.48	2.11	1338	3.10	3.86
Vouchers	1200	0.88	1.24	1338	2.06	2.41
LIHTC	1200	0.83	1.22	1338	1.94	2.46
Public Housing	1200	0.59	0.90	1338	1.50	2.33
Renter Households	1200	1.15	1.82	1338	2.51	3.21
Households in Poverty	1200	1.16	1.68	1338	2.66	3.57
	Atlanta Distance			Atlanta Time		
	N	Mean	Stdev	N	Mean	Stdev
Total Population	678	2.27	2.92	721	1.43	1.50
Vouchers	678	1.18	1.57	721	0.80	0.97
LIHTC	678	1.37	1.81	721	1.01	1.61
Public Housing	678	1.63	1.61	721	1.22	1.56
Renter Households	678	2.09	2.54	721	1.38	1.56
Households in Poverty	678	2.05	2.70	721	1.35	1.51
	Augusta Distance			Augusta Time		
	N	Mean	Stdev	N	Mean	Stdev
Total Population	69	1.91	1.95	72	1.06	1.25
Vouchers	69	1.37	0.80	72	0.76	0.35
LIHTC	69	1.39	0.90	72	0.77	0.36
Public Housing	69	1.04	0.63	72	0.66	0.30
Renter Households	69	1.48	1.28	72	0.79	0.50
Households in Poverty	69	1.77	1.86	72	1.00	1.08
	Chicago Distance			Chicago Time		
	N	Mean	Stdev	N	Mean	Stdev
Total Population	1592	1.43	2.62	1771	0.92	1.79
Vouchers	1592	0.79	1.36	1771	0.54	1.43
LIHTC	1592	0.87	1.49	1771	0.50	0.57
Public Housing	1592	0.66	0.70	1771	0.51	0.50
Renter Households	1592	1.04	1.82	1771	0.77	1.66
Households in Poverty	1592	1.13	2.18	1771	0.77	1.52
	Fresno Distance			Fresno Time		
	N	Mean	Stdev	N	Mean	Stdev
Total Population	244	1.53	3.22	257	1.03	1.47
Vouchers	244	1.10	2.07	257	0.73	1.02
LIHTC	244	1.04	0.82	257	0.65	0.30
Public Housing	244	1.34	2.44	257	0.90	0.91

Renter Households	244	1.26	2.25	257	0.89	1.33
Households in Poverty	244	1.37	2.67	257	0.96	1.31
	Houston Distance			Houston Time		
	N	Mean	Stdev	N	Mean	Stdev
Total Population	776	3.32	3.93	857	2.33	2.98
Vouchers	776	2.36	2.06	857	1.55	1.87
LIHTC	776	2.26	1.99	857	1.44	1.06
Public Housing	776	1.85	1.63	857	1.42	1.64
Renter Households	776	2.78	3.05	857	1.98	2.45
Households in Poverty	776	3.01	3.64	857	2.17	3.09
	Los Angeles Distance			Los Angeles Time		
	N	Mean	Stdev	N	Mean	Stdev
Total Population	2610	1.55	2.26	2907	1.13	1.44
Vouchers	2610	1.37	2.01	2907	0.90	1.08
LIHTC	2610	1.43	1.93	2907	0.99	1.69
Public Housing	2610	1.39	1.87	2907	0.84	0.89
Renter Households	2610	1.54	2.25	2907	1.06	1.38
Households in Poverty	2610	1.53	2.25	2907	1.10	1.45
	New York City Distance			New York City Time		
	N	Mean	Stdev	N	Mean	Stdev
Total Population	2851	1.17	1.73	3223	0.80	0.98
Vouchers	2851	1.01	1.37	3223	0.61	0.75
LIHTC	2851	0.94	1.17	3223	0.67	0.89
Public Housing	2851	1.20	4.21	3223	0.50	0.72
Renter Households	2851	1.10	1.77	3223	0.71	0.86
Households in Poverty	2851	1.11	1.64	3223	0.74	0.92
	Spokane Distance			Spokane Time		
	N	Mean	Stdev	N	Mean	Stdev
Total Population	127	2.38	4.01	142	1.21	1.06
Vouchers	127	2.26	2.87	142	1.11	1.10
LIHTC	127	3.34	3.12	142	1.35	1.09
Public Housing	127	1.32	1.74	142	1.00	1.35
Renter Households	127	2.44	3.37	142	1.20	1.04
Households in Poverty	127	2.54	4.35	142	1.19	1.02

Table 4: Job Accessibility Measures – Jobs per Labor Force Member
 U.S. MSAs with Population > 100,000 People
 Deviations from MSA Mean

Job Openings per Labor Force Member, 2009				
Group	N	Weighted Mean	Weighted SD	Significantly different from Total Population?
Total Population	48,987	0.000	0.028	N/A
Vouchers	48,987	0.002	0.018	Yes
LIHTC	48,987	0.004	0.025	Yes
Public Housing	48,987	0.014	0.115	Yes
Renter Households	48,987	0.001	0.016	Yes
Households in Poverty	48,987	0.003	0.043	Yes
Low-Skilled Job Openings per Labor Force Member, 2009				
Group	N	Weighted Mean	Weighted SD	Significantly different from Total Population?
Total Population	48,987	0.0000	0.0101	N/A
Vouchers	48,987	0.0008	0.0068	Yes
LIHTC	48,987	0.0014	0.0093	Yes
Public Housing	48,987	0.0045	0.0334	Yes
Renter Households	48,987	0.0003	0.0057	Yes
Households in Poverty	48,987	0.0010	0.0163	Yes
Low-Income Job Openings per Labor Force Member, 2009				
Group	N	Weighted Mean	Weighted SD	Significantly different from Total Population?
Total Population	46,191	0.0000	0.0063	N/A
Vouchers	46,191	0.0005	0.0040	Yes
LIHTC	46,191	0.0008	0.0060	Yes
Public Housing	46,191	0.0027	0.0196	Yes
Renter Households	46,191	0.0002	0.0035	Yes
Households in Poverty	46,191	0.0006	0.0104	Yes

Table 5: Atlanta and Chicago, Job Accessibility Measures – Low-Skilled Job 2009 Openings with 2000, 2004*, and 2009 Residential Locations

	Jobs Per Low-Skilled Unemployed			Jobs Per Labor Force Member		
Atlanta						
	2000*	2004	2009	2000	2004	2009
Total Population**	1.44	1.44	1.43	0.005	0.005	0.004
Vouchers	0.84	0.82	0.80	0.006	0.006	0.007
LIHTC	1.02	1.01	1.01	0.007	0.006	0.007
Public Housing	1.09	1.01	1.22	0.011	0.011	0.007
Renter Households	1.40	1.39	1.38	0.006	0.005	0.005
Households in Poverty	1.25	1.30	1.35	0.007	0.006	0.006
Chicago						
	2000*	2004	2009	2000	2004	2009
Total Population	0.90	0.90	0.92	0.005	0.005	0.004
Vouchers	0.49	0.54	0.54	0.005	0.005	0.006
LIHTC	0.44	0.45	0.50	0.007	0.007	0.007
Public Housing	0.46	0.45	0.51	0.023	0.011	0.008
Renter Households	0.76	0.77	0.77	0.005	0.005	0.005
Households in Poverty	0.56	0.66	0.77	0.007	0.006	0.006

* For the total population and renter and poor households, 2005 estimates were used in lieu of 2004 numbers.