

**Safe, but Could Be Safer: Why Do Voucher Households Live in Higher Crime
Neighborhoods?**

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Abstract

The radical growth in the Housing Choice Voucher Program over the past 25 years has had a number of benefits for subsidized households, including access to a greater array of neighborhoods. However, while voucher households tend to live in safer neighborhoods than those in supply-side subsidized housing, they still lag behind the general population in terms of neighborhood safety.

This paper attempts to identify the urban spatial characteristics that lead voucher households to live in higher crime neighborhoods. Using census tract-level crime and housing data on 91 U.S. cities in 2000, I estimate a set of regression models that find that three housing market variables have strong associations with the crime exposure of voucher households – the percent of renters located in high crime neighborhoods, the differential between average rents in low and high-crime tracts, and to a lesser extent, the vacancy rate in low-crime tracts.

These findings suggest that the existence of tight rental markets in low-crime neighborhoods within cities make it harder for voucher households to access those areas. Cities with such market characteristics can respond by landlord outreach and increasing the supply of rental housing in lower crime neighborhoods either through reducing building restrictions or subsidizing supply.

Keywords: Crime, Public housing, Vouchers, Low-income housing

Over the past 25 years, the U.S. Department of Housing and Urban Development (HUD) and local housing authorities have radically changed how they deliver housing subsidies to low-income households. Much of the justification for these policy changes has to do with locating subsidized households in better neighborhoods. Although neighborhood quality is often equated with the area poverty rate, policymakers and researchers are increasingly using additional metrics to measure the types of neighborhoods where households live.

One of these metrics is neighborhood crime – a very important aspect of neighborhood quality, particularly for those that live in subsidized housing. Subsidized households have frequently cited crime as a paramount concern in their neighborhoods and as a motivating force for wanting to leave them (Goering et al 2002; Hanratty, Pettit, and McLanahan 1998; Rubinowitz and Rosenbaum 2000). These concerns were often justified, as there have been many documented cases of public housing projects and other clusters of subsidized housing being located in particularly dangerous neighborhoods (Kingsley and Pettit 2008; Popkin et al 2002; Rubinowitz and Rosenbaum 2000). Further highlighting the relevance of crime in this context is the fact that subsidized housing legislation has often emphasized neighborhood safety. This includes the landmark 1949 Housing Act requirement to provide a “suitable living environment” (Newman and Schnare 1997) and measures in The Quality Housing and Work Responsibility Act of 1998 on safety and crime prevention (Federal Register 1999).

This all suggests that neighborhood crime is an important measure of neighborhood quality, and that any attempts to encourage subsidized households to better neighborhoods should be mindful of neighborhood crime. Recent work has examined the efficacy of the voucher program and other housing subsidies at granting access to lower crime neighborhoods (Buron et al 2002; Feins and Shroder 2005; Keels et al 2005; Kling, Ludwig, and Katz 2005; Lens, Ellen,

and O'Regan 2011). In the most recent of these studies, Lens, Ellen, and O'Regan (2011) found that voucher households occupy safer neighborhoods than Low-Income Tax Credit (LIHTC) and public housing households, but still higher crime neighborhoods than the typical non-subsidized household. And while all of these studies provide important insights into *whether* voucher households are accessing lower crime neighborhoods, no existing studies help us to understand *why* voucher households may or may not be able to live in safer neighborhoods.

This paper addresses this question by examining the crime exposure of the typical voucher household in 91 U.S. cities in 2000. Using a large sample of neighborhood crime data I attempt to identify the city and metropolitan area spatial characteristics that are associated with a greater concentration of an area's voucher households in higher crime neighborhoods.

Specifically, I examine the role of economic and racial segregation, in addition to the spatial characteristics of rental markets as possible drivers of increased exposure to neighborhood crime for voucher families.

A better understanding these relationships provides policymakers with guidance on how to improve housing subsidy delivery in a number of ways. First, identifying the cities where voucher households are concentrated in higher crime neighborhoods can help these cities to target efforts at mobilizing these households out of such neighborhoods, whenever possible. Second, by identifying the housing and demographic factors that are associated with exposure to neighborhood crime for voucher households, we can begin to develop context-based strategies for housing subsidies. Specifically, if particular market features are associated with higher concentrations of different types of subsidized households in higher crime neighborhoods, then policymakers can tailor their housing subsidy mixes to fit the conditions in their area housing markets. Alternatively, if these housing market features are changeable, then this would provide

additional motivation to do so. In this paper, I find that three housing market characteristics are chiefly responsible for the extent that a city's voucher population is clustered in higher crime neighborhoods – the percent of renters located in high-crime neighborhoods, the differential between average rents in lower and high-crime tracts, and – to a lesser extent – the vacancy rate in lower crime tracts. In different ways, these three variables suggest that tight rental markets – particularly in low-crime neighborhoods – make it difficult for voucher households to access lower crime neighborhoods. In response, cities with tight rental markets should consider building affordable housing in lower crime areas and/or removing zoning restrictions on housing construction in those areas.

Given the bulk of the findings stress that tight rental markets are bad for voucher household neighborhood safety, one solution could be to expand the stock of affordable housing in such markets. Despite the fact that supply-side efforts to expand the affordable housing stock – chiefly the LIHTC – have been documented to locate households in even higher crime neighborhoods, such development could be intentionally located in lower crime neighborhoods. Furthermore, it is likely that zoning is playing a substantial role here. The fact that the stock of rental housing is much lower in lower crime neighborhoods is not likely due to chance – higher income, safer neighborhoods often have a preponderance of single-family housing because that is all that cities allow. If some of these regulations are removed, this may spur multifamily development in safer neighborhoods that a wide array of families – with or without vouchers – can afford.

Background and Literature

Since the inception of the Section 8 voucher program in the 1970s, vouchers have steadily taken over as the primary vehicle for subsidizing housing in the United States. Figure 1

displays counts of vouchers, LIHTCs, and public housing from 1990 to 2007. By 1990, vouchers had already surpassed the one million mark but by 2007 that number had more than doubled to 2.2 million vouchers. In that year, voucher households accounted for 44 percent of HUD-assisted households.

There are a number of reasons for the dramatic rise in the voucher program. Most pertinent for this paper is the increased flexibility that voucher households have in their location choices compared to other subsidized households. Voucher households should be able to access a wide array of housing units, within budget constraints, rather than a fixed supply of housing as constructed with programs such as public housing and the LIHTC. Policymakers therefore hope that voucher households will be able to use that enhanced flexibility to access higher quality neighborhoods. Furthermore, there is less stigma attached to voucher households than public housing, so it is likely that individual households will be more likely to be able to locate in lower crime neighborhoods than public housing developments, which have tended to locate in neighborhoods with few amenities and high crime and poverty rates.

However, voucher households choose housing and neighborhoods with a greater set of constraints than the typical household. First, voucher households have less wealth and lower incomes than the typical household, potentially limiting neighborhood options. Second, landlords may stigmatize voucher holders, and resist accepting applicants who list vouchers as a source of income (Freeman 2012; Turner, Popkin, and Cunningham 1999). Finally, voucher holders may have limited information about alternative neighborhoods in making their choices.

As noted, there is a growing body of work that examines the extent that the flexible (within constraints) nature of the voucher program has allowed households to reach higher opportunity neighborhoods. There is a longstanding focus on poverty, but recent work has also

documented the public safety concerns and conditions of subsidized households. Much of this work comes from studies on three important demonstration programs – Gautreaux, Moving to Opportunity (MTO), and HOPE VI.

Neighborhood Poverty

Research examining neighborhood poverty outcomes for subsidized households concludes that public housing tenants live in particularly high poverty neighborhoods, and voucher households – whether they be participants in demonstration programs or the general voucher-holding population – live in a wider array of neighborhoods that also have relatively high poverty rates. Pendall (2000) found that the typical voucher household lives in neighborhoods with poverty rates that are 33 percent higher than the average household. Compared to the LIHTC, McClure (2006) found that similar proportions of voucher and LIHTC households (30 and 26 percent, respectively) live in low-poverty neighborhoods. Importantly, these proportions are higher than those for all poor households, although lower than for all renter households. Less promising findings on the voucher program come from a series of papers that find that voucher households tend to cluster in the same areas in a number of different cities (Wang and Varady, 2005; Wang, Varady, and Wang, 2008). The general conclusion from all of this work is that, while voucher households live in lower poverty neighborhoods than we tend to see for traditional public housing tenants, voucher households are still locating in high-poverty neighborhoods.

Neighborhood Crime

A smaller body of work exists that has examined the neighborhood crime rates experienced by voucher households. Although crime is a frequent concern of both subsidized housing residents and policymakers, data on neighborhood crime is not always accessible. The

earliest studies of neighborhood crime exposure for subsidized households come via examinations of the three major demonstration programs – Gautreaux, MTO, and HOPE VI. Although these are specialized populations even within the subsidized housing community – these households were intentionally selected or motivated to participate chiefly because they were in acutely distressed neighborhoods – their experiences shed light on what neighborhood crime conditions look like for public housing and voucher residents. Generally, these groups were located in very high-crime areas when living in their original public housing developments and chose to move to lower crime (yet still relatively unsafe) areas after receiving their vouchers.

The Gautreaux program was created in Chicago in 1976 as a result of a series of lawsuits against the Chicago Housing Authority (CHA) and HUD, and offered black families in CHA housing the opportunity to move to desegregated areas around the Chicago area, including the suburbs. Rubinowitz and Rosenbaum (2000) reported a number of statistics highlighting just how dangerous Gautreaux participants' and other Chicago public housing residents' neighborhoods were. In 1980, the Robert Taylor Homes – the largest public housing development in the country at the time – comprised only one percent of Chicago's population yet 10 percent of the city's murders, aggravated assaults, and rapes. Also according to Rubinowitz and Rosenbaum (2000), nearly one-half of Gautreaux participants reported that violent incidents occurred regularly in their neighborhoods. Criminal victimization rates were twice as high among Chicago public housing tenants than in the city as a whole.

Unfortunately, those that used vouchers to move (often to the suburbs) continued to face relatively high crime rates. Gautreaux suburban movers experienced violent crime rates about five times as high as the crime rate in the Chicago suburbs at that time, and those that moved within the city faced violent crime rates about 1.5 times as high as the rest of the city. More

promisingly, many years after their initial move, the Gautreaux households tracked by Keels et al (2005) lived in neighborhoods with very comparable violent and property crime rates to the surrounding county. These findings, paired with positive effects on education and employment for Gautreaux participants, led housing advocates to seek additional funding for similar mobility programs and helped usher in the dramatic expansion of the voucher program.

To replicate the Gautreaux study in a larger, experimental setting, HUD created MTO in 1993 as a five-city demonstration to move subsidized households living in high poverty public housing developments into low-poverty neighborhoods. In contrast to Gautreaux's focus on racial segregation, the direct goal of MTO was to alleviate concentrated poverty by moving public housing residents to low poverty neighborhoods. As with Gautreaux, despite the fact that crime was not the primary indicator of neighborhood quality that the program was designed to address, researchers report dramatically unsafe conditions for those participating in the program. Goering et al (2002) reported that more than one-half of MTO participants identified crime, gangs, and drugs as the principal motivation for wanting to move out of their neighborhoods. Hanratty, McLanahan, and Pettit (1998) found that 11 percent of respondents reported that someone in their household had been shot or stabbed in the past six months, and 46 percent reported that somebody had tried to break into their home in the past six months. These reports of victimization were supported by administrative data. Violent crime rates for the baseline MTO census tracts in Boston, Chicago, and Los Angeles were three times higher than in the metropolitan areas as a whole (Kingsley and Pettit, 2008).

After MTO households used vouchers to move, their neighborhood crime conditions typically improved. Kingsley and Pettit (2008) found that violent crime rates in Boston, Chicago, and Los Angeles were almost twice as high in the origin neighborhoods of the experimental

MTO group than in the post-move neighborhoods. Feins and Shroder (2005) reported results of pre- and post-move surveys for the MTO treatment, comparison, and control groups (the comparison group includes households who received vouchers but were not restricted to use them in low-poverty neighborhoods). Survey respondents in the two groups that received vouchers reported significantly greater improvements in neighborhood safety than the control group for every question asked.¹ Thus, MTO participants were successful in using vouchers to move to safer neighborhoods.

HOPE VI program participants have also been successful at leaving dangerous public housing developments for safer environments. Popkin and Cove (2007) summarized three waves of the HOPE VI Panel Study. Baseline measures from 2001 showed that nearly 80 percent of households reported “big problems” with people using and selling drugs, two-thirds reported big problems with shootings, 23 percent with people being attacked, and 16 percent with rapes and sexual assault. Large declines in all of these measures were reported by relocatees from public housing by 2003. By 2005, nearly all of these reports were less than half as prevalent – 35 percent of relocatees reported big problems from people using and selling drugs, and shooting, attacks, and rapes/sexual assault declined to 26, 13, and 9 percent, respectively. The evidence that HOPE VI revitalization projects are moving households to safer neighborhoods is preliminary, however, as the revitalization projects and voucher mobility HOPE VI spawned were still in progress as of the latest follow up surveys in 2005.

The only existing study that looks at the voucher population as a whole – rather than specialized subsets participating in Gautreaux, MTO, and HOPE VI – was conducted by Lens, Ellen and O’Regan (2011). Using census tract-level crime and voucher (in addition to LIHTC,

¹ Questions address perceived safety during the day, safety during the night, drug activity in view in the neighborhood, and whether a household member was a crime victim in the past 6 months.

public housing, and poor renter) counts from 91 U.S. cities in 2000, they found that voucher households occupy much safer neighborhoods than LIHTC and public housing residents, face similar crime rates as the broader population of renters below the poverty line, but live in higher crime neighborhoods than the population as a whole in those cities. A surprising result from this paper is the comparison between LIHTC and voucher households in terms of crime. While numerous studies report that LIHTC and voucher households occupy similar neighborhoods in terms of poverty, Lens, Ellen, and O'Regan found that voucher households occupy significantly safer neighborhoods, providing one clear advantage of tenant-based subsidies over supply-side ones.

An important mechanism to consider in the examination of the neighborhood crime rates experienced by subsidized households is the potential that these households can affect crime themselves, something increasingly studied over the years. Although that is not the focus of this study, the results of these analyses have implications for how we interpret the findings in this paper. For instance, if voucher households increase neighborhood crime, then they are inherently more likely to be in higher crime neighborhoods.

There are only a few studies that directly test whether and how voucher households affect neighborhood crime, although there are a number that estimate the relationship between public housing and crime. The general consensus is that neighborhoods with traditional public housing are typically more dangerous, and public housing likely plays a role in that, but whether the existence of public housing has a dramatic effect on neighborhood crime is unclear. (Farley 1982; McNulty and Holloway 2000; Roncek, Bell, and Francik 1981). Looking at scattered-site public housing, Goetz, Lam, and Heitlinger (1996) found that such housing was associated with

fewer police calls in Minneapolis, MN. Galster et al (2003) found no evidence that the creation of either dispersed public housing or supportive housing alters crime rates in Denver.

Looking at voucher households, Suresh and Vito (2009) examined the effects of public housing demolition and the concentration of Housing Choice Voucher holders on patterns of homicide in Louisville, KY. They found that homicides were initially clustered in and around public housing developments, and were then located near Section 8 apartments once public housing was demolished. However this work is purely correlational and relied on several cross-sections rather than longitudinal analyses. Van Zandt and Mhatre (2009) analyzed crime data within a quarter mile radius of apartment complexes containing 10 or more voucher households during any month between October 2003 and July 2006 in Dallas. Unfortunately, the police did not collect crime data in these areas if the number of voucher households dropped below 10, leading to gaps in coverage and limiting the number and type of neighborhoods examined. The authors found that clusters of voucher households are associated with higher rates of crime, however similar to Suresh and Vito, it is unclear if this relationship was causal.

Popkin et al looked at public housing transformation in Chicago and Atlanta and track the households that used vouchers to leave housing slated for demolition. They found that an influx of voucher households into a neighborhood increased crimes in that neighborhood after a threshold of voucher households entered the neighborhood, providing the most reliable evidence to date that voucher households increase crime. However, it is unclear whether the high amount of neighborhood turnover that large influxes of voucher households portend were to blame for crime in this case.

Ellen, Lens, and O'Regan (2012) used longitudinal data on 10 U.S. cities covering various years between 1997 and 2008 and estimated whether increased voucher numbers in

census tracts lead to elevated crime. The authors found a strong association between vouchers and crime, however they concluded that the association appears to be largely due to the fact that voucher households tend to move to neighborhoods that are experiencing increases in crime and/or have high crime rates to begin with.

In sum, voucher households live in relatively unsafe neighborhoods, but occupy safer neighborhoods than those of LIHTC and public housing households. It is also possible that voucher households affect neighborhood crime rates, suggesting some caution when developing policies to move voucher households to lower crime neighborhoods. But there is no prior work that identifies the city and metropolitan area housing and demographic characteristics that are most likely to allow voucher households access to lower crime neighborhoods. Pendall (2000) addressed a similar question looking at poverty and other measures of neighborhood distress. Using tract-level data on 443 metropolitan areas in 1998, Pendall identified the proportion of an area's voucher population that resides in a distressed neighborhood,² and estimated a set of models that identify the area factors most strongly associated with the voucher population's presence in distressed neighborhoods. Pendall found that the percentage of renters in distressed neighborhoods and high rates of black and Hispanic households among the voucher population are associated with a higher proportion of voucher households in distressed neighborhoods. Relatively high rents in non-distressed neighborhoods and the poverty rate in the MSA, however, were negatively associated with voucher concentration in distressed neighborhoods. Pendall concludes that voucher households actually avoid neighborhoods with very low rents, perhaps due to the value of their subsidies. In this paper, I estimate the effect of these housing market and

² Following Kasarda (1993), Pendall defines a distressed neighborhood as one that is one standard deviation or more above the mean in each of the following: the share receiving public assistance, percent males 16+ who worked fewer than 27 weeks in previous year, share of female headed households, and share age 16-19 who are not in school and lack a high school degrees.

urban spatial variables – in addition to others – on the ability of voucher households to reach lower crime neighborhoods.

Data and Methods

Data

The goal of this paper is to identify the city and metropolitan area spatial characteristics that contribute to the concentration of voucher households in high-crime areas. The empirical piece begins by providing descriptive statistics estimating neighborhood crime exposure for the voucher, LIHTC, and public housing populations.³ Then, I estimate a set of models to identify that factors that explain differentials in crime exposure and location in high-crime neighborhoods for the voucher population. The analysis relies heavily on the National Neighborhood Crime Study, a nationally representative sample of crime data for 9,593 census tracts in 91 U.S. cities, collected by Ruth Peterson and Lauren Krivo of Ohio State University. Peterson and Krivo collected Part I (major) crime counts⁴ from city police departments in 1999, 2000, and 2001. The public -use data consists of Part I crimes summed over the entire three years, making the 2000 crime counts equivalent to three-year averages. Collecting data in three-year averages allows for abnormal spikes to be smoothed out over the sample period, and is frequently used in crime research when possible (Sampson, Raudenbush, and Earls 1997). The sample of cities is a stratified (by region of the country) random sample from all cities with at least 100,000 persons as of the 2000 census (Peterson and Krivo, 2010). Appendix I provides a list of the 91 cities, in addition to basic descriptive statistics on crimes and subsidized housing units for each city.

³ Some of these descriptive statistics are reprinted from Lens, Ellen, and O'Regan, (2011).

⁴ Part I Crimes are collected as part of the FBI's Uniform Crime Report (UCR) system. These crimes are comprised of the violent crimes assault, sexual assault, homicide, and robbery; and property crimes larceny, burglary, motor vehicle theft, and arson.

Census tract-level counts for four types of households were merged to the crime data – voucher households, renter households below the poverty line, and public housing and LIHTC households – all measured in 2000. I also merge these data to 2000 Census counts of total housing units and tract-level demographic statistics. I also provide descriptive statistics for all tracts in U.S. cities with population greater than 100,000 as a comparison point.

Comparing the two samples in Table 1, it is clear that the 91-city sample is indeed quite similar to all U.S. cities. This sample represents over one-third of all U.S. cities with population greater than 100,000, and has similar prevalence of whites, blacks, and Hispanics, people in poverty, and public housing, voucher, and LIHTC households. In each sample, voucher households represent approximately two percent of all housing units. Crime rates are also very similar (62.0 and 60.9 crimes per 1000 residents) in each sample.

Estimating Crime Exposure

I construct three measures to estimate the exposure to crime for subsidized households. The first two are continuous measures that function as weighted averages. One is an absolute measure of crime exposure, and the other is relative to the city's crime rate. The first weighs a neighborhood's crime rate by the proportion of the sample's relevant household type (voucher, LIHTC, etc.) within that neighborhood. This calculates the neighborhood crime rate experienced by the average member of the given group. This absolute crime measure uses the number of people in the tract as the denominator, expressed as crimes per 1,000 persons. For voucher households, the crime exposure rate can be expressed as:

$$(1) \sum_{i=1}^n [Crime_i * (\frac{v_i}{V})]$$

where $Crime_i$ is the crime rate in census tract i , v_i is the number of voucher households (or public housing, LIHTC, or poor renter households) in census tract i , and V is the number of voucher

households (or public housing or LIHTC units, or poor renter households) in the city. The resulting value is the weighted average crime rate.

To construct the second measure, where neighborhood crime exposure is relative to the overall city crime rate, I take the ratio between each tract's crime rate and that of the surrounding city. That ratio replaces the crime rate in census tract i ($Crime_i$), and the resulting value for each subgroup (i.e. voucher or LIHTC households) is the weighted average of the ratio between tract and city crime rates. Looking at both relative and absolute measures of crime exposure is important. For the absolute measure, although voucher crime exposure is largely driven by city crime rates, families in higher-crime neighborhoods are affected just the same. Further, the portability of vouchers across city boundaries should allow voucher households to leave high-crime cities for lower crime neighboring jurisdictions. The relative measure, on the other hand, captures the isolation of voucher households in the higher-crime neighborhoods within cities, regardless of the crime levels in a city.

The third measure captures the percent of each city's (and the entire sample's) housing subgroup population that resides in a high-crime neighborhood. A high-crime neighborhood is one with a crime rate in the top quartile of all tracts in the sample. The top quartile threshold for the entire sample is 88 crimes per 1000.

Table 2 provides the crime exposure rates for the total population and voucher, poor renter, LIHTC, and public housing households, and LIHTC households in Qualified Census Tracts (QCTs)⁵ using the two weighted average measures and the highest quartile measure. The three measures perform similarly across the five groups – voucher households are in higher crime areas than the total population, but poor renters, LIHTCs, public housing households, and

⁵ Developers utilizing the LIHTC receive a 30 percent bonus on their tax credit for building in QCTs, which are tracts where at least half of the residents earn less than 60 percent of the area gross median income.

LIHTCs in QCTs are all in higher crime areas than voucher households. In all columns, each of the values are statistically significantly different from one another at the 1 percent level. In terms of magnitude, the simplest comparison is in the second column of data – voucher households live in tracts 22 percent higher than those in the surrounding city, 28 percent for poor renters, 51 percent for LIHTC households, 60 percent for public housing households, and 81 percent for LIHTC households in QCTs. The finding that voucher households experience substantially lower neighborhood crime rates than LIHTC households differs sharply from findings in the literature regarding poverty exposure – LIHTC and voucher households tend to be located in similarly situated neighborhoods in terms of poverty. What remains to be seen is which cities provide greater opportunities for these voucher households to avoid living in high-crime neighborhoods, and what spatial characteristics of these cities are most associated with such opportunities.

Modeling City-Level Voucher Crime Exposure

Given the large number of cities included in the cross-section, I am able to estimate regression models that shed light on the spatial characteristics of cities associated with different levels of voucher crime exposure. It is important to examine this at the city level, because that is the level at which voucher programs are often administered. Although there are often several housing submarkets within a city or metropolitan area, public housing authorities operating at the city, county, or MSA level often have a lot of influence on the location of subsidized households. Simply put, very few housing policies are determined at the neighborhood level. A city's overall crime rate likely has much to do with voucher crime exposure, but it is important to identify whether, controlling for city crime rates, conditions in some cities are more conducive to allowing voucher households to access safer neighborhoods than in others.

A city's voucher population is more likely to be highly exposed to crime when the total crime rate is high, and when crime and voucher households are highly concentrated – particularly if they are concentrated in the same neighborhoods within the city. Thus, the total crime rate, the concentration of voucher households, the concentration of crime, and the interaction between voucher concentration and crime concentration are all likely to be highly correlated with voucher crime exposure. But there are additional factors that are likely to affect the concentration of voucher households in less-desirable neighborhoods. In work on identifying the factors that lead voucher households to live in distressed neighborhoods (high levels of male unemployment, high school dropouts, public assistance receipt, and female-headed households), Pendall (2000) hypothesized that you will observe a higher proportion of the voucher population in distressed tracts when it is more difficult or costly for voucher households to locate in non-distressed areas. The same is likely for crime. Building on Pendall's model, I include the following variables: the proportion of rental housing in high (or very high) crime tracts, rent differential between lower and high-crime tracts as a percentage of rent in low-crime tracts, rent in lower crime tracts as a percentage of HUD Fair Market Rent in 2000, differential between the voucher minority population and city minority population, the vacancy rate in lower crime neighborhoods, and the city poverty rate.

Following this, a model that identifies the relative importance of these effects is expressed as:

$$(2) VouchExp_i = \alpha_i + \beta_1 Crime_i + \beta_2 VouchConc_i + \beta_3 CrConc_i + W\delta_i + D\gamma_i + e_i$$

Here, a city's voucher crime exposure rate is regressed on the city's total crime rate, the concentration of voucher households (measured by the voucher/non-voucher dissimilarity

index⁶), and the concentration of crime in a city (the neighborhood standard deviation divided by the neighborhood mean). I run two sets of models, one with the absolute measure of crime exposure as the dependent variable, and the other using the relative (ratio between tract and city crime rates) measure. In models with the relative measure as the dependent variable, I do not include the city crime rate on the right-hand side of the equation. δ_i signifies the vector of housing market variables following Pendall (2000) listed above. I also include a vector of demographic and segregation variables (γ_i) that are also likely to affect the ability of voucher households to reach lower crime neighborhoods and a dummy variable to denote whether the city is the core city of a MSA, to differentiate from central cities and more suburban areas. Additionally, I include a dummy variable that signifies whether the city's landlords were subject to source of income (SOI) laws that prohibit them from discriminating against voucher households. These laws should increase the number of voucher households in a city by increasing the voucher utilization rate (the proportion of households with vouchers that are actively using the voucher to rent a home). Freeman (2012) has found that SOI laws do in fact raise utilization rates after jurisdictions pass such laws. Voucher households in jurisdictions with SOI laws should also be less clustered in distressed neighborhoods, since landlords in high demand areas are less likely to discriminate against them. In fact, Freeman (2012) also found that voucher household locational outcomes were affected by SOI laws.

Descriptive statistics for these variables are presented in Tables 3 and 4. Table 3 contains city-level variables while Table 4 displays characteristics of high and low-crime census tracts.

Looking at the city-level variables, we see that the average voucher crime exposure rate across

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$$(f6.1) \ 0.5 * \sum_{i=1}^n \frac{v_i}{V} - \frac{nv_i}{NV}$$

In this version of a standard dissimilarity index, v_i is the number of vouchers in a tract, V is the number of vouchers in the city, nv_i is the number of non-voucher households in tract i , and NV is the number of non-voucher households in the city. I calculate this index separately for each city.

cities is higher than the average total crime rate. The voucher/non-voucher dissimilarity index is comparable to the white/nonwhite dissimilarity index, and higher than the poor/non-poor dissimilarity index. On average, about 46 percent of voucher households would have to change census tracts in order for their spatial distribution to be equivalent to non-voucher households. The coefficient of variation is about 0.74, meaning that average neighborhood crime rates are only about 25 percent higher than the standard deviation.

In Table 4, we observe that high and low-crime tracts are quite different across a number of indicators. Low-crime tracts are more populous and have dramatically lower crime rates (by definition). Voucher households are slightly more likely to live in high-crime neighborhoods than low-crime neighborhoods, but LIHTC and public housing households are much more likely to live in high-crime tracts than all other tracts. Average rents are clearly lower in high-crime neighborhoods, and vacancy, poverty, and minority rates are higher.

Results

Results from a set of models identifying the city characteristics associated with higher levels of voucher crime exposure are presented in Tables 5, 6, and 7. In Table 5, the dependent variable is the crime rate weighted by the prevalence of voucher households in the tract, in Table 6, I use the relative measure that captures the ratio between tract and city crime. Table 7 provides results from the models with the percent of voucher households in the highest crime quartile as the dependent variable. In each table, the independent variables are the same with the exception of city crime rate being dropped from Table 6, as the city crime rate is already controlled for in the construction of the crime exposure measure on the right-hand side of the equation. In model 1, I include only housing market variables – the rent differential between high and low crime tracts, average rent in lower crime tracts as a percent of HUD FMR, percent of renters in high-

crime tracts, and the vacancy rate. Model 2 adds the poverty rate, the poor/non-poor dissimilarity index, and the white/non-white dissimilarity index. In the third model, I drop the dissimilarity indices in favor of racial differentials between the city and voucher population (for blacks and Hispanics separately) and add dummy variables signifying whether the city's landlords are subjected to source of income laws and whether the city is a central city in a metropolitan area. In the fourth and final model, I include all previously mentioned variables and all models control for the region of the country. Note that in both tables, the number of observations is either 89 or 87, as I drop two cities (Livonia and Pembroke Pines) with less than 100 vouchers, and two cities, Hialeah and Miami, do not have data on the race of voucher householders, meaning they are dropped from models with the black and Hispanic voucher/general population variables.

Some clear patterns emerge across the two tables. The rent differential between high and low crime tracts is a fairly consistent correlate of voucher crime exposure – in cities where lower crime tract rents are relatively higher than higher crime tract rents, we see that voucher households are more exposed to neighborhood crime. Interestingly, these findings contrast sharply with Pendall's (2000) findings looking at distressed tracts. His analyses concluded that voucher households are more likely to live in non-distressed neighborhoods when rents in distressed neighborhoods are relatively lower, suggesting that they avoid distressed tracts when rents there are very low – not the case for higher crime tracts.

The percent of renters in high-crime tracts is strongly related to the relative measure of voucher crime exposure. This makes sense, as voucher households are locating where the rental opportunities are. This finding is similar to Pendall (2000) and suggest that broader efforts to increase multifamily development and density in safer neighborhoods (reducing costs by driving

up supply) could work to reduce the clustering of voucher households in high-crime neighborhoods.

The vacancy rate in low crime areas is weakly related to each of the continuous measures of crime exposure, as is the average rent in lower crime tracts as a percent of the fair market rent. However, in Table 7, where the dependent variable is the percent of voucher households in high-crime tracts (the top quartile), the vacancy rate in low-crime tracts is very strongly associated with such voucher concentrations in high-crime tracts. Further, these results are consistent with the rent differential between low and high-crime tracts and the percent of renters in high-crime tracts. The findings for these housing market variables provide support for what many have suggested about the limits of the voucher program – in very tight rental markets, landlords often discriminate against voucher households (Cunningham and Sawyer 2005; Freeman 2012; Fosburg, Popkin, and Locke 1996). In these markets, supply-side efforts – or increases in the value of the voucher subsidy – may be more effective. However, public housing and LIHTC households are even more clustered in higher crime neighborhoods, suggesting we have yet to find ways of building subsidized housing in low-crime areas.

The most counterintuitive finding is with regards to the poverty rate. The poverty rate has a strong, negative relationship with the crime exposure measures in Tables 5 and 6 (and a weak relationship with the top quartile measures). The negative relationship suggests that the higher the poverty rate, the lower the voucher clustering in high crime tracts. Thus, in cities with higher poverty rates, voucher households are relatively less exposed to high crime. This could be due to the fact that in high poverty cities, there are more areas for voucher households to locate because rents are generally lower. It is notable that these correlations are quite strong – scatterplots of

crime exposure and poverty rates that control for the overall crime rate suggests that the high-poverty cities clearly have relatively low voucher crime exposure rates.

Income segregation – measured by the poor/non-poor dissimilarity index – has a very strong relationship with the absolute measure of crime exposure in Table 5, and a weaker relationship with the relative measure and highest quartile measure in Tables 6 and 7. The magnitude of the relationship is quite strong. On the other hand, the white/non-white dissimilarity index is not related to crime exposure. Source of income laws are not at all related to crime exposure for voucher households, suggesting that those laws are not having an impact on locating voucher households in lower crime neighborhoods. Voucher households have greater exposure to neighborhood crime in central cities according to the absolute measure but not with the relative measure. Relatively high rents in lower crime neighborhoods as compared to HUD FMRs, the concentration of crime, the voucher/non-voucher dissimilarity index, the interaction between crime and voucher concentrations, and differentials between black and Hispanic proportions of voucher households and all other households are insignificant in all models.

Conclusion and Policy Implications

Recent research on the voucher program suggests that these households occupy safer neighborhoods than LIHTC and public housing households. This paper provides additional evidence supporting those conclusions by showing that LIHTC and public housing households live in significantly higher crime neighborhoods when controlling for the city crime rate, and are significantly more likely to live in neighborhoods that are in the highest quartile of the distribution of census tract-level crime rates in 91 large U.S. cities. While this is an important achievement for the voucher program, these households are still about 1.5 times more likely to

live in higher crime neighborhoods than the general population, and on average, live in neighborhoods that with crime rates that are over 20 percent higher. In response to this differential, this paper attempts to identify why voucher households are clustered in higher crime neighborhoods.

Two housing market characteristics explain much of the variation in the extent to which voucher households cluster in high crime neighborhoods – the percent of renters located in high crime neighborhoods and the differential between average rents in lower and high crime tracts. For the proportion of voucher households living in high-crime neighborhoods, the vacancy rate in lower crime tracts is also an important correlate. These results suggest that tight rental markets make it difficult for voucher households to access lower crime neighborhoods: when low-crime neighborhoods in a city have high rents and low vacancy rates, voucher households are exposed to more crime.

In most models, the higher the city's poverty rate, the lower the crime exposure of voucher households. This suggests that perhaps those cities have lower rents, and voucher subsidies provide those households additional purchasing power. With the exception of the poor/non-poor dissimilarity index, which was strongly related to higher crime exposure for voucher households, a number of segregation and demographic characteristics were weak predictors of voucher crime exposure.

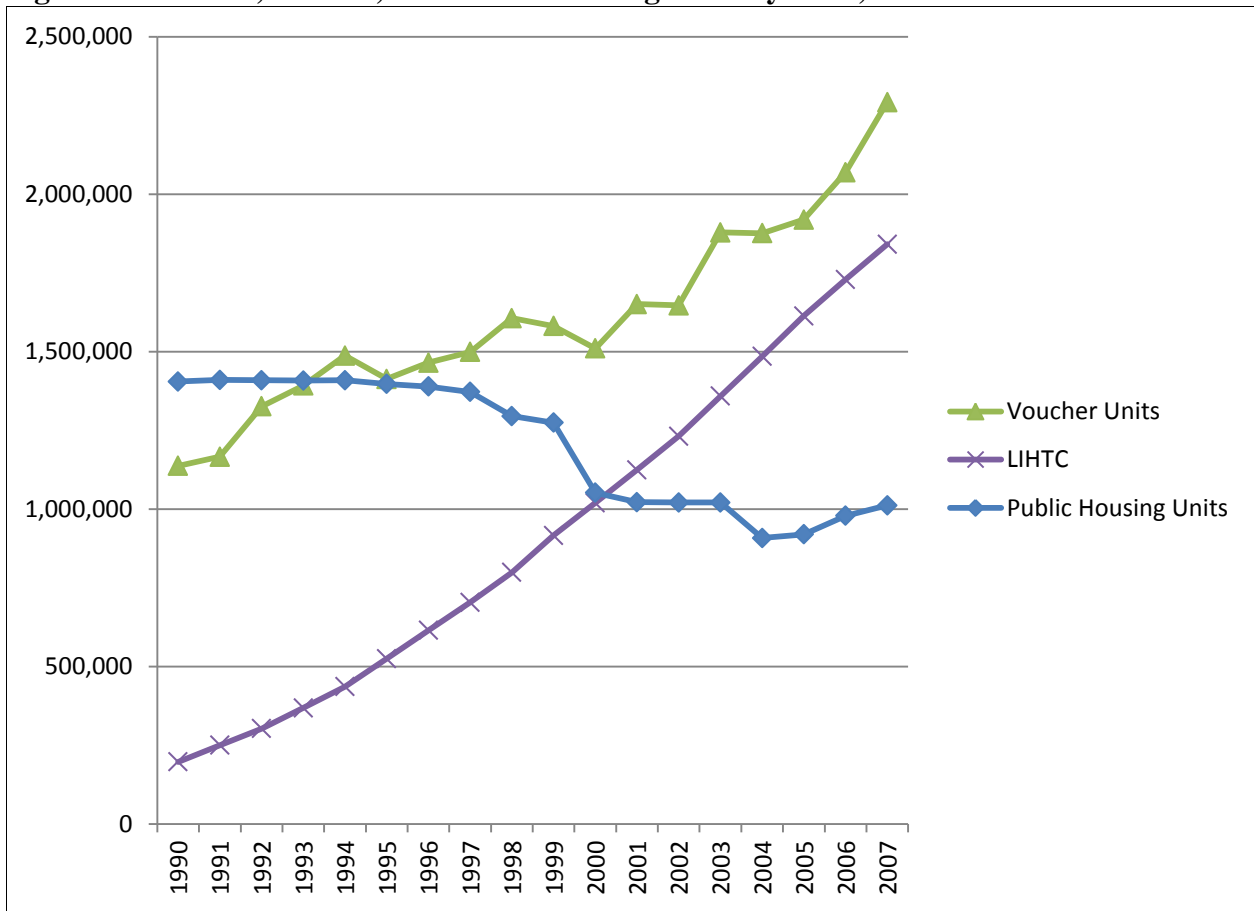
Given the bulk of the findings stress that tight rental markets are bad for voucher neighborhood safety, a sensible solution is to expand the stock of affordable housing in such markets. Despite the fact that supply-side efforts to expand the affordable housing stock – chiefly the LIHTC – have been documented to locate households in even higher crime neighborhoods, such development could be intentionally located in lower crime neighborhoods. Furthermore, it

is likely that zoning plays a substantial role here. The fact that the stock of rental housing is much lower in lower crime neighborhoods is not likely due to chance – higher income, safer neighborhoods often have a preponderance of single-family housing because that is all that cities allow. If some of these regulations are removed, this may spur multifamily development in safer neighborhoods that a wide array of families – with or without vouchers – can afford.

These findings also suggest possible alterations to the voucher program. First, an increase in the value of the voucher subsidy should reduce the likelihood that voucher households will locate in higher-crime neighborhoods. Of the housing variables, the strongest correlate with voucher crime exposure is the rent differential between high and low crime neighborhoods. High and low-crime neighborhoods are always going to have disparate average rents, meaning voucher households require generous subsidies to allow them to reach lower crime neighborhoods.

Mobility counseling is another underfunded and under-utilized potential way to reduce the exposure of voucher households to neighborhood crime. There are many reasons why voucher and other low-income households tend to congregate in higher-crime neighborhoods, but one is likely a lack of information about housing opportunities in other locations. Cunningham and Sawyer (2005) document the efforts of the Housing Opportunity Program (HOP) in Chicago. Voucher households that received mobility counseling were twice as likely to locate in low-poverty neighborhoods as those that did not receive such counseling. Housing authorities should be provided with funding to replicate these efforts with the goal of helping households avoid higher crime neighborhoods.

Figure 1: Voucher, LIHTC, and Public Housing Units by Year, 1990-2007



Source: Author's calculations of HUD data; Schwartz 2006

Table 1: Tract-Level Descriptive Statistics, 2000

	91-City Cross-Section Sample (N=9,583 tracts 91 cities)	All Tracts in U.S. Cities > 100,000 (N=19,252 tracts, 250 cities)
Total Population	39,426,839	106,466,565
Crimes per 1000 people	62.0	60.9 ⁷
Voucher households per Tract	31.8	38.4
LIHTCs per Tract	22.7	24.9
Public Housing per Tract	26.3	31.5
Poor Renters per Tract	184.4	219.5
People per Tract	4,114	5,162
Poverty Rate (Weighted Avg.)	16.9%	17.1%
Percent Non-Hispanic White (weighted Avg.)	48.4%	48.0%
Percent Non-Hispanic Black (weighted Avg.)	22.5%	21.8%
Percent Hispanic (Weighted Avg.)	22.9%	22.3%

Table 2: Crime Exposure Rates, 2000**Sample: 91 Cities**

Unit Type	Weighted Average Crimes per 1000 Persons	Neighborhood-based Ratio between Weighted Average and City Crime Rates	% in High Crime Neighborhoods (Top Quartile)
All Households	62.0	1.00	18.3%
Voucher households	76.9	1.22	26.8%
Poor Renters	82.2	1.28	29.8%
LIHTC	100.6	1.51	35.7%
Public Housing	108.4	1.60	42.6%
LIHTC Units in QCT	121.5	1.81	49.9%

All values are statistically different from voucher value in same column, alpha = 0.01.

⁷ 222 U.S. cities with crime data available.

Table 3: Descriptive Statistics for City-Level Regression Variables, 2000

Variable	Mean	Standard Deviation
Voucher Crime Exp per 1000	72.1	27.9
Total Crime Rate per 1000	64.6	23.9
Voucher/Non Voucher Dissimilarity	0.455	0.100
Neighborhood Crime Concentration	0.739	0.149
Poor/Nonpoor Dissimilarity	0.320	0.059
White-Nonwhite Dissimilarity	0.389	0.158
Population	432,278	556,237
Poverty Rate	0.156	0.063
Pct Black	0.189	0.167
Median Income, \$1000s	40.8	11.9
Vacancy Rate	0.068	0.030
Voucher households per Capita	0.008	0.005

Table 4: Characteristics of High and Low Crime Tracts

	Top Quartile (N=2,396)	Bottom 75% (N=7,187)
Total Population	7,215,897	32,210,942
People per Tract	3,011.6	4,481.8
Crimes per 1000 people*	142.8	43.9
Voucher households per Tract*	44.1	36.2
LIHTCs per Tract*	37.4	23.0
Public Housing per Tract*	39.6	19.3
Poor Renters per Tract*	274.9	201.0
Renters per tract*	1003.7	906.0
Average rent	\$561.35	\$716.0
Vacancy Rate	11.7%	6.1%
Poverty Rate	26.8%	15.7%
Percent Non-Hispanic White	36.2%	51.2%
Percent Non-Hispanic Black	43.3%	20.9%
Percent Hispanic	16.3%	21.8%

*Weighted by tract population

Table 5: Modeling City Voucher Crime Exposure, 2000
DV: Voucher Crime Exposure (Crime Rate Weighted Average)

	Model 1	Model 2	Model 3	Model 4
High-low crime rent differential	21.88***	14.70***	17.27***	13.72**
	(6.089)	(5.005)	(5.872)	(5.908)
Avg rent in lower crime as % of FMR	16.30**	-4.532	-8.784	-4.013
	(7.811)	(8.044)	(8.689)	(8.889)
% Renters in high crime	56.06	27.86	19.60	24.81
	(41.54)	(35.12)	(33.85)	(31.19)
Vacancy rate, low crime	-80.17*	-49.63	-30.49	-18.76
	(42.96)	(38.04)	(48.17)	(46.27)
Crime concentration			5.429	3.213
			(15.16)	(14.29)
Voucher dissimilarity index			27.06	8.726
			(36.75)	(36.96)
Voucher and crime interaction term			-18.97	-15.47
			(33.65)	(32.48)
Poverty rate		-104.4***	-118.7***	-148.4***
		(25.98)	(35.69)	(35.54)
%Black vouchers minus %Black city			4.484	-6.546
			(10.85)	(9.978)
%Hispanic vouchers minus %Hispanic city			-5.878	-24.21*
			(15.03)	(13.89)
Poor dissimilarity index		53.69***		67.16***
		(16.11)		(21.38)
White/non-white dissimilarity index		6.102		6.220
		(8.550)		(12.14)
Source of income law dummy			1.434	0.127
			(2.687)	(3.011)
Central city dummy			7.237***	6.022***
			(2.457)	(2.264)
Total crime rate per 1000	1.142***	1.244***	1.209***	1.234***
	(0.0762)	(0.0844)	(0.0805)	(0.0793)
Constant	-9.659	3.526	15.93	5.619
	(8.403)	(11.82)	(21.11)	(20.66)
Region Controls	Yes	Yes	Yes	Yes
Observations	89	89	87	87
Adjusted R-squared	0.870	0.904	0.894	0.905

Robust standard errors in parentheses

***** p<0.01, ** p<0.05, * p<0.1**

Table 6: Modeling City Voucher Crime Exposure, 2000
DV: City-Relative Voucher Crime Exposure (Weighted Average)

	Model 1	Model 2	Model 3	Model 4
High-low crime rent differential	0.435***	0.311**	0.403***	0.312**
	(0.158)	(0.130)	(0.148)	(0.142)
Avg rent in lower crime as % of FMR	0.305**	-0.0553	-0.121	-0.00324
	(0.124)	(0.142)	(0.142)	(0.150)
% Renters in high crime	0.560	0.536	0.799**	0.924**
	(0.390)	(0.432)	(0.373)	(0.398)
Vacancy rate, low crime	-1.140	-0.406	-0.185	0.224
	(0.694)	(0.609)	(0.732)	(0.742)
Crime concentration			0.542*	0.527*
			(0.288)	(0.293)
Voucher dissimilarity index			0.947	0.525
			(0.705)	(0.753)
Voucher and crime interaction term			-0.928	-0.891
			(0.668)	(0.666)
Poverty rate		-1.782***	-1.986***	-2.832***
		(0.517)	(0.709)	(0.880)
%Black vouchers minus %Black city			-0.0722	-0.290
			(0.205)	(0.192)
%Hispanic vouchers minus %Hispanic city			-0.223	-0.478*
			(0.224)	(0.254)
Poor dissimilarity index		0.603*		0.876*
		(0.357)		(0.515)
White/non-white dissimilarity index		0.191		0.414
		(0.166)		(0.266)
Source of income law dummy			-0.0106	-0.0109
			(0.0477)	(0.0507)
Central city dummy			0.0753	0.0481
			(0.0512)	(0.0492)
Constant	0.961***	1.315***	1.099**	0.902**
	(0.112)	(0.254)	(0.456)	(0.448)
Region Controls	Yes	Yes	Yes	Yes
Observations	89	89	87	87
Adjusted R-squared	0.195	0.338	0.289	0.340

Robust standard errors in parentheses

***** p<0.01, ** p<0.05, * p<0.1**

Table 7: Modeling City Voucher Crime Exposure, 2000
DV: Percent of voucher households in high crime tracts (highest quartile)

	Model 1	Model 2	Model 3	Model 4
High-low crime rent differential	0.189***	0.182***	0.172**	0.167**
	(0.0680)	(0.0628)	(0.0765)	(0.0666)
Avg rent in lower crime as % of FMR	0.0755	0.0191	0.0241	0.0351
	(0.0517)	(0.0627)	(0.0685)	(0.0792)
% Renters in high crime	1.248***	1.172***	1.199***	1.134***
	(0.104)	(0.108)	(0.108)	(0.105)
Vacancy rate, low crime	-0.836***	-0.794***	-0.665*	-0.681**
	(0.265)	(0.278)	(0.353)	(0.335)
Crime concentration			0.0229	-0.000224
			(0.102)	(0.107)
Voucher dissimilarity index			0.128	0.0362
			(0.322)	(0.324)
Voucher and crime interaction term			-0.100	-0.0527
			(0.232)	(0.247)
Poverty rate		-0.341*	-0.409	-0.503*
		(0.180)	(0.261)	(0.255)
%Black vouchers minus %Black city			0.0495	0.00800
			(0.0741)	(0.0805)
%Hisp vouchers minus %Hisp city			-0.111	-0.187
			(0.113)	(0.113)
Poor dissimilarity index		0.158		0.319*
		(0.134)		(0.177)
White/non-white dissimilarity index		0.0310		-0.0124
		(0.0707)		(0.101)
Source of income law dummy			-0.0130	-0.0215
			(0.0221)	(0.0246)
Central city dummy			0.00945	0.00555
			(0.0192)	(0.0206)
Total crime rate per 1000	-0.000174	0.000721	0.000615	0.00138
	(0.000879)	(0.000994)	(0.000990)	(0.00101)
Constant	-0.0851	-0.0697	-0.0371	-0.0835
	(0.0559)	(0.0785)	(0.165)	(0.165)
Region Controls	Yes	Yes	Yes	Yes
Observations	86	86	84	84
Adjusted R-squared	0.913	0.915	0.913	0.914

Robust standard errors in parentheses

***** p<0.01, ** p<0.05, * p<0.1**

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