

WORKING PAPER

Do Housing Choice Vouchers Live Near Good Schools?

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Abstract: The Housing Choice Voucher program was created, in part, to help low income households reach a broader range of neighborhoods and schools. Rather than concentrating low income households in designated developments, vouchers allow families to choose their housing units and neighborhoods. In this project we explore whether low income households use the flexibility provided by vouchers to reach neighborhoods with high performing schools. Unlike previous experimental work, which has focused on a small sample of voucher holders constrained to live in low-poverty neighborhoods, we look at the voucher population as a whole and explore the broad range of neighborhoods in which they live. Relying on internal data from HUD on the location of assisted households, we link each voucher holder in the country to the closest elementary school within their school district. We compare the characteristics of the schools that voucher holders are likely to attend to the characteristics of those accessible to other households receiving place based housing subsidies, other similar, unsubsidized households and fair market rent units within the same state and metropolitan area. These comparisons provide us with a portrait of the schools that children might have attended absent HUD assistance. In comparison to other poor households in the same metropolitan areas, we find that the schools near voucher holders have *lower* performing students than the schools near other poor households without a housing subsidy. We probe this surprising finding by exploring whether differences between the demographic characteristics of voucher holders and other poor households explain the differences in the characteristics of nearby schools, and whether school characteristics vary with length of time in the voucher program. We also examine variation across metropolitan areas in the relative quality of schools near to voucher holders and whether this variation is explained by economic, socio-demographic or policy differences across cities.

1. Introduction

Each year, the Federal Housing Choice Voucher program spends roughly 19 billion dollars¹ to provide rental assistance to over two million households and over two and a half million children under the age of eighteen.² While public housing developments have historically been located in poor neighborhoods with low-performing schools, housing vouchers provide families with the opportunity to utilize the subsidy in a wider range of neighborhoods, school districts and catchment zones – albeit limited by the availability of appropriate affordable housing. The hope is that low income families will use housing vouchers to locate in neighborhoods with higher performing schools, leading to improved educational outcomes for their children and potentially a pathway out of poverty. The assistance provided by vouchers is substantial. As an example, the median voucher household with children has a family size of four, earns approximately \$13,000 annually and lives in a unit that rents at \$1,000 per month. For this family the voucher is equivalent to an increase in post-tax income of approximately \$8,000 annually, increasing their income by 60 percent. Thus, vouchers have the potential to dramatically widen the neighborhoods -- and associated schools -- that low income households

¹ Based on the Department of Housing and Urban Development's 2013 Budget available at <http://portal.hud.gov/hudportal/documents/huddoc?id=CombBudget2013.pdf>

² To receive a voucher households apply to the local Public Housing Authority (PHA), who determines eligibility based on local Area Median Income (AMI) as well as some local priorities. All PHAs require that a family's income does not exceed 80 percent of AMI, but the majority of PHAs require that the family's income does not exceed 50 percent of area median income (AMI). By law PHAs are required to award 75 percent of their vouchers to households whose incomes do not exceed 30 percent of AMI. During the application process the PHA collects information on the family's income, assets and composition. Once the family is deemed eligible they are put on a waiting list for a voucher. As demand usually exceeds supply many waitlists are quite long. According to the New York City Housing Authority (NYCHA) the average waiting period in New York City is around 5 years. Some PHAs also specify particular preferences, such as prioritizing a family who is (1) homeless, (2) paying more than 50 percent of their income on rent or (3) involuntarily displaced. Once a household receives a voucher they then must find a unit which meets an acceptable level of health and safety before the PHA can approve the unit. Each PHA determines a payment standard, which is the amount needed to rent a moderately priced dwelling unit in the local housing market (generally based on Fair Market Rents which are determined by HUD). A household is then required to pay up to 30 percent of their income on rent and the remainder (up to the payment standard) is covered by the PHA. Additional information on the Housing Choice Voucher program is available through HUD. http://portal.hud.gov/hudportal/HUD?src=/program_offices/public_indian_housing/programs/hcv/about/fact_sheet.

can reach. That said, family location decisions depend upon a wide range of factors other than school quality. Thus, whether – or to what extent – housing voucher holders reach neighborhoods with better quality schools than other poor households who do not have vouchers is an important empirical question, which we address in this paper.

While previous work on schools and housing vouchers has focused on a small sample of voucher holders in a limited set of geographic areas, we explore the characteristics of schools available to voucher holders with children in across the country (329 metropolitan areas). Relying on confidential data from the U.S. Department of Housing and Urban Development (HUD), we link voucher households with children (as well as households with children receiving other forms of federal rental housing assistance) to the closest elementary school within their school district. We then link these to school level data from the U.S. Department of Education on academic performance, socio-demographic characteristics of the student body and school resources. These rich data afford a unique opportunity to explore the link between housing vouchers and school quality.

We compare the schools that voucher holders with children³ are likely to attend to the schools that other subsidized households are likely to attend within the same state and metropolitan area (MSA). We also compare the schools near to voucher holders with the schools near to other poor households with children in the same state and metropolitan area and test whether differences persist after controlling for individual family and metropolitan level characteristics.

In brief, we find that, on average, the schools nearest to voucher holders have higher proficiency rates than those near public housing residents, but lower proficiency rates than those

³ When we discuss our sample of voucher households we refer to only voucher households with children unless otherwise noted.

near Low Income Housing Tax Credit (LIHTC) residents and other poor households with children. The story is not simply about the location of affordable rental units. Families with vouchers reach schools that are lower proficiency than the schools nearest to housing units that rent under the maximum allowed by the voucher program.

This paper proceeds as follows. The next section reviews relevant literature. Sections three and four present measures, data and methodology, respectively, and we discuss results in the fifth section. We conclude with a discussion of the implications of our findings for policy.

2. Literature

Existing research on the neighborhoods of voucher holders generally finds that, on average, voucher holders live in slightly *less* disadvantaged neighborhoods than other poor households (Pendall, 2000; Wood, Turnham and Mills, 2008; Galvez, 2011). Similarly, voucher holders typically live in neighborhoods that are *less* disadvantaged than those lived in by the average public housing resident or resident of other HUD-assisted development (Hartung and Henig, 1997; Kingsley et al., 2003; Pendall 2000; Devine et al., 2003). However, the neighborhoods where voucher holders live appear to be somewhat *more* disadvantaged on average than the neighborhoods surrounding LIHTC developments (McClure, 2006).

A few papers have examined which metropolitan level factors could shape neighborhood outcomes for voucher families, specifically exploring whether population characteristics, the housing market, and voucher program characteristics shape outcomes for voucher families. Focusing on characteristics of the population, Pendall (2000) and Galvez (2011) find evidence that in metropolitan areas with higher poverty rates, voucher households are more concentrated

in distressed neighborhoods. Both also find that in metropolitan areas with disproportionately large shares of black voucher households, voucher households are more likely to live in distressed neighborhoods. Galvez (2011) also finds that in metropolitan areas with higher vacancy rates and a larger rental housing stock, voucher households are less concentrated in poor neighborhoods.

Virtually all of the prior work simply compares the demographics of the neighborhoods lived in by voucher holders and those of other households.⁴ More recently, a few studies have considered other neighborhood characteristics, specifically crime and the quality of local schools. Lens, Ellen and O'Regan (2011), for example, examine crime rates for voucher holders. They find that on average voucher households lived in neighborhoods about as safe as those lived in by the average poor renter household, but significantly safer than those lived in by households with place-based assistance. Deng (2007) is perhaps the only study that examines the schools near conventional voucher holders. Focusing on six metropolitan areas, she compares the quality of local schools in neighborhoods where voucher holders live to the schools in the neighborhoods where LIHTC tenants and the wider population of renter households live. She finds that both LIHTC residents and voucher holders live near to lower performing schools than the typical renter household in the same metropolitan statistical area. Of the six MSAs she examines, the schools nearest to voucher holders are higher performing than the schools nearest

⁴ Research on the Gautreaux and MTO housing experiments also examine the relationship between vouchers and school quality. Research on Chicago's Gautreaux program, which gave vouchers to low-income black households and randomly assigned them to either middle-income white suburban neighborhoods or low-income, mostly black urban neighborhoods, finds that children who moved to the suburbs attended higher performing schools (Kaufman and Rosenbaum, 1992; Rosenbaum, 1995). The evidence from the Moving to Opportunity (MTO) program, where low-income families were randomly assigned either an unrestricted voucher, a voucher restricted for use in a low-poverty neighborhood, or no voucher, finds no positive outcomes in terms of school quality for children in the restricted voucher group (Sanbonmatsu et al, 2006). Since the households participating in these two experimental programs were explicitly directed to higher income neighborhoods the results have limited relevance for the conventional voucher program in which neighborhood choices are unrestricted.

to LIHTC tenants in only two MSAs: Boston and New York. These results suggest that context matters, and that outcomes for voucher households will vary across metropolitan areas.

Our research builds on Deng (2007) in a number of critical ways. First, we include a portrait of the schools near to all housing voucher holders with children across the country, which includes over one million households. Second, we include a rich set of school level indicators, describing not only the test scores in schools near voucher holders, but also the poverty concentration, racial composition and level of resources within these schools. Third, we compare outcomes for voucher holders to a broad set of comparison groups, including residents of public housing, tax credit developments, renter households, poor households with children, as well as the set of housing units with two or more bedrooms with rents below the fair market rent, or FMR. (These are the rental units that are affordable to voucher holders). Fourth we are able to use detailed data about housing voucher holders to test whether particular household characteristics are associated with improved outcomes for voucher holders. In particular, we have information on how long a household has been in the housing voucher program, allowing us to examine its relationship to the quality of the nearest school. Fifth and finally, we include a rich set of metropolitan level characteristics to study how context shapes opportunities for voucher holders, with an eye towards particular policies that could lead to improved neighborhood outcomes for this set of low-income households.

3. Data and Measures

In undertaking this work, we use data on the neighborhood locations of housing choice voucher holders and other low income households as well as data on the characteristics of the

elementary schools closest to those neighborhoods. Our sample includes 329 metropolitan areas across the country.⁵

Assisted Households, Renters and Poor Households

For this project, we assemble data on assisted households, renters and poor households from four different sources. First, we use a national file of subsidized housing tenants in 2008 obtained from the U.S. Department of Housing and Urban Development (HUD). This dataset provides the residential address of all voucher holders, as well as the income, race and composition of each household. Similar data are provided for households living in other forms of HUD subsidized housing, specifically public housing. Second, we also use HUD's publicly available Low Income Housing Tax Credits dataset, which includes the address of every LIHTC development placed in service by 2009, together with the number and type of units it includes. Third, we use neighborhood counts of unsubsidized households and the price of rental units from the 2005-2009 American Community Survey. Fourth we rely on HUD's 2008 designation of fair market rents to create tract level estimates of the number of FMR units available to families.

Table 1 shows characteristics of Housing Choice Voucher holders with children, public housing residents with children, poor households with children, and the full set of renters with children in metropolitan areas. The vast majority of households receiving vouchers (70%) earn below 30 percent of Area Median Income (AMI), slightly lower than the share of public housing residents. As for race (defined based on reported race of the head of household), voucher holders and public housing tenants include a larger proportion of black households and a smaller

⁵ This sample includes all primary metropolitan areas (PMSAs) as of 2000, other than Anchorage, AK and Honolulu, HI.

proportion of Hispanic and white households as compared to both other poor households and renters.⁶ On average, these different groups of households have similar numbers of children on average, with the exception of the full set of renters with children, whose households include somewhat fewer children.

The bottom half of the table shows the distribution of these households together with that of LIHTC units with at least two bedrooms (as these are the units that can accommodate families with children).⁷ As shown, voucher holders are distributed more evenly across the country's four regions than both LIHTC units and public housing developments. Public housing developments are over-represented in the Northeast and under-represented in the West, whereas LIHTC developments are under-represented in the Northeast and over-represented in the South. Voucher households and LIHTC developments are more likely to be located in the central city than the typical low-income renter and much less likely than public housing residents.

Schools

While consensus about the best quantitative measures of school quality remains elusive, much education research relies upon test score based measures due, in part, to their broad availability across the U.S. following *No Child Left Behind*. Even more, test score based measures are relatively easy to understand and enjoy broad face-validity in the public eye. That said, test score measures have limitations, and thus we supplement them with characteristics of

⁶ Household heads identifying themselves as white but not Hispanic, are classified as white. Household heads who report their race as black are classified as black. And household heads who report their ethnicity as Hispanic, but who are not black are classified as Hispanic.

⁷ Data on LIHTC tenants is not collected nationally, and therefore it is not included in this analysis. For more information on tenants of LIHTC housing see O'Regan and Horn (2013).

the student body, to capture differences in peers, and the pupil-teacher ratio, to capture differences in school resources.

School data are drawn from two different sources, both from the U.S. Department of Education. First, we measure school performance using the proficiency rates on state math and English exams for students in all public schools in the country for the 2008-2009 school year. Second, we rely the Common Core of Data for measures of school level poverty rates and racial composition, as well as the location of each elementary school.

Table 2 describes our school level data. As proficiency rates are based upon state-specific exams with standards and performance criteria varying across states, in addition to reporting national summary statistics for this variable, we also report the distribution for two states at each extreme: Missouri, which has the lowest mean proficiency rate in our sample and Nebraska, which has the highest mean proficiency rate. These are two neighboring Midwestern states, with a similar poverty rate and minority composition⁸, so these wide differences are likely capturing variation in the measurement of school performance rather than large underlying differences in the state populations. These illustrate the wide disparity in the school performance measures used across states, and the need to adjust for these differences in our national analyses. Turning to demographics, almost half of the students in these public elementary schools are white, and almost half are eligible for free or reduced price lunch. We see wide variation in the racial composition and poverty rates across these public elementary schools throughout the country. We also include one measure of school level resources: the ratio of pupils to teachers. We see that the average classroom in our sample has approximately 16 students per teacher. We

⁸ Nebraska has a poverty rate of 11.8% and a minority share of 13.1% whereas Missouri has a poverty rate of 14.0% and a minority share of 17.2%.

use all of these indicators to describe the performance and characteristics of the schools near voucher households.

Metropolitan Areas

We then supplement these data with additional information on local housing markets and local voucher program characteristics. Data on the housing market as well as data on metropolitan area populations come from the 2000 Census long form data. We track the number of housing authorities in each MSA, drawn from HUD's Picture of Subsidized Households, as a measure of the fragmentation of voucher program administration within a given housing market.⁹

Table 3 includes a description of our metropolitan level data, for the 329 MSAs in our sample. Average rents are \$550, and vacancy rates are 8%. As for demographics, 38% of students are minorities, and 47% are eligible for free or reduced-price lunch. Looking at the mean proficiency rate in the schools nearest to poor students, we see the mean poor student lives near a school where 70% of students are proficient. In terms of segregation in these metropolitan areas, the average dissimilarity index between non-whites and whites is 0.43, meaning that 43% of minorities would have to move to achieve an even distribution of non-white and white households within a metropolitan area. As for the characteristics of the voucher programs within these MSAs, we see that on average vouchers make up about 7% of the renter populations on average. Of these households, on average 57% are minorities, but there is wide variation in this share even between the 25th and 75th percentiles (33% to 80%). Finally, in terms of the

⁹ We would like to thank Martha Galvez for sharing these data with us, as she carefully organized and cleaned this data source.

governance of the housing vouchers, there are on average 1.5 PHAs per 100,000 people, again showing some variation across these metropolitan areas.

Data Construction

We combine these various pieces into two large datasets. The first dataset enables us to conduct a detailed analysis of the relationship between voucher household characteristics and nearby schools. To conduct this analysis we use a detailed household level data on housing voucher holders.¹⁰ This dataset includes a wide range of household level indicators which we believe can shed light on the variation in residential outcomes for households within the voucher program. Specifically we include the household's income, the number of people in the household, the number of elementary school aged children in the household, the race and age of the household head and the number of years a household has had a housing voucher.

Our second dataset allows us to compare voucher holders to a broader set of low-income households. Specifically, we rely on counts of renter households and poor households with children that are available only at the census tract-level. In order to compare voucher holders to these groups we aggregate our voucher household data to the census tract level. This dataset includes 41,758 census tracts, or all census tracts that have at least one voucher household (which includes 83 percent of all census tracts in our 329 metropolitan areas).¹¹ We then construct a similar dataset for public housing households with children and a similar dataset for LIHTC units. (Since we do not have household level data on LIHTC residents, we proxy for households with children by including in this dataset only units with two or more bedrooms.)

¹⁰ This dataset also includes detailed data on public housing residents, though this component is not yet part of our analysis.

¹¹ Census tracts with no voucher households are not included in this dataset.

We then append these three census tract level datasets to create a housing group dataset, where each housing group is observed at the census tract level. Finally, we append this data set to three additional datasets, one of which includes the number of all renter households with children in each census tract in the country another which includes the count of poor households with children in each tract and a third which includes the number of units with two or more bedrooms renting at or below the FMR in each census tract.¹² (We remove voucher holders and public housing residents from these tract level estimates of poor households¹³ and renters so we can consider these counts of unassisted households.) We then append these six tract level datasets into what we call a housing group tract level dataset, in which each observation shows the number of households or housing units in a particular housing group in a particular tract. Each census tract, in other words, can have up to six observations.

We refine our categories further by distinguishing subsidized households by race, creating a race group/housing group/tract level data set. As we do not have household level data on LIHTC tenants, we do not include tax credits in this portion of the analysis. Every census tract can now have as many as nine observations: white, black or Hispanic vouchers, white, black or Hispanic public housing, or white, black or Hispanic poor children.

We then link these two primary datasets to schools. Ideally, we would link each household to the schools actually attended by their school aged children – which would require household level data on the school attended by each school aged child. Indeed, some researchers

¹² The number of units in a census tract renting at fair market rent (FMR) is not provided by the Census Bureau and therefore we needed to create an estimate. We relied on the number of units in a census tract by gross rent and number of bedrooms and merged this to the 2008 county level fair market rents. We assumed an even distribution of rental units within each rent category to calculate the share of units within a rent category that were available at the FMR. In counties where FMR was above \$1,000 for a particular unit type we relied on the share of housing renting below the FMR and above \$1,000 at the county level, available through the ACS 2005-2009 public use micro sample and assumed that the same share of units in the census tract rented below the FMR.

¹³ For estimates of poor households we only remove voucher and public housing households with incomes below the poverty line.

have gained access to this information for specific school districts or small groups of voucher holders (Jacob, 2004; Schwartz et al., 2010; DeLuca and Rosenblatt, 2010). On a national scale, however, it is not possible to identify exactly which school each of these households attends. Nor is it possible to identify the school for which each household is zoned to attend, based on the location of its home.¹⁴

It is possible, however, to determine for each household, the school within the boundaries of their school district that is nearest to their home. To do so, we create two links, one for our household level dataset and one for our housing group level dataset. For our housing group level dataset we link the centroid of each census tract to its zoned school district, and then link it to the nearest elementary school within that district. For our voucher household level analysis we link each household to their zoned school district and then link them to the nearest elementary school within that district. We focus on elementary schools in part because of the widespread reliance on school attendance zones (or “catchment areas”) through which students are assigned to local public elementary schools based upon residential location, but also because researchers have found that proximity is a very important factor in school choice, particularly for younger children (Hastings et al. 2006).¹⁵ Further, there is some evidence that lower income families are particularly likely to base their school choice on distance (Teske Fitzpatrick, and Kaplan 2007).

¹⁴ It is important to note, however, that a group of researchers at the College of William and Mary led by Sal Saporito is currently collecting data on elementary school attendance zones throughout the country, with the goal of collecting data from the 600 largest cities in the country. The complete dataset should be publicly available in the next few years.

¹⁵ School attendance zones are also used to determine school assignments for middle school and high school and previous research finds that proximity is also an important factor in school choice at the middle and high school levels. Schwartz, Stiefel and Wiswall (2013) and Barrow, Claessens and Schanzenbach (2010). That said, the link between residence and elementary schools is generally regarded as strongest both because there are substantially more elementary schools than secondary schools, and because preferences for proximity are likely to be stronger for younger children.

Thus, the closest elementary school within a school district is likely to provide a reasonable proxy measure for educational opportunity.¹⁶

Indeed, in testing the accuracy of this method in comparison to the attendance zone boundary approach in New York City (where we have detailed information on the elementary school attendance zone boundaries) we find that for 74 percent of all HUD assisted households, the nearest school within the community school district¹⁷ is in fact their zoned school. As New York City is the largest school district in the country the nearest school within the school district is less likely to also be the zoned school than in a smaller school district. In fact, many school districts across the country only have one elementary school, making the district boundary the de-facto attendance zone. This estimate therefore likely provides a lower bound on the accuracy of the nearest school in district approach, suggesting that on a national scale this method will provide an accurate proxy for educational opportunity.

4. Methodology

School Quality and Subsidized Housing

We begin our analysis with our housing group dataset, where schools are linked to households through the centroid of the census tract, allowing a comparison between voucher households, other assisted households, renter households and poor households. The centerpiece

¹⁶ This method is similar to that employed by Deng (2007) who uses “Thiessen” polygons to create proximate zones around each elementary school.

¹⁷ As the New York City school district is so large we rely on sub-districts, called community school districts. New York City has 32 community school districts which were conceived in the late 1960s when school administration was being decentralized. Though these districts were officially eliminated in 2003 and replaced with school regions, these boundaries have historically determined school attendance and therefore we rely on these boundaries within New York City.

of our empirical work is a regression model examining the characteristics of the public schools nearest to the neighborhoods where these housing groups are located:

$$SCH_{hcm} = \alpha + \beta_1 HCV_{hcm} + \beta_2 PUB_{hcm} + \beta_3 LIHTC_{hcm} + \eta_{ST/MSA} + \varepsilon_{hcm} \quad (1)$$

where h indexes housing group (that is, public housing, housing vouchers, LIHTC or “other renters”/“other poor”), c indexes census tracts, and m metropolitan areas. In this model SCH represents a set of characteristics of the nearest school to the centroid of the census tract, as described earlier. HCV is a dummy variable identifying Housing Choice Voucher observations, PUB is a dummy identifying public housing observations, and $LIHTC$ is an indicator variable identifying tax credit observations. We weight these regressions by the number of households in each housing group tract observation. The model also includes a set of state specific MSA fixed effects, ST/MSA , which allow for a different intercept for each MSA-state combination. In this way, we control for a wide range of differences across MSAs (such as housing market conditions or segregation) and states (including tests, standards and regulations).¹⁸

We estimate this model with a number of different samples, but focus on the sample that includes all assisted households and poor renters and the sample that includes all assisted

¹⁸ State effects are particularly important because of the broad variation in testing and standards across states, making naïve comparison of proficiency rates misleading. For example, in some states, proficiency standards are relatively low, pass rates are high, and variation across schools is driven by differences in the share of students who are truly struggling academically. In other states, standards are higher, pass rates somewhat lower, and variation across schools reveals differences in the share of students who have some higher level of mastery.

households and units that rent at less than the FMR. In these specifications, “other poor households” and “fair market rent” units, respectively, serve as comparison groups.¹⁹

School Quality and the Characteristics of Housing Voucher Households

We then turn to examining whether and how access to higher-performing schools varies with the characteristics of housing voucher holders.²⁰ We estimate the following model:

$$\text{Prof}_{im} = \alpha + \beta_1 \text{HH}_{im} + \eta \text{ST/MSA} + \varepsilon_{im} \quad (2)$$

where i indexes the household and m the metropolitan areas. In this model HH represents a vector of household level characteristics including household earnings, race, size, and age as well as number of elementary aged children and number of years in the program. We again estimate this model with State/MSA fixed effects.

We also add to model (2) a series of metropolitan level characteristics to examine the association between characteristics of metropolitan areas and voucher household outcomes. We employ the following regression model:

¹⁹ We also estimate this model using our race/housing/tract level data set, allowing coefficients to vary across race groups. In this way, we examine the nexus of race, housing vouchers and schools. Note, however, that these models do not include the LIHTC households specifically because race data are unavailable.

²⁰ As we do not know the race of households in LIHTC developments they are not included in this portion of the analysis.

$$\text{Prof}_{im} = \alpha + \beta_1 \text{HH}_{im} + \beta_2 \text{Vch}_m + \beta_3 \text{PHA}_m + \beta_4 \text{M}_m + \beta_5 \text{P}_m + \beta_6 \text{Poor}_m + \eta \text{ST} + \varepsilon_{im} \quad (3)$$

where *Vch* represents a series of characteristics of the voucher program in that MSA including the market penetration of the voucher program, measured as share of renter households with vouchers as well as the share of voucher holders that are minorities. *PHA* represents the number of PHAs per capita for voucher holders. *M* represents a series of housing market characteristics, including rental values in the metropolitan area, the rental vacancy rate, and the minority/white dissimilarity index. *P* represents a series of controls for MSA population characteristics, including the share of elementary school students eligible for free or reduced price lunch and the share minority elementary school students. We also control for mean outcomes for all poor households with children in the metropolitan area, so our coefficients can be interpreted as indicating associations with voucher holders living near to higher-performing schools controlling for the quality of schools attended by typical poor families in that metropolitan area.

5. Results

The three panels of Table 4 present our comparisons of the schools near to voucher holders with children to the schools near to a series of households with children who receive other forms of housing assistance and to other households with children in the general population. Table 4a begins with a stripped down model, comparing the proficiency rate of schools near to housing voucher holders to public housing residents. In column (1) we see that voucher holders, on average, live near to schools that have proficiency rates that are approximately 3 percentage points higher than the schools near to public housing residents. We next expand our comparison

to include LIHTC units, presented in column (2). The coefficients suggest similar differences between public housing and voucher households, even once the tax credit group is included. And we see that voucher households live near to lower performing schools than households who live in LIHTC developments, by approximately one percentage point. As voucher holders are able to choose where they would like to utilize this subsidy, and tenants of LIHTC developments are not able to exercise this choice, this finding is somewhat surprising. In columns (3)-(5), we compare the average proficiency rate of schools near voucher holders with children to the average proficiency rate of schools near renter households with children, poor households with children,²¹ and units with at least two bedrooms, renting at or below the FMR. We find similar differences across these regressions between voucher households and both public housing households and LIHTC units. Further, comparing voucher households to other poor households and renter households with children reveals that voucher households live near to schools with lower proficiency rates than these two groups of households. These unfavorable comparisons are troubling, as one would hope that vouchers should provide low income households with sufficient resources to improve on (or at least match) the residential outcomes of other households living in poverty. Finally, the last column suggests that disparities are not driven simply by the distribution of units that are affordable to voucher holders. The results show that voucher holders, on average, live near schools that have lower proficiency rates than the schools nearest to the average multi-bedroom housing unit renting at or below the fair market rent in the same state and metropolitan area.

²¹ As previously mentioned since these comparison groups are constructed from census data, they include assisted households and therefore differences between voucher households and these comparison groups would be biased downwards to some degree. To attempt to adjust for this downward bias, we have removed both voucher households and public housing residents from our estimates of renters and poor households.

Tables 4b and 4c examine a broader set of school characteristics and show similar results. Voucher households with children live near schools that have a higher percent of poor students and black students than other poor households with children. This is also true when looking at where voucher holders live in relationship to the affordable rental stock.²² In contrast we find that voucher households live near schools with fewer students per teacher than other poor households with children, indicating that although these schools have lower test scores and higher poverty rates they do provide smaller classes on average – due, perhaps, to compensatory funding programs, such as Title I.

One potential reason why voucher holders may experience different school outcomes is that they are much more likely to be non-white, and in general non-white students tend to have access to lower performing schools, given patterns of residential segregation. To assess whether these differences are driven by differences for minority groups, in the following analysis we look separately at outcomes for white households, black households and Hispanic households.²³

Table 5 reveals wide disparities in the performance of schools near voucher children of different races and ethnicities.²⁴ White voucher children are living in neighborhoods with schools that are ranked 8 percentile points higher than those of black voucher children and 6 percentile points higher than those of Hispanic voucher children. When comparing outcomes between racial groups for the population at large, we find that even greater differences emerge. Poor white children live near schools that are ranked 12 percentile points higher than those of

²² When examining the results for Hispanic students we find that voucher households live near schools with a lower concentration of Hispanic students than poor students in general, but a higher concentration of Hispanic students relative to where the affordable housing stock is located.

²³ Since the ACS does not provide tabulations of households by income, race and presence of children we include instead the number of children living below the poverty line by race, and weight the assisted housing data accordingly so that these numbers are comparable.

²⁴ For ease of exposition, we refer to racial groups, rather than both racial and ethnic groups.

poor black children and 8 percentile points higher than those of poor Hispanic children. When focusing on the differences in school performance between voucher children and each of the comparison groups within each racial group, we see that in fact black voucher children live near higher performing schools than other poor black children and we find similar but less dramatic results for Hispanic voucher children. It appears that one reason why voucher holders experience much worse outcomes than the population at large is that they are more likely to be non-white.

In the next part of this analysis, we take advantage of our rich household level data on voucher holders to explore which household characteristics – in addition to race – are associated with the quality of the proximate school.

Table 6 describes the relationship between household, program, and metropolitan area characteristics and the performance of schools near voucher households. As expected, higher income and white voucher households live near to higher performing schools. In addition, smaller households with older heads also live near to higher performing schools than other voucher holders. Finally, we find that households who are new to the program live near to higher performing schools than households who have been in the program for more years. While it is possible that families with vouchers are moving to neighborhoods with lower performing schools over time, it seems more likely that the patterns we see could be the result of selection, as the families who are most likely to experience gains in income and exit the voucher program may also be those most likely to find their way to good schools. A more optimistic interpretation of these findings is that households who move to neighborhoods with high performing schools quickly experience improvements in their economic outcomes and exit the voucher program. This finding warrants further research into the mobility patterns of voucher households.

To examine the association between metropolitan area characteristics and voucher household outcomes, we replace the state/MSA fixed effects with state fixed effects and introduce metropolitan level indicators. Our key interest lies in housing market and voucher program characteristics, but we also include demographic controls to ensure that their omission is not biasing our results. Note that we include the mean proficiency rate of the school nearest to poor households with children in the metropolitan area, to control for the performance of the schools typically available to poor families in the area.

Consistent with expectations, we find that in MSAs with higher vacancy rates, voucher holders reach relatively high-performing schools. Similarly, we find that minority voucher holders reach relatively low-performing schools in metropolitan areas that are more racially segregated. Both of these results suggest that in metropolitan areas where housing options are more constrained (either through segregation in the housing market or through availability of housing) voucher households end up near lower performing schools. That said, higher rents appear to be associated with higher proficiency rates.

As for voucher program characteristics, we find that the predominance of the Housing Choice Voucher program within an MSA is associated with lower school performance near voucher holders. This could indicate that there are limited options for voucher holders in neighborhoods with higher performing schools, and that as there are increasing shares of vouchers in the market, these households are left with fewer options. We also find an association between the share of voucher holders in a metropolitan area that are non-white and lower performing schools. One potential explanation for this relationship is that in MSAs where a large share of voucher holders are minorities, the program overall can become stigmatized. Finally, we find some evidence that a greater number of PHAs are associated with improved

outcomes for voucher holders. Perhaps smaller PHAs offer more individual assistance, or perhaps they are able to dedicate more resources to helping voucher families find suitable neighborhoods. It is important to note that all of these findings cannot be interpreted as causal, but merely descriptive correlations that suggest directions for future research. These surprising results on the administration of the voucher program suggest that further work is necessary to understand how these different features of the voucher program broaden or constrain opportunities for voucher households.

6. Conclusions/Discussion

Existing research on the residential outcomes of voucher holders finds that on average voucher holders live in neighborhoods that are slightly more advantaged than those in which other poor households live, but that they still live in highly disadvantaged neighborhoods (Pendall, 2000; Galvez, 2011; Lens, Ellen, O'Regan, 2011). This research pushes the question a step further and probes whether the Housing Choice Voucher program has the potential to break the cycle of poverty through breaking the link between poor households and low performing schools. Unfortunately we find that this does not appear to be the case.

We find that while voucher holders live in neighborhoods with higher performing schools than households living in public housing developments, they live in neighborhoods with lower performing schools than households living in LIHTC developments and poor households overall. This is disappointing, given that we hope Housing Choice Vouchers are designed to provide households with the purchasing power that would enable them to move to neighborhoods with better services and schools.

In short, it appears that Housing Choice Vouchers are not sufficient to break the link between poor households and poor schools. While one reason why voucher holders experience much worse outcomes than the population at large is that they are more likely to be non-white, one might expect voucher holders to do more to erase racial disparities. Similarly, it does not appear that families experience gains over time when participating in the program. Voucher holders who have had their vouchers for longer live near to lower performing schools, though this could be entirely due to attrition from the program rather than due to effects of the program. To determine what this reflects about the voucher program this requires following voucher holders in the program for multiple years and observing the types of moves households make throughout their tenure in the program.

More work is necessary to uncover *why* voucher holders are not able to reach neighborhoods with better schools and whether changes in the administration of the program could lead to improved residential outcomes. The fact that voucher holders are able to reach neighborhoods with higher ranked schools in weaker housing markets suggests that voucher holders can reach better schools when they have access to a larger range of neighborhoods. Efforts to provide more information to voucher holders about school choices and to provide assistance with housing search might help voucher holders overcome existing barriers and start to break the link between poverty and poor schools.

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Table 1 Characteristics of Subsidized and Other Households with Children

	Voucher Households ^a	Public Housing ^b	LIHTC Units ^c	All Poor Households ^d	All Renter Households ^e
<i>Household Characteristics</i>					
Median Income	\$15,095	\$14,977	--	\$12,900	\$33,214
Earning Below 30% AMI	69.9%	72.1%	--	71.2%	24.9%
Earning Between 30% and 50% of AMI	24.0%	19.2%	--	17.5%	19.4%
Earning Above 50% AMI	6.1%	8.7%	--	11.3%	55.7%
Below Poverty Line	72.6%	74.4%	--	100.0%	31.8%
Average Number of Children	2.2	2.1	--	2.2	1.9
Average Years in Program	5.0	6.3	--	--	--
<i>Percentage of Household Heads that are:</i>					
White	22.1%	14.1%	--	32.2%	37.1%
Hispanic	17.7%	23.0%	--	31.9%	28.7%
Black	58.1%	60.9%	--	29.6%	26.4%
<i>Geographic Distribution</i>					
Northeast	22.4%	36.1%	11.5%	17.8%	19.3%
Midwest	20.5%	16.0%	23.9%	20.2%	17.0%
South	35.5%	37.1%	42.1%	37.8%	34.5%
West	21.6%	10.9%	22.5%	24.3%	29.2%
Central City	59.1%	79.1%	52.1%	70.0%	70.5%
Suburban	40.9%	20.9%	47.9%	30.0%	29.5%
Total Number of Households	1,024,767	289,144	753,650	4,502,676	10,171,088

^a Voucher households are those households with children that received housing vouchers in 2008, from the Department of Housing and Urban Development's national file of subsidized housing tenants.

^b Public housing includes all households with children living in public housing in 2008, from the HUD's national file of subsidized housing tenants.

^c LIHTC households are measured as LIHTC units with more than two bedrooms, that were placed in service by 2008, from HUD's LIHTC dataset.

^d Poor households are defined as all households with children living below the poverty line including both renter and owner households, from the American Community Survey 2005-2009 Public Use Microdata Sample estimates weighted by household.

^e Renter households are defined as all households with children living below the poverty line, from the American Community Survey 2005-2009 Public Use Microdata Sample estimates weighted by households.

Table 2 Descriptive Statistics, Elementary Schools, 2008-2009

	Mean	25th Percentile	Median	75th Percentile
Average Proficiency Rate in Math and ELA	75.5%	61.0%	77.8%	87.0%
Lowest Proficiency State - Missouri	44.4%	31.0%	46.5%	57.5%
Highest Proficiency State - Nebraska	90.2%	89.5%	90.0%	94.0%
<i>Percentage of Public School Students that are:</i>				
White	49.6%	14.8%	53.9%	81.3%
Hispanic	22.6%	2.8%	9.7%	33.7%
Black	19.6%	2.1%	7.3%	24.7%
Asian	5.1%	0.6%	2.1%	5.7%
Free/Reduced Price Lunch Eligible	48.3%	22.1%	48.6%	76.6%
 Pupil/Teacher Ratio	 15.9	 13.6	 15.6	 17.9
 <i>Number of Schools</i>	 28,693			

Note: Average proficiency is calculated as the school level unweighted arithmetic average of the percentage of students deemed proficient in mathematics and the percentage deemed proficient in ELA based upon state exams.

Sample includes all non magnet or charter elementary schools with a 4th grade in 329 metropolitan areas across the country.

Table 3 Selected Characteristics of Metropolitan Areas

	Mean	25th Percentile	Median	75th Percentile
Mean Rent (2000)	\$550	\$461	\$521	\$613
Vacancy Rate (2000)	8.2%	5.7%	7.1%	9.4%
Non-White/White Dissimilarity Index (2000)	0.43	0.34	0.43	0.51
Percentage of Minority Voucher Holders (2008)	57.3%	32.9%	63.9%	79.8%
Percentage of Renter Households with Vouchers	6.9%	5.1%	6.5%	8.1%
Number of Public Housing Authorities per 100,000 people (2008)	1.5	0.6	1	2
Percentage of Public Elementary School Students that are Minority	37.6%	22.2%	33.9%	53.1%
Percentage of Public Elementary Students that are Poor	46.9%	38.5%	47.3%	56.7%
Mean Proficiency Rate in nearest school to poor students	70.0%	62.2%	72.2%	80.0%
<i>Number of MSAs</i>	329			

Note: Minority is defined as black or Hispanic. Non-minorities include Asian and white students. Poor is defined as eligible for free or reduced price lunch.

Sample includes all 2000 primary metropolitan areas other than Anchorage, AK and Honolulu, HI.

Table 4a Regression Results – School Proficiency Models

	(1)	(2)	(3)	(4)	(5)
Households with:					
Vouchers	3.02*** (0.03)	-1.12*** (0.02)	-4.92*** (0.01)	-2.69*** (0.02)	-3.58*** (0.01)
Public Housing		-4.01*** (0.03)	-7.89*** (0.03)	-5.74*** (0.03)	-6.41*** (0.03)
LIHTC ^a			-3.40*** (0.02)	-1.31*** (0.02)	-2.11*** (0.02)
<i>Reference Sample is:</i>					
Households in LIHTC Units		X	X	X	X
Households in Rental Units			X		
Poor Households (all unit types) ^b				X	
Households in FMR Units ^c					X
Constant	61.85*** (0.03)	66.10*** (0.02)	69.08*** (0.00)	67.67*** (0.01)	67.91*** (0.00)
State/MSA Fixed Effects	X	X	X	X	X
Observations	50,604	65,694	114,316	108,927	114,361
Households	1,313,911	2,067,561	11,120,557	5,599,475	12,089,120
R-squared	0.536	0.532	0.488	0.523	0.47

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Dependent variable is average proficiency calculated as the school level unweighted arithmetic average of the percentage of students deemed proficient in mathematics and the percentage deemed proficient in ELA based upon state exams.

^a LIHTC households are measured as LIHTC units with more than two bedrooms, that were placed in service by 2008, from HUD's LIHTC dataset.

^b Poor households are defined as all households with children living below the poverty line including both renter and owner households, from the American Community Survey 2005-2009 Public Use Microdata Sample estimates weighted by household.

^c Fair market rents refer to housing with more than two bedrooms with rent at or below fair market rent as determined by HUD.

Table 4b Regression Results School Characteristic Models (reference category Poor Households with Children)

Dependent Variables	Proficiency Math/ELA	Percent Black	Percent Hispanic	Percent Free/Reduced Price Lunch	Pupil/Teacher Ratio
	(1)	(2)	(3)	(4)	(5)
Households with:					
Vouchers	-2.69*** (0.02)	10.31*** (0.03)	-2.02*** (0.02)	5.15*** (0.03)	-0.23*** (0.01)
Public Housing	-5.74*** (0.03)	15.52*** (0.05)	-0.92*** (0.04)	9.72*** (0.05)	-0.43*** (0.01)
LIHTC	-1.32*** (0.02)	6.33*** (0.03)	-1.84*** (0.03)	0.87*** (0.03)	-0.11*** (0.01)
Constant	67.67*** (0.01)	24.69*** (0.01)	32.29*** (0.01)	62.96*** (0.01)	15.77*** (0.00)
State/MSA Fixed Effects	X	X	X	X	X
Observations	108,634	108,634	108,634	108,634	108,429
Households	5,599,475	5,599,475	5,599,475	5,599,475	5,588,590
R-squared	0.523	0.421	0.616	0.244	0.116

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Note: We are missing data on pupil/teacher ratio for a few schools and therefore we have a smaller sample of observations for this dependent variable. LIHTC households are measured as LIHTC units with more than two bedrooms, that were placed in service by 2008, from HUD's LIHTC dataset.

Table 4c Regression Results School Characteristic Models (reference category Fair Market Rents Units with 2+ Bedrooms)

Dependent Variables	Percent Proficient Math/ELA	Percent Black	Percent Hispanic	Percent Free/Reduced Price Lunch	Pupil/Teacher Ratio
	(1)	(2)	(3)	(4)	(5)
Households with:					
Vouchers	-3.58*** (0.01)	9.02*** (0.02)	0.74*** (0.02)	6.80*** (0.03)	-0.19*** (0.01)
Public Housing	-6.41*** (0.03)	13.99*** (0.04)	1.54*** (0.04)	10.86*** (0.05)	-0.42*** (0.01)
LIHTC	-2.11*** (0.02)	5.17*** (0.03)	0.68*** (0.02)	2.43*** (0.03)	-0.06*** (0.01)
Constant	67.91*** (0.00)	25.55*** (0.01)	29.05*** (0.01)	61.22*** (0.01)	15.66*** (0.00)
State/MSA Fixed Effects	X	X	X	X	X
Observations	114,361	114,361	114,361	114,361	114,136
Households	12,089,120	12,089,120	12,089,120	12,089,120	12,062,863
R-squared	0.47	0.392	0.523	0.204	0.099

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Note: We are missing data on pupil/teacher ratio for a few schools and therefore we have a smaller sample of observations for this dependent variable. LIHTC households are measured as LIHTC units with more than two bedrooms, that were placed in service by 2008, from HUD's LIHTC dataset.

Table 5 School Characteristics of Voucher Households with Children vs. Other Households with Children, by Race

	Proficiency Math/ELA	Percent Black	Percent Hispanic	Percent Free/Reduced Price Lunch	Pupil/Teacher Ratio
	(1)	(2)	(3)	(4)	(5)
<i>Black Children</i>					
Vouchers	-10.20*** (0.01)	29.91*** (0.02)	1.92*** (0.02)	18.80*** (0.02)	-0.57*** (0.01)
Public Housing	-12.55*** (0.02)	34.25*** (0.04)	1.99*** (0.03)	22.03*** (0.04)	-0.70*** (0.01)
Poor	-12.00*** (0.01)	33.18*** (0.02)	1.68*** (0.02)	21.09*** (0.02)	-0.71*** (0.01)
<i>Hispanic Children</i>					
Vouchers	-7.57*** (0.02)	8.73*** (0.04)	17.06*** (0.03)	17.33*** (0.04)	-0.36*** (0.01)
Public Housing	-10.48*** (0.03)	13.91*** (0.06)	16.31*** (0.05)	20.24*** (0.06)	-0.66*** (0.02)
Poor	-8.34*** (0.01)	6.60*** (0.02)	20.93*** (0.02)	18.99*** (0.02)	-0.37*** (0.01)
<i>White Children</i>					
Vouchers	-2.10*** (0.02)	4.11*** (0.03)	2.72*** (0.03)	5.66*** (0.04)	-0.24*** (0.01)
Public Housing	-4.20*** (0.04)	7.19*** (0.08)	3.61*** (0.07)	10.65*** (0.08)	-0.53*** (0.02)
Constant	72.78*** (0.01)	15.38*** (0.01)	26.63*** (0.01)	52.81*** (0.01)	16.07*** (0.00)
State/MSA Fixed Effects	X	X	X	X	X
Observations	193,198	193,198	193,198	193,198	192,860
Households	13,284,177	13,284,177	13,284,177	13,284,177	13,261,042
R-squared	0.592	0.579	0.692	0.352	0.138

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Note: We omitted the group poor white children. Poor households are defined as all households with children living below the poverty line. We are missing data on pupil/teacher ratio for a few schools and therefore we have a smaller sample of observations for this dependent variable.

Table 6 Proficiency Rate of Schools near to Voucher Households with Children, by Household Characteristics and MSA Characteristics

	(1)	(2)	(3)
<i>Household Characteristics</i>			
Log(HH Income)	0.81*** (-0.018)	0.96*** (-0.019)	0.80*** (-0.018)
Black	-7.87*** (-0.036)	-8.91*** (-0.035)	-3.13*** (-0.076)
Hispanic	-5.39*** (-0.045)	-6.31*** (-0.044)	-0.91*** (-0.078)
Number of HH Members	-0.38*** (-0.011)	-0.43*** (-0.011)	-0.38*** (-0.011)
Age of Household Head (decades)	0.62*** (-0.073)	0.64*** (-0.077)	0.74*** (-0.075)
Age of HH Head Squared (decades)	-0.10*** (-0.009)	-0.09*** (-0.009)	-0.10*** (-0.009)
Number of Elementary School Age Children	0.08*** (-0.016)	0.05*** (-0.017)	0.06*** (-0.017)
Less than 2 years with Voucher	0.06** (-0.032)	0.02 (-0.033)	0.08** (-0.032)
More than 6 years with Voucher	-0.54*** (-0.032)	-0.71*** (-0.033)	-0.63*** (-0.032)
<i>Voucher Program Characteristics</i>			
Share Minority Voucher HHs			-2.25*** (-0.177)
Share of renter households with vouchers			-5.03*** (-0.783)
Number of PHAs per 100,000 HHs			0.40*** (-0.019)
<i>MSA Characteristics</i>			
Mean Proficiency for Poor HH with Children			0.51*** (-0.003)
Share Minority Students			4.13*** (-0.18)
Share Free Lunch Students			-0.93*** (-0.182)
Minority Dissimilarity 2000			-0.73*** (-0.254)
Interaction Dissim/Min HH			-10.98*** (-0.154)
Mean Rent 2000			0.01*** 0
Vacancy Rate 2000			5.38*** (-0.569)
Constant	62.17*** (-0.217)	61.67*** (-0.225)	22.72*** (-0.396)
State/MSA Fixed Effects	X		
State Fixed Effects		X	X
Observations	981,657	981,657	981,657
R-squared	0.051	0.067	0.116

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1