

1-1-2012

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## Recommended Citation

Popkin, S. J., Rich, M. J., Hendey, L., et. al. (2012). Public Housing Transformation and Crime: Making the Case for Responsible Relocation. *Cityscape* 14(3): 137-160.  
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## Abstract

*The research in this article examines the effect on crime rates of public housing transformation in Atlanta and Chicago, focusing on the neighborhoods receiving households relocated with housing vouchers. Modeling the complex relationship between voucher holder locations and crime, using quarterly data, our analysis found that crime rates fell substantially in neighborhoods with public housing demolition, whereas destination neighborhoods experienced a much lesser effect than popular accounts imply. Nevertheless, on average, negative effects emerge for some neighborhoods with modest or high densities of relocated households compared with conditions in areas without relocated households. Overall, we estimate small net decreases citywide in violent crime over study periods during which crime declined significantly. These findings suggest a need for thoughtful relocation strategies that support both assisted residents and receiving communities.*

## Introduction

Chicago and Atlanta are very different cities but, in the 1990s, both faced serious problems with their public housing—distressed, high-crime developments that were damaging residents' lives and contributing to neighborhood decline. By the end of the decade, both cities' housing authorities had used federal HOPE VI<sup>1</sup> grants to launch ambitious citywide transformation efforts, with the goal of demolishing their worst developments and replacing them with new, mixed-income communities. Transforming public housing meant relocating thousands of households while the new housing was constructed, a process that often took years and required developing new services to support residents through the process. As part of the relocation effort, many former public housing residents in both cities received housing choice (Section 8) vouchers (HCV) and moved to private-market housing; most opted to keep their vouchers and stay in their new neighborhoods rather than return to the new mixed-income communities.

Not surprisingly, the nation's two largest public housing transformation efforts—the Chicago Housing Authority's (CHA's) Plan for Transformation and the Atlanta Housing Authority's (AHA's) Olympic Legacy Program and Quality of Life Initiative (QLI)—generated a variety of concerns, and many affordable housing advocates focused on how former residents fared during the relocation process (Bennett, Smith, and Wright, 2006; Keating, 2001; NHLP et al., 2002). Local politicians and press accounts in these cities and others have also raised questions about whether households receiving vouchers bring crime and disorder to their new communities (Dumke, 2011; Medina, 2011).

A 2008 *Atlantic Monthly* article sparked a media controversy by claiming that HOPE VI—specifically, relying on vouchers to relocate residents in private rental housing—was to blame for rising crime in Memphis (Rosin, 2008). The article drew a grim picture of rapidly increasing crime in previously safe Memphis communities and then used an analysis that associated crime incidents with the movement of voucher recipients to make the case that HOPE VI was responsible for these problems. The article ignited a national debate about the effect of housing vouchers on crime, with many researchers and advocates arguing that the *Atlantic Monthly's* analysis was too simplistic, blaming voucher holders unfairly for broader trends (Briggs and Dreier, 2008). Until recently, however, no systematic efforts have tried to understand whether empirical evidence supports these fears or if they simply represent negative stereotypes of public housing residents.

Using a panel data set of administrative records from each housing authority and reported Part I crimes at the census tract level for more than 30 quarters in Chicago and Atlanta, our research examines the relationship between crime and relocation from public housing using advanced modeling techniques. The three questions we explore in this article are (1) the degree to which the entrance into a neighborhood of relocated voucher households has a significant effect on crime; (2) whether any detected effect varies according to thresholds in the concentration of relocated households; and (3) the degree to which the transformation efforts affected overall crime, looking at tracts where public housing was demolished and at destination neighborhoods for relocated households.

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<sup>1</sup> HOPE VI stands for Housing Opportunities for People Everywhere. Begun in 1992, it funded the demolition and rehabilitation of public housing around the country. For more information on the program, see Popkin et al. (2004).

This article begins a discussion of the possible way that public housing transformation might influence neighborhood crime rates and an overview of the transformation efforts in Atlanta and Chicago. We describe the data used, the methodology employed, and the challenges we faced in trying to answer our research questions. We review the results of the analysis on destination neighborhoods first and then describe how results are a part of an analysis on the citywide net effects of the transformation efforts.

The relationship between crime rates and public housing households relocating into the private market is complex. Crime declined dramatically in both cities throughout the 2000s, even in neighborhoods that received many relocated households. Furthermore, the transformation efforts led to substantial decreases in crime in neighborhoods<sup>2</sup> where the CHA and the AHA demolished public housing communities. This decline contributed to a small but significant net decrease in violent crime across all Chicago neighborhoods and a small decrease in violent crime and property crime in Atlanta neighborhoods. The picture is not entirely positive, however. The transformation contributed to slightly more property crime overall in Chicago, and some neighborhoods in both cities have experienced problems associated with concentrations of relocated households. After the number of relocated households reached a certain threshold, crime rates, on average, decreased less than they would have if no former public housing residents had moved in. We conclude the article with a discussion of the policy implications of these findings and suggest that future relocation efforts need to learn from Chicago's and Atlanta's experiences, particularly the responsible relocation strategies both housing authorities developed as they learned more about residents' needs (AECF, 2008).<sup>3</sup>

## **How Could Public Housing Transformation Affect Crime?**

Over the past two decades, housing assistance in the United States has undergone a profound transformation (Turner, Popkin, and Rawlings, 2009). The \$6 billion HOPE VI Program facilitated the demolition of hundreds of distressed inner-city public housing developments and enabled housing authorities to replace them with a combination of new, mixed-income communities and vouchers. Underlying this transformation was the hope that public housing residents would benefit both socially and economically from living in more diverse, higher opportunity neighborhoods (Joseph, Chaskin, and Webber, 2007). Although not every public housing revitalization project has realized all these hopes, a large body of research shows that former residents are generally living in better housing in safer neighborhoods where they experience less stress and anxiety (Briggs, Popkin, and Goering, 2010; Popkin, Levy, and Buron, 2009; Turner, Popkin, and Rawlings, 2009).

Public housing transformation also intends to improve neighborhoods. Removing distressed public housing properties that cause blight may allow for new development, increase property values, and

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<sup>2</sup> For purposes of this analysis, we define neighborhoods as census tracts. Throughout this article, we use the terms neighborhood, census tract, and tract interchangeably. These terms are not in reference to Chicago's 77 community areas, which are much larger, typically containing about nine census tracts each.

<sup>3</sup> Responsible relocation provides relocation counseling and other direct services to ensure that residents receive appropriate relocation benefits and have the opportunity to move to better neighborhoods than those they are leaving.

attract more affluent residents (Turner, Popkin, and Rawlings, 2009). Although large-scale relocation of public housing families is controversial, however, the question of how such moves might affect destination communities has received relatively little attention from researchers, despite real concerns about the potential for creating new concentrations of poverty (Galster et al., 2003). Only one major study rigorously explored how voucher holders living in a community might affect crime rates, and it found no evidence to support a link between the presence of voucher holders and increased crime (Ellen, Lens, and O'Regan, 2011). That study, however, looked only at traditional<sup>4</sup> voucher holders (who are not generally former public housing residents), used annual data on voucher holders, and did not explicitly examine the question of the potential effect of large-scale public housing relocation.<sup>5</sup>

We have several reasons to expect that large-scale public housing demolition and relocation might affect crime in destination communities more than the presence of traditional voucher holders.<sup>6</sup> First, relocating public housing residents for redevelopment could disrupt their social networks (Hagedorn and Rauch, 2007), increasing their risk for either perpetrating or becoming victims of crime in their new neighborhoods (Haynie and South, 2005; Sharkey and Sampson, 2010). Second, new residents moving into a neighborhood could disrupt the community's *collective efficacy*—the degree of mutual trust and social cohesion that acts as a protective factor for residents—thereby making the residents of these neighborhoods less safe (Sampson, Raudenbush, and Earls, 1997). Third, some public housing residents or their associates could simply bring crime with them, essentially displacing problems like drug trafficking and gang activity from one neighborhood to another.<sup>7</sup>

## Transforming Public Housing in Chicago and Atlanta

Atlanta and Chicago have undertaken the two most prominent public housing transformation efforts in the nation, initiatives that have been both widely lauded and extremely controversial. In both cities, the most visible change has been replacing notorious developments like Robert Taylor

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<sup>4</sup> Throughout the article, we refer to those households that receive a housing choice voucher subsidy but that did not relocate from public housing as “traditional” or “regular” voucher holders.

<sup>5</sup> Research is thin on the differences between housing choice voucher households and public housing households, but evidence indicates that public housing households are more likely to include elderly people and less likely to include children.

<sup>6</sup> The connection between public housing and crime is complex, but the two are clearly related. For example, research shows a moderate-to-strong positive relationship between the location of subsidized housing in cities and crime hotspots (Galster et al., 2002; McNulty and Holloway, 2000; Roncek, Bell, and Francik, 1981; Suresh and Vito, 2007), and that public housing might impose negative crime externalities on surrounding neighborhoods (Sandler, 2011). Opportunities for involvement in gang violence and drug sales, among other kinds of offending, are more readily available to youth who reside in public housing developments than to those who live elsewhere (Popkin et al., 2000; Venkatesh, 2000). Public housing residents also experience elevated levels of criminal victimization relative to their nonpublic housing counterparts (DeFrances and Smith, 1998; DeKeseredy et al., 2003; Griffiths and Tita, 2009; Holzman, Hyatt, and Dempster, 2001; Kling, Liebman, and Katz, 2005).

<sup>7</sup> Evidence across multiple U.S. cities is mixed (Kleinhaus and Varady, 2011; Suresh and Vito, 2009; VanZandt and Mhatre, 2009), although the most rigorous research suggests this phenomenon is not occurring as a result of HOPE VI demolition (Cahill, Lowry, and Downey, 2011; Santiago, Galster, and Pettit, 2003).

Homes in Chicago and Techwood Homes in Atlanta with new, mixed-income housing that reflected the current thinking on how to provide affordable housing without creating concentrations of poverty.<sup>8</sup>

Chicago has been one of the country's housing policy bellwethers, and efforts there have received considerable national attention. The CHA's Plan for Transformation began in 1999, when the agency announced its goal to replace or rehabilitate 25,000 units of public housing.<sup>9</sup> As in many cities, relocation proved the most challenging aspect of the transformation initiative. First, with more than 16,000 households to relocate, the sheer magnitude of the problem was daunting. Second, many CHA residents faced numerous barriers that made relocation particularly challenging. Because of the terrible conditions in CHA family developments, tenants who had better options had left long ago, leaving behind a population dominated by extremely vulnerable families (Popkin et al., 2000). Third, like most housing authorities, the CHA had little experience providing supportive services and certainly had not previously attempted a large-scale relocation.<sup>10</sup> The challenges only intensified over time, as families who were easier to relocate moved, leaving the CHA with a population increasingly dominated by the most vulnerable households (Popkin, 2010). The agency ultimately overcame these challenges. Using the funding and regulatory flexibility that the U.S. Department of Housing and Urban Development's (HUD's) Moving to Work (MTW) program provided, the CHA built a robust resident services department; by 2011, the CHA had completed work on more than 85 percent of its planned units (Popkin et al., 2010).

CHA residents had three relocation options; they could (1) move to new mixed-income housing, (2) live in rehabilitated public housing, or (3) use a voucher to rent a private-market unit. By 2008, approximately 6,400 former public housing households had relocated to the private market with vouchers. The limitations of the voucher program—that rents must fit HUD's guidelines for affordability and landlords must be willing to comply with program rules and regulations—meant, however, that voucher rental units tended to concentrate in lower income, heavily minority areas (Cunningham and Drosch, 2005). Although the CHA offered residents relocation assistance and mobility counseling to encourage them to move to *opportunity areas* that offered better schools and services, and although those who chose vouchers could move to any unit that met housing quality and rent payment standards, many chose to stay in familiar areas on the city's South and West Sides (Popkin, Levy, and Buron, 2009). Furthermore, one benefit of tenant-based vouchers is that recipients have the freedom to move, and many residents moved several times after leaving public housing.

Although the CHA did not launch its Plan for Transformation until 1999, the AHA was an early leader in the national movement to replace distressed public housing developments with market-quality communities. In 1996, the Atlanta Blueprint called for using a HOPE VI grant to revitalize the Techwood-Clark Howell Homes, the nation's oldest public housing development, marking an

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<sup>8</sup> For an overview of the CHA's history and the Plan for Transformation, see Popkin (2010).

<sup>9</sup> The CHA's Plan for Transformation included providing relocation and self-sufficiency services to the existing lease-compliant households living in public housing as of October 1, 1999 (known as original 10/1/99 residents), to help them relocate (CHA, 2011).

<sup>10</sup> The agency's long history of mismanagement and broken promises compounded its problems with relocation (Bennett et al., 2006; Popkin and Cunningham, 2005; Venkatesh et al., 2004).

important point in the evolution of the HOPE VI program nationally. When the first phase of Centennial Place—in reference to the Centennial Olympic Games that Atlanta hosted that year—opened in summer 1996, it was the nation’s first mixed-income development that included publicly assisted housing. Also in 1996, the AHA unveiled its Olympic Legacy Program, the agency’s effort to bring to scale the mixed-income revitalization model for traditional public housing. The AHA was able to build on the momentum from the Centennial Place revitalization and leverage additional local investment to support replacing three additional public housing developments with mixed-income communities.<sup>11</sup> After nearly a decade of experience in turning distressed public housing into mixed-income, mixed-use developments, the AHA launched its final and even more ambitious effort to fully transform public housing in the city of Atlanta. As with the CHA, the AHA’s participation in the MTW program, which began in July 2003, made possible the legal and regulatory framework for that effort. Among the key initiatives were a number of policy changes in AHA leasing standards and practices and the adoption of a set of strategies intended to enable families to use their vouchers in a broader range of neighborhoods. In addition, like the CHA, the AHA introduced in 1998 a 5-year, family-focused coaching and counseling program to provide comprehensive assistance to tenants throughout and after the relocation process.

AHA’s QLI, launched in 2007, aimed to demolish nearly all of the city’s remaining family public housing developments and to replace those units with new mixed-income communities. Just as the CHA discovered, the AHA found that the families still needing to be relocated during these later phases of the transformation initiative were more vulnerable and required more substantial support. The AHA’s comprehensive supportive services, launched as part of its expanded relocation strategy, were available to relocated families for up to 5 years. Relocated households that received this comprehensive support reported substantial improvements in their quality of life (Rich et al., 2010). By 2010, the AHA no longer owned or operated any large-scale family public housing developments. To underscore the magnitude of the transformation, in 1996, more than 70 percent of AHA assisted households lived in conventional public housing; by 2011, nearly 70 percent of AHA residents had vouchers, another 15 percent lived in new mixed-income housing, and the rest lived in other mixed-income properties throughout the city with project-based rental assistance. In the course of this transformation, about 10,000 households relocated, and most, by far, used vouchers to move to the private market.

## Data

Our analysis draws on several data sources: data on voucher holders and relocated households from housing authority administrative records in Atlanta and Chicago, crime incident reports, and census data.

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<sup>11</sup> Overall, the AHA included 10 family public housing projects in the Olympic Legacy Program, with 7 receiving assistance through the HOPE VI Program.



## **Housing Authority Administrative Data**

Using HUD Form 50058<sup>12</sup> data obtained from the AHA and the CHA, we tracked voucher holders longitudinally, from January 2002 through December 2009 in Atlanta and from October 1999 through December 2008 in Chicago, and we created a data set with the number of voucher holder households aggregated to the census tract level for each quarter.<sup>13</sup> We were able to distinguish voucher holder households that had relocated from public housing developments from those participating in the regular Section 8 program.<sup>14</sup> Using the number of households in a tract (a description of the calculation follows), we generated separate rates for relocated voucher holder households per 1,000 households and for regular voucher holder households per 1,000 households. We refer to the former group as “relocated households per 1,000 households” and the latter as “regular voucher holders per 1,000 households” in the remainder of this article. To answer our question about the effect voucher holders have on crime in their destination neighborhoods, we removed from the analysis sample tracts with substantial demolition of public housing units (because, by definition, these areas would not be receiving communities) and those that are non-residential.<sup>15</sup> These data do not include households relocated from public housing that did not take a housing choice voucher, such as those that relocated to mixed-income developments.

## **Crime and Population Data**

We obtained the quarterly tract-level crime data containing Part I crime<sup>16</sup> and gun crime<sup>17</sup> reports for our study period. We also separately tabulated and included with our data reports of crimes that involved a gun. The Chicago estimates used tract-level data from the 2000 and 2010 decennial censuses to create intercensal population and household estimates for each quarter in Chicago, whereas the Atlanta estimates used 2000 census data and population estimates that the Atlanta Regional Commission calculated. The final analysis sample in Chicago contained observations for 813 tracts over 37 quarters, and the Atlanta sample contained observations for 121 tracts over

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<sup>12</sup> Form 50058 is a module of HUD’s Inventory Management System/Public and Indian Housing Information Center, a system that stores information on families who participate in public housing or Section 8 rental subsidy programs ([http://portal.hud.gov/hudportal/HUD?src=/program\\_offices/public\\_indian\\_housing/systems/pic](http://portal.hud.gov/hudportal/HUD?src=/program_offices/public_indian_housing/systems/pic)).

<sup>13</sup> The Chicago study period begins with the fourth quarter of 1999 to include the start date of the Plan for Transformation and the significant improvements in data quality after the HUD takeover of the CHA. Although Atlanta’s public housing transformation began in the early 1990s, data on relocated public housing households were not available before 2002, so the Atlanta study period begins then.

<sup>14</sup> For Chicago, we matched public housing residents on the CHA’s 10/1/99 list to the data and created flags to indicate if a voucher holder was part of the Plan for Transformation. For Atlanta, we derived data from the AHA’s housing choice voucher and relocation administrative databases, which included a field indicating whether voucher holders received their vouchers as a result of public housing transformation.

<sup>15</sup> This excluded group includes tracts with 100 or more public housing units demolished: 18 total tracts in Atlanta and 30 total tracts in Chicago.

<sup>16</sup> Part I violent crime includes aggravated assault, forcible rape, murder, and robbery. Part I property crime includes arson, burglary, larceny, and motor vehicle theft.

<sup>17</sup> Gun crimes (those involving handguns or other firearms) include homicide, sexual assault, robbery, battery, ritualism, and assault.

32 quarters. We chose quarters as the unit of time for this analysis because we sought to accumulate sufficient numbers of reported crimes of various types and thereby avoid substantial numbers of observations with zero counts.

Exhibit 1 shows the summary statistics over the analysis period for our dependent and independent variables of interest. We did not model gun crime in Atlanta. The two cities' average quarterly violent crime rates are similar: 4.9 crimes per 1,000 people in Chicago and 4.4 in Atlanta. Property crime rates are substantially higher in Atlanta than in Chicago. The average population in a census tract is roughly the same between cities, with a slightly higher average in Atlanta, about 3,800 compared with about 3,400 in Chicago. On average, the density of relocated households is very similar between the two cities, but Atlanta has higher densities of regular voucher households.

To give a sense of how these variables change from quarter to quarter in Chicago, the average absolute change in the voucher holder rates is 0.39 for relocated households and 1.6 for regular voucher households. For crime counts, the average change is 4.19 for violent crime, 9.78 for property crime, and 2.35 for gun crime.

**Exhibit 1**

**Descriptive Statistics of Dependent and Independent Variables for Analysis Samples**

Variable	Chicago		Atlanta	
	Mean	Standard Deviation	Mean	Standard Deviation
Part I violent crimes	12.3	13.2	14.5	11.9
Part I violent crimes per 1,000 population	4.9	5.9	4.4	3.8
Part I property crimes	41.3	37.3	75.4	60.3
Part I property crimes per 1,000 population	17.5	28.6	21.9	22.9
Gun crimes	4.7	5.8	NA	NA
Gun crime per 1,000 population	1.8	2.4	NA	NA
Population	3,382	2,525	3,788	2,080
Relocated HH per 1,000 HH	3.5	7.0	3.3	6.7
Regular HCVP HH per 1,000 HH	31.2	40.8	50.2	63.3
Number of Observations	30,081		3,296	

*HCVP = Housing Choice Voucher Program. HH = households. NA = data not available.*

*Source: Analysis of 50058 data from Chicago and Atlanta Housing Authorities, Chicago and Atlanta Police Departments and the U.S. Census Bureau*

**Methodology**

The question of whether relocated households cause crime in their new neighborhoods appears straightforward superficially. Substantial analytical challenges make answering it very difficult, however, because of three potential problems—selection bias, endogeneity bias, and spatial autocorrelation—that violate the basic statistical assumption about the independence of errors associated with observations.

**Efforts To Confront Statistical Challenges**

*Selection bias* occurs when one or more unmeasured (uncontrolled in the model) neighborhood characteristics causally affect both crime and where voucher holders decide to live. This problem

can bias the estimated coefficients; the amount of bias depends on the strength of the correlation between the voucher holders' residential selections and the unmeasured variables. In this case, several neighborhood characteristics—availability of affordable housing, layout of streets, architectural character of buildings, access to mass transit, and presence and design of public spaces and facilities—will likely affect both how many voucher holders move into the neighborhoods and how much crime will occur there. To minimize selection bias, we estimate a fixed-effects model in which the dummy variable we specify for each tract serves as a summary proxy for all the aforementioned, unmeasured characteristics.

*Endogeneity bias* arises if crime rates and voucher holder concentration are mutually causal. Voucher holder concentration might indeed affect the crime rate in a neighborhood, for any or all of the reasons noted previously. The causation might also work in reverse, however. Landlords in neighborhoods with rising crime rates, who face falling property values and skyrocketing vacancies, might respond by recruiting voucher holders more aggressively. Concurrently, rents might fall in these areas so that they become more economically attractive destinations in which voucher holders can save out-of-pocket contributions to rent payments. This circular pattern of causation can bias the coefficients of the endogenous crime and voucher concentration variables, with the strength of the bias depending on the degree of reverse causation. Our use of quarterly data helps address some issues with endogeneity bias because it precisely estimates the sequence of voucher holders and crime. We count voucher holders in a tract if they are present at the beginning of the quarter and count crimes during each quarter.<sup>18</sup> Although this approach does not address endogeneity completely, it reduces potential feedback bias if the market does not respond quickly to changes in crime—that is, if landlords take several quarters or longer to reduce rents in response to crime increases.<sup>19</sup>

*Spatial autocorrelation* occurs when observations with similar values cluster across geographic space. Clusters of this sort undoubtedly occur with the phenomenon of crime, for which spatial spillovers have long been considered the norm. Statistical analyses that do not correct for spatial dependency can have unstable parameter estimates and yield unreliable significance tests. We make this correction by employing a spatial lag variable in our model, defined using the tract centroids and an inverse distance decay function,  $\alpha = 1$ , with a 2-mile cutoff (Hipp, 2010).

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<sup>18</sup> The voucher population in a tract is highly correlated quarter to quarter. A test of lagged or future voucher holder rates in the same model with the current rate violates assumptions about the independence of errors.

<sup>19</sup> We tested a specification of the model employing the lagged (one quarter) value of tract median sales prices for single-family homes and condominiums as a control, but the additional term did not appreciably affect our results and caused a number of tracts to drop from the analysis because of missing data. With Chicago data, we also experimented at length with instrumental variables (IVs) as a way of confronting endogeneity bias. Unfortunately, the number of relocated voucher households was zero for most observations and very small in nearly every other observation, thus rendering the predictive power of our first-stage residential location models very poor. Because of this weak instrument in the second stage, we were reluctant to report those results. We stress, however, that our IV estimates supported the conclusions we report here regarding the effect of relocated voucher households on neighborhood crime rates. Thus, we have some confidence that our conclusions have not been seriously distorted by endogeneity bias.

## Specification of the Crime Models

We estimate negative binomial, fixed-effects panel models of crime counts as a function of relocated households per 1,000 households.<sup>20</sup> Our base model treats this key variable as continuous; our threshold model breaks the rate into various categories to test for nonlinear effects. As a control for the aggregate concentration of all vouchers, we enter the rate of regular voucher holders per 1,000 households in the models. We also control for the citywide crime trend and seasonality of criminal activity by including dummy variables for each quarter and omitting the first quarter. Tract fixed effects and the spatial lag of the given crime dependent variable, as explained previously, complete the specification.

Following recent convention in criminological research, we employ a negative binomial specification (Hipp and Yates, 2009; Osgood, 2000). This specification handles crime counts instead of crime rates and includes population as a separate explanatory variable with its coefficient constrained to 1. Constraining the coefficient for population enables us to interpret the estimates in relation to crime rates per capita instead of counts. A negative binomial estimation is preferable to standard ordinary least squares (OLS) regression on crime rates because it accounts for skewed crime rate distributions, particularly in areas with small populations like census tracts, where small increases in crime counts can produce dramatic changes in crime rates (Osgood, 2000). This estimation uses the Poisson distribution for counts and includes an error term with a gamma distribution, the latter to allow for overdispersion caused by dependence between crime events.

Given the critical policy importance of identifying whether a threshold of voucher holder concentration that triggers crime exists, we also estimate a threshold model. Based on the literature, we expect that threshold points might exist below which voucher holders have no effect on crime (Galster, Tatian, and Smith, 1999). Because the distribution of voucher households in neighborhoods is highly skewed, and because many neighborhoods have no voucher households, we use separate categorical dummy variables for various threshold levels of both relocated and regular voucher households per 1,000 households, with zero voucher holders as the omitted category. We created threshold categories using the quartiles for tracts with nonzero values of relocated and regular voucher households separately over four quarters at the end of the study period in Chicago, the fourth quarter of 2007 through the third quarter of 2008. Atlanta tracts fell into similar threshold categories, so we applied the Chicago threshold categories to the Atlanta data for comparability.

Finally, we experimented with a variety of models that enabled the potential effect of relocated households on crime to differ according to the neighborhood context, as measured by variables operationalized with 2000 census tract-level data. Given that our models include tract fixed effects, these contextual variables enter the model as interactions with the relocated household rates variable. We tried a wide variety of variables that attempted to measure the degree of collective efficacy and pre-existing concentrations of poverty in the neighborhood. Unfortunately, none of these

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<sup>20</sup> A test of the model using the count of relocated households instead of the rate per 1,000 households did not produce any substantive differences in the coefficients estimated.

experiments provided sufficiently consistent, meaningful, or robust results to report here. The Atlanta research team is continuing to experiment with other tract-level data sources that might serve as proxies for collective efficacy.<sup>21</sup>

Our model estimates the marginal effect of relocated households on crime in destination neighborhoods during the transformation efforts, but it does not tell us what effect relocation under these efforts had on crime in neighborhoods where public housing was demolished. To predict how many crimes would have been reported in these neighborhoods in the absence of the demolition of the public housing developments, we estimated an OLS model for the public housing tracts for each crime type, using data from 1991 through 2008 for Chicago and from 1997 through 2009 for Atlanta ( $n = 30$  in Chicago;  $n = 18$  in Atlanta). In each tract, actual crime counts were set to *missing* after the start date for the relocation of households in preparation for the first building demolition.<sup>22</sup> We used the coefficients from the terms in this model, including controls for time, tract fixed effects, and indicators for season, to produce an expected crime count in these neighborhoods in the absence of public housing demolition.<sup>23</sup> Subtracting the expected number from the actual number of crimes gives us the change in crime because of the public housing transformation and demolition in these tracts.

For the other residential, or *destination*, neighborhoods, we divided the number of actual crimes in each tract by the appropriate coefficient from the threshold model to estimate what crime would have occurred in these neighborhoods if no households had relocated there and the public housing transformation had not occurred. By aggregating the results across tracts and over the study periods of what expected crime would have been without the transformation efforts in the public housing demolition tracts and the destination neighborhoods, we arrive at a citywide net effect of the efforts.

## Results

Overall, our negative binomial fixed-effect models<sup>24</sup> of crime in Atlanta or Chicago suggest a more complex relationship between crime and public housing transformation than has been implied in the popular media. The control variables indicated that, as expected, higher counts of similar crimes within a 2-mile radius were associated with higher counts of that crime in the particular neighborhood.<sup>25</sup> Most tract fixed effects proved statistically significant, suggesting substantial,

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<sup>21</sup> Residential churning within a tract might also contribute to decreased collective efficacy. We do not have a reliable method of measuring all residential movement at the census tract level, either annually or quarterly. If residential churning within tracts is consistent over time, however, the inclusion of tract fixed effects in the model would account for it.

<sup>22</sup> The relocation of households in public housing units took place over an extended period. We assumed that relocation began at least 1 year before the “notice to proceed” date for the demolition of each building (obtained from the CHA).

<sup>23</sup> Regression results for this model are available from the authors on request. We excluded one tract in Chicago with public housing demolition (818.00) from this model for property crime only because of its unusually high volume of property crime and crime trend over time. We used a linear extrapolation for this tract to estimate the quarters after demolition occurred. This procedure did not alter our conclusions overall.

<sup>24</sup> We estimated parameters using the NBREG procedure in STATA MP 11.

<sup>25</sup> Details are available on request; they are omitted from exhibit 2 for brevity.

persistent crime differentials among census tracts in Chicago and Atlanta, but we do not discuss them here because they offer no important insights. The results of central interest, however, indicate that greater concentrations of relocated households were associated with higher crime rates of all types investigated; this relationship manifested itself only after surpassing a threshold occurring in a minority of tracts.

### Violent, Property, and Gun Crime Effects on Destination Neighborhoods

The estimation of our base model specification shows that higher rates of relocated households in a neighborhood (census tract) in both Atlanta and Chicago are associated with higher violent crime rates during that quarter (exhibit 2). In these negative binomial models, because tract population has been logged and its coefficient constrained to 1, we can interpret the coefficient on relocated households per 1,000 households as the percentage increase in crimes per capita for each additional relocated household per 1,000 households in a quarter. The coefficient of 0.00769 for violent crime in the Chicago base model indicates a 0.77-percent increase in per capita crime for each additional relocated household per 1,000 households. We found similar results in Atlanta, where an additional relocated household per 1,000 households is associated with a 0.72-percent increase in per capita crime. The associated effect on crime for relocated households is slightly less for property crime in both cities and slightly more for gun crime in Chicago.

#### Exhibit 2

Base Models All Residential Tracts (Except Public Housing Demolition Tracts)

Dependent Variable (Crime Count)	Violent		Property		Gun
	Chicago	Atlanta	Chicago	Atlanta	Chicago
Relocated voucher holder HH per 1,000 HH	0.00769*** (0.000539)	.00717*** (0.00128)	0.00657*** (0.000450)	0.00477*** (0.000936)	0.00926*** (0.000795)
Regular voucher holder HH per 1,000 HH	0.000725*** (0.000152)	- 0.00035 (0.000245)	0.000766*** (0.000132)	0.0002562 (0.000172)	0.000831*** (0.000227)
Spatial lag of crime	0.0374*** (0.000754)	0.0212*** (0.00254)	0.0150*** (0.000239)	0.00713*** (0.00053)	0.0887*** (0.00189)
Constant	- 6.010*** (0.0485)	- 7.339*** (0.119)	- 5.697*** (0.0444)	- 5.073*** (0.0631)	- 7.130*** (0.0792)
Observations	30,081	3,296	30,081	3,296	30,081

HH = households.

\*\*  $p < 0.05$ . \*\*\*  $p < 0.01$ .

Notes: All models include population, tract fixed effects, and indicators for each quarter as described in the text. Standard errors included in parentheses.

### Effect by Density of Relocated Households

The base models show small effects associated with relocated households on average across census tracts, but we expected that variation across neighborhoods was possible based on the density of relocated households. The findings from our threshold models, shown in exhibit 3, indicate a much smaller effect of public housing transformation on destination neighborhood crime rates than the popular accounts we discussed in the beginning of this article imply. Nevertheless, they

**Exhibit 3**

**Threshold Models All Residential Tracts (Except Public Housing Demolition Tracts)**

Dependent Variable (Crime Count)	Violent		Property		Gun
	Chicago	Atlanta	Chicago	Atlanta	Chicago
Very low density Relocated HHs per 1,000 HHs: > 0 to 2	- 0.0100 (0.00823)	- 0.0389 (0.0236)	0.00517 (0.00594)	- 0.0308 (0.0164)	- 0.0301** (0.0124)
Low density Relocated HHs per 1,000 HHs: 2 to 6	0.0465*** (0.00978)	0.0354 (0.0274)	0.0449*** (0.00747)	0.00551 (0.0197)	0.025 (0.0146)
Moderate density Relocated HHs per 1,000 HHs: 6 to 14	0.126*** (0.0119)	0.106*** (0.0331)	0.0918*** (0.00925)	0.0573** (0.0236)	0.119*** (0.0177)
High density Relocated HHs per 1,000 HHs: 14+	0.193*** (0.0145)	0.190*** (0.0432)	0.168*** (0.0114)	0.0865*** (0.0306)	0.209*** (0.0216)
Very low density Regular voucher holders per 1,000 HHs: > 0 to 5	- 0.00530 (0.0170)	0.0223 (0.0407)	0.0103 (0.00915)	0.0373 (0.0224)	0.0163 (0.0297)
Low density Regular voucher holders per 1,000 HHs: 5 to 22	- 0.00855 (0.0196)	0.0979 (0.0565)	0.0135 (0.0111)	0.0347 (0.0333)	0.00432 (0.0335)
Moderate density Regular voucher holders per 1,000 HHs: 22 to 64	0.0316 (0.0229)	0.0868 (0.0659)	0.0139 (0.0142)	0.0389 (0.0401)	0.0812** (0.0382)
High density Regular voucher holders per 1,000 HHs: 64+	0.0770*** (0.0249)	0.0739 (0.0704)	0.0550*** (0.0164)	0.0142 (0.0437)	0.139*** (0.0407)
Spatial lag of crime	0.0367*** (0.000753)	0.0217*** (0.00257)	0.0149*** (0.000240)	0.00708*** (0.000537)	0.0882*** (0.00189)
Constant	- 5.967*** (0.0527)	- 7.347*** (0.121)	- 5.665*** (0.0464)	- 5.081*** (0.0650)	- 7.125*** (0.0868)
Observations	30,081	3,296	30,081	3,296	30,081

HCVP = Housing Choice Voucher Program. HH = household.

\*\*  $p < 0.05$ . \*\*\*  $p < 0.01$ .

Note: All models include population, tract fixed effects, and indicators for each quarter as described in the text. Standard errors included in parentheses.

suggest negative effects for some neighborhoods when relocated households take up residence in them. Using neighborhoods with at least one relocated household, we defined four categories of relocated household density: **very low**-density areas have more than 0 to 2 relocated households per 1,000 households; **low**-density areas have more than 2 to 6; **moderate**-density areas have more than 6 to 14; and **high**-density areas have more than 14.

In Chicago, for instance, a neighborhood with a low density of relocated households at the beginning of the quarter has a (statistically) significantly higher rate of violent and property crimes per capita (5 percent) during that quarter than a neighborhood without relocated households, all

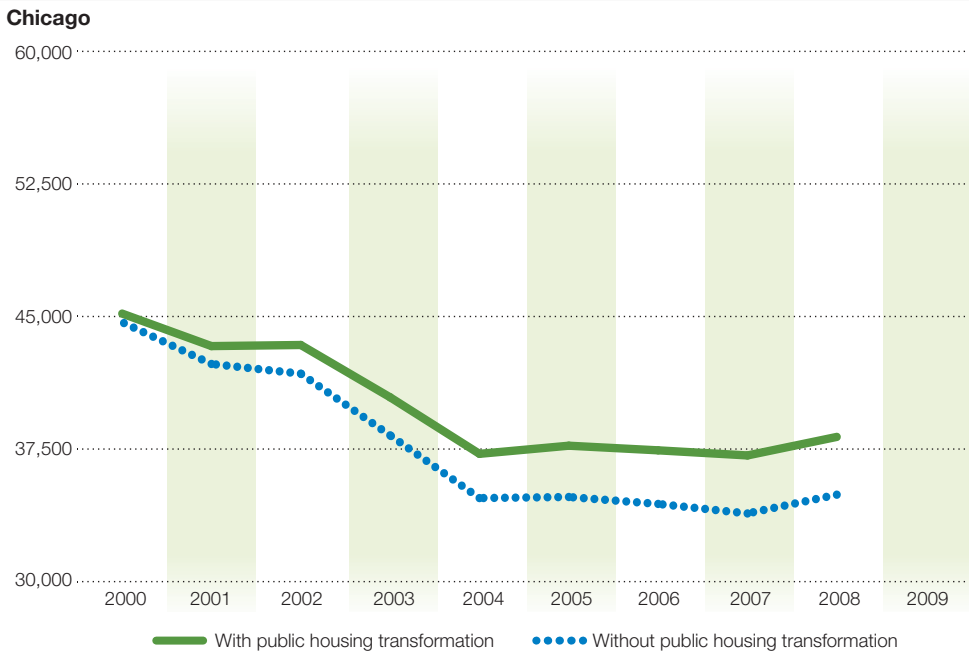
other things being equal.<sup>26</sup> Relocated households have no effect on gun-related crime in Chicago or either property or violent crime in Atlanta until they reach a moderate density. A neighborhood with a moderate density of relocated households compared with a similar neighborhood with no relocated households has a violent-crime rate, on average, 11 percent higher in Atlanta and 13 percent higher in Chicago. Compared with a similar neighborhood with no relocated households, a neighborhood with a high density of relocated households has 21 percent higher violent-crime rates in both Atlanta and Chicago.

### Aggregate Effect in Destination Neighborhoods

Crime generally decreased during the study periods in the residential neighborhoods without public housing demolition in Atlanta and Chicago. The solid line in exhibit 4 represents the actual number of crimes reported. The dashed line shows how much crime we predict would have occurred in these neighborhoods if no households had relocated there and public housing transformation had not occurred. We used the estimates from the previously described threshold models to calculate the dashed line. The difference between the two lines is our estimate of the effect of the relocated households on crime in these neighborhoods.

#### Exhibit 4

Annual Number of Violent Crimes in Destination Tracts (1 of 2)



Source: Urban Institute analysis of data from the Chicago Police Department and the Chicago Housing Authority

<sup>26</sup> To the extent that neighborhoods with higher pre-existing crime rates attracted more relocated households because vacancies were higher, rents were lower, or landlords were more heavily recruiting there, our estimates will overstate the true effect of these households on subsequent crime rates.



**Exhibit 4**

**Annual Number of Violent Crimes in Destination Tracts (2 of 2)**



Source: Emory University analysis of data from the Atlanta Police Department and the Atlanta Housing Authority

Our estimates of the effects of relocated households on crime in the destination neighborhoods vary depending on the density of relocated households; these estimates suggest that overall crime reports in the destination neighborhoods would have been 2.8 and 5.5 percent less, respectively, for violent crime in Atlanta and Chicago if public housing transformation had not occurred. Without relocated households in these neighborhoods, property crime would have been 1.1 percent less in Atlanta and 2.8 percent less in Chicago. Gun crime in Chicago would have been 4.3 percent less in destination neighborhoods.

**Aggregate Effect in Neighborhoods With Public Housing Demolition**

In the Chicago neighborhoods where public housing was demolished, violent crime decreased more than 60 percent compared with our estimate of crime if housing transformation had not occurred. Property crime declined 49 percent and gun crime declined 70 percent between 2000 and 2008. In Atlanta, violent crime declined 13 percent and property crime declined 9 percent between 2002 and 2009 in neighborhoods with public housing demolition.

**Aggregate Effect of Public Housing Transformation Citywide**

By combining our analyses of destination and public housing demolition neighborhoods, we can estimate the aggregate effect across each study period of the transformation efforts on crime in Chicago and Atlanta. As in many American cities, crime declined in both Chicago and Atlanta during

the study period. In both cities, however, tearing down public housing and relocating residents with vouchers meant a modest, statistically significant reduction in violent crime overall.<sup>27</sup> Over the period from 2000 to 2008, the CHA's Plan for Transformation is associated with a 1.0-percent net decrease in violent crimes reported and a 0.3-percent increase in property crimes reported, independent of other factors affecting crime rates. The demolition of CHA housing had a greater effect on gun crime, which was more heavily concentrated in public housing; reports of gun crime decreased, on net, 4.4 percent citywide. In Atlanta, the effects of public housing transformation from 2002 through 2009 yielded a 0.7-percent net decrease in violent crimes and a 0.5-percent decrease in property crimes.<sup>28</sup>

Although the overall effect on crime in both cities was generally positive, as with any major social policy intervention, CHA and AHA efforts generated positive effects in some places and negative effects in others. Both cities experienced significant and lasting crime declines in neighborhoods where they tore down public housing and in many neighborhoods where former public housing residents moved. In a relatively few areas in Chicago and Atlanta that received more than a few relocated households, however, crime decreased less than it would have if no former public housing residents had moved in.

The analyses also examined the effect of traditional voucher holders—those who were not relocated from public housing—on crime (exhibits 2 and 3). Traditional voucher holders have much smaller effects on crime rates than do relocated households, and a much higher density of traditional voucher holders is necessary before we see any effect at all. For violent crime in Chicago, compared with a similar neighborhood with no traditional voucher holders, the density of traditional voucher holders in the neighborhood has no effect on crime until it exceeds 64 households per 1,000 households, which is nearly five times greater than the high-density threshold for public housing relocation vouchers. Violent crime per capita in Chicago neighborhoods with a high density of traditional voucher holders is about 8 percent higher, on average, than a neighborhood with no voucher holders.<sup>29</sup> In Atlanta, no statistically significant threshold effects emerged at any level for traditional voucher holders in regards to property or violent crime.

These findings raise the question of how many and how often census tracts have densities of relocated households that are associated with higher crime rates. Because households move, census tracts might shift among our four density categories over the course of the study period. Also, because we based these thresholds on cumulative voucher holders in a neighborhood, as more public housing relocation vouchers enter the private market over the study period, the number of census tracts with moderate and high densities of relocation households is more likely to be greater. During the study period, most Chicago tracts (52 percent) had no (33 percent) or very low (19 percent) densities of relocated households—the categories for which no effects on crime exist. Another

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<sup>27</sup> Note that this analysis of public housing transformation includes only former public housing residents relocated with Section 8 vouchers and does not include analysis of residents living without vouchers in rehabilitated public housing or mixed-income developments.

<sup>28</sup> Because of data limitations, we were unable to perform the analysis for gun crime in Atlanta.

<sup>29</sup> We found that traditional voucher holders were associated with a very small effect on property crime per capita in Chicago (an average of less than 0.1 percent more), but we could not identify thresholds for the effect.

one-third of tracts had relocated households at the density levels associated with effects on crime (low, moderate, and high) for most of the study period. In the remaining 15 percent of tracts, the density of relocated households was also at these levels but not for most of the study period.

Similarly, most of Atlanta's census tracts fell into the lowest relocated household categories. From 2002 through 2009, about one-half of the Atlanta census tracts included in the analysis had either no public housing transformation relocation households (21 percent) or a very low or low density of relocation households (25 percent), in which the effects of public housing transformation on crime were not statistically significant. Only about 13 percent of the census tracts in Atlanta had moderate or high densities of relocated households during most of the study period, whereas 41 percent had moderate or high densities of relocated households for less than one-half of the study period, with most of these tracts reaching that threshold level during the final four quarters of the study period.

Finally, the tracts in both cities that experienced the greatest effect on crime associated with relocated households were neighborhoods that were already vulnerable, with high poverty and crime rates before the arrival of public housing relocation households. In other words, our story is not the popular version of previously stable communities spiraling into decline because public housing residents moved in, but rather a story of poor families moving into areas that were already struggling. In Chicago tracts where at least a low density of relocated households persisted for at least one-half of the study period, the median income was \$31,400 and the poverty rate was 31 percent (citywide figures were \$38,600 and 20 percent, respectively). In 2000, the violent crime rate in these tracts was 29.6 per 1,000 people compared with 16.6 per 1,000 people for Chicago overall. The tracts that received relocated households only at the lowest category are much less vulnerable. In these tracts, the median income (on average) was \$50,858, the poverty rate was 15 percent, and the violent crime rate was 8.8 per 1,000 people. In 2008, the proportion of the city that experienced the effects on crime associated with relocated households included 12 percent of tracts with a low density of relocated households, 16 percent with a moderate density, and 14 percent with a high density. Of the remaining tracts, 41 percent did not contain any relocated households and 17 percent had a very low density of relocated households, so the effects were not statistically significant.

In Atlanta, the census tracts classified as having a moderate or high density of relocated households for more than one-half of the study period had a median income of only \$26,000 and a 32-percent poverty rate (citywide figures were \$37,200 and 24 percent, respectively). The violent crime rate in these tracts in 2002 was 29.7 per 1,000 people; the rate for Atlanta overall was 22.7 per 1,000 people. By comparison, in the tracts that had relocated households but never at sufficient densities to classify them into the two highest threshold categories at any point during the study, the median income (on average) was \$56,090 and the poverty rate was 22.6 percent. The violent crime rate in these tracts was 22.6 per 1,000 people, equivalent to the overall rate for Atlanta. By the end of 2009, 14 percent of tracts in the city had a moderate density and 37 percent had a high density of relocated households. Of the remaining tracts, where we found no effect on crime, 22 percent had no relocated households, 15 percent had a very low density, and 12 percent had a low density of relocated households.

## Policy Implications

Untangling the relationship between public housing transformation and crime trends is extremely challenging. Neighborhoods with higher pre-existing crime rates are also more likely to be affordable and accessible to voucher holders because they have more vacancies, lower rents, and more landlords actively recruiting them (Popkin and Cunningham, 2000). The econometric techniques we developed for this research provide the best estimation possible of the effect of large-scale public housing relocation on crime trends in the neighborhoods where relocated households move. This analysis shows a similar pattern in both Chicago and Atlanta: not the simplistic relationship implied by media accounts, but rather a complex picture of declining crime rates in both cities, a small net decrease in violent crime citywide associated with the transformation efforts, and effects in some neighborhoods—those that received more than a few relocated households—that suggest that crime would have been less there had no public housing transformation occurred. Overall, our findings show that most neighborhoods in both cities were able to absorb public housing relocation voucher households without any adverse effect on neighborhood conditions.

This research raises many questions, most notably *why* the presence of even relatively small clusters of relocated households in destination neighborhoods is associated with statistically significant differences in crime rates during that quarter, on average, compared with tracts without any relocation voucher holders, whereas the presence of traditional voucher holders seems to have little to no effect. In a historical context, public housing developments suffered extreme violent crime and drug trafficking rates; many households had members tied to gangs or the drug trade (Popkin, 2010; Popkin et al., 2000). Some former households might have brought problem behaviors—or associates—with them or, conversely, might have become targets in their new communities because of gang turf issues.<sup>30</sup> Ethnographic research might help shed light on how relocated households affect neighborhood dynamics.

Regardless of the mechanism, a crucial policy implication from this research is the need for responsible relocation strategies—like those both Chicago and Atlanta now employ—that offer former residents a real choice of housing and neighborhoods and that provide long-term support after those residents leave public housing.<sup>31</sup> Other housing authorities planning large-scale redevelopment should learn from the experiences of these two cities about how to support former residents in moving to a wider range of communities and how not to create new concentrations of poverty in other vulnerable communities.

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<sup>30</sup> We do not have empirical evidence on which to stake this claim, which would require linking addresses of crime victims and crime perpetrators to addresses of voucher holders. We are attempting to do this follow-up work in Chicago, although we may encounter considerable data limitations in the completeness of reported unit numbers for multifamily residences. We also acknowledge that the housing authorities do perform background checks on households before enrolling them in public housing or the voucher program.

<sup>31</sup> This recommendation is consistent with a wide range of research showing how concentrations of disadvantaged households adversely affect neighborhoods (Galster, Cutsinger, and Malega, 2008; Galster et al., 2003). How to best prevent such reconcentration has been discussed at considerable length (Briggs, Popkin, and Goering, 2010; Galster et al., 2003; Grigsby and Bourassa, 2004; Katz and Turner, 2008, 2001; Pendall, 2000; Popkin and Cunningham, 1999; Popkin, Cunningham, and Burt, 2005; Turner and Williams, 1998).

These strategies include—

- Comprehensive supportive services for relocated households before and after relocation.
- Mobility counseling to ensure that residents make informed choices about their housing and neighborhood options.
- Financial incentives, such as raising allowable Fair Market Rent levels, to voucher holders and potential landlords in desirable areas.<sup>32</sup>

Other types of strategies that HUD or local housing authorities should consider are—

- Direct leasing and brokerage for connecting voucher holders to market-rate rental housing and subsidized developments in a wider range of neighborhoods.
- Performance incentives for housing authorities, rewarding those that help voucher holders move outside disadvantaged neighborhoods and that avoid creating new concentrations of poverty.
- Prohibitions on the use of vouchers in certain neighborhoods that already have high concentrations of assisted housing and requirements that they be used only in more opportunity-rich neighborhoods.
- Requirements for all landlords to participate in the voucher program on request.
- Intensified fair housing enforcement aimed at expanding choices for minority voucher holders and families with children.
- Coordination with local law enforcement to ensure that patrol officers and narcotics and gang units are aware of the neighborhoods receiving relocated households and take action in preventing any violence that might result.

Promoting opportunity and choice will not be sufficient, however, to address the needs of many relocated households—the families who endured the worst of the gang violence, drug trafficking, and management neglect that characterized the nation’s most distressed public housing. The substantial differences in crime effects between relocated households and traditional voucher holders underscore the unique challenges of long-term public housing residents and suggest that observers should not apply these findings regarding relocated households to the general voucher holder population. Many of these residents—who are, after all, moving involuntarily—require much more intensive support throughout the search, relocation, and postmove process than most housing authorities have provided to date. Other research on CHA families has found that many of these residents have never lived anywhere other than public housing and lack the skills and experience necessary to negotiate the private market (Popkin, 2010). The Chicago Family Case Management Demonstration showed that providing intensive, wraparound services—more intensive than the comprehensive services that the CHA offers to all residents—to vulnerable families is feasible, even after relocation (Popkin et al., 2010). The costs of these services were not insignificant, but they were not more expensive than standard place-based services. Furthermore, the benefits in terms of stable households could be significant for both former public housing residents and the communities to which they move.

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<sup>32</sup> Both the AHA and the CHA were able to use the flexibilities that MTW afforded to institute these reforms.

## Acknowledgments

The authors thank Wesley Skogan for lending his insights to the methodology and report. For their critical review of the authors' methodology, the authors thank John Hipp, Lance Hannon, Jens Ludwig, and Akiva Liberman. At the Urban Institute, the authors acknowledge the thoughtful guidance given by Nancy La Vigne and Marge Turner and the graphic design by Timothy Meko. At Emory University, the authors thank Moshe Haspel, Lance Waller, Jeffrey Switchenko, Michael Leo Owens, and Elizabeth Griffiths (now at Rutgers) for their important contributions. They acknowledge the John D. and Catherine T. MacArthur Foundation, Annie E. Casey Foundation, and Chicago Housing Authority (CHA) for their generous support of this work. Finally, the authors acknowledge the CHA and Atlanta Housing Authority (AHA) for their collaboration, transparency, and commitment to evidence-driven policymaking. The findings and conclusions presented are those of the authors alone, and do not necessarily reflect the opinions of their funders; the CHA; the AHA; or the Urban Institute, its trustees, or its funders.

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