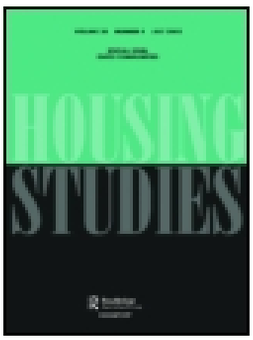

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The effect of market conditions on the housing outcomes of subsidized households: the case of the US voucher programme

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ABSTRACT

Since being created in the 1970s, housing vouchers have become the primary mode of federal housing support for low-income households in the US. The voucher programme was designed to provide recipients with the mobility needed to secure higher quality housing in neighbourhoods of their choice. Decades of analysis suggest that the programme has failed to produce the favourable outcomes envisioned by policymakers. To add to our understanding of the outcomes of this important federal programme, this paper seeks to underscore the importance of context-dependent policy analysis. In particular, this study analyses the impact of housing market conditions on the outcomes achieved by voucher recipients. Using neighbourhood and housing outcome data from the American Housing Survey, and median rent and rental market vacancy data, this paper demonstrates the important role that market conditions play in programme outcomes. The results from this study suggest that voucher recipients are successful at improving housing unit quality outcomes regardless of market conditions, but the ability to move to a better neighbourhood is a function of vacancy rates.

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Housing; voucher; Housing Choice Voucher; Section 8; market; vacancy; neighbourhood

Introduction

In the US, existing research notes that expensive cities with low vacancy rates present unique challenges for Housing Choice Voucher (HCV) recipients when they attempt to use their vouchers to secure a housing unit (Pashup *et al.*, 2005). In response to these well-documented obstacles, Eric Johnson, Executive Director of the Oakland Housing Authority, told the *Oakland Tribune*, 'I've been in various meetings with HUD (US Housing and Urban Development) officials and explained to them that I see a programme that's dying' (Drummond, 2016). It may be premature to declare the death of the HCV programme in the US, but research highlights the significant challenges associated with this programme (Galvez, 2011; Katz & Turner, 2001; Lens, 2013; McClure & Johnson, 2015; Pashup *et al.*, 2005; Pendall, 2000).

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To enhance our understanding of the relationship between market conditions and housing outcomes, this paper relies on neighbourhood and housing outcome data from the American Housing Survey (AHS) and rental market data from the US Census and HUD to demonstrate the important role that market conditions play in the housing and neighbourhood outcomes of HCV recipients. This study uses data from 46 metropolitan areas to compare the outcomes of voucher households to a group of comparably-situated, unassisted households. This analysis assesses the impact of both market rents and vacancies on housing and neighbourhood outcomes. The findings suggest that vacancy rates have more explanatory power than do market rents – a result likely due to the fact that the generosity of vouchers varies based on prevailing local market rents, while differences in vacancies are not addressed in the programme. In sum, the results suggest that the HCV programme remains a viable tool for enhancing the housing and neighbourhood outcomes of voucher recipients in many markets, but the ability of the programme to deliver on its stated objectives is undermined in cities with tight market conditions.

In the 1980s, housing vouchers became the primary mode of federal housing support for low-income households in the US. The voucher programme was designed to provide recipients with the choice and flexibility needed to secure quality housing in neighbourhoods of their choice. Later, the government added the de-concentration of race and poverty as stated objectives of the programme. Decades of analysis suggest that the voucher programme has failed to deliver the favourable housing outcomes envisioned by policymakers (DeLuca *et al*., 2013; Pendall, 2000). The outcomes of the programme are far from uniformly negative and therefore invite detailed contextual investigations of the programme and its outcomes. The findings from this study suggest that voucher recipients are able to improve the quality of housing in which they reside, regardless of market conditions, but the ability to improve neighbourhood outcomes is a function of the strength of the market. Tight housing conditions create unique challenges for voucher recipients trying to improve their neighbourhood outcomes. Given the tight market conditions that prevail in many US cities, the findings of this study raise concerns about the ability of this important federal policy to provide the choice and mobility that was envisioned when the programme was established.

This study relies on the 'recent mover' sub-sample of the American Housing Survey to analyze housing and neighbourhood satisfaction of households that have recently moved. This dataset is powerful because it provides a measure of household satisfaction with housing that is absent from the existing literature. Most studies rely on third-party, objective measures of housing and neighbourhood quality, which may, or may not, reflect the needs and desires of individual households. The analysis in this paper is unique because it highlights the conditions in which households are able to secure housing that they themselves deem to be better than their previous residence.

This paper proceeds with a review of relevant literature, a description of the data and methods used in this study, and a summary of the findings. To conclude, limitations of this study are highlighted and policy implications are discussed. Given the important role that housing vouchers play in supporting low-income households in

the US, understanding where and how the programme succeeds is essential to ensuring the ongoing viability and efficacy of this critical federal programme.

Literature review

The HCV programme is the successor programme to the Section 8 (Schwartz, 2015). Housing vouchers were implemented at a time when the federal government was moving away from public housing. Rather than providing housing directly to recipients, vouchers allowed the government to use the private market as a delivery mechanism for housing support. In 2017, the programme provided tenant-based housing vouchers to over 2.2 million households. While the federal government funds the programme, local housing authorities administer the HCV programme. Households are eligible if their household income is less than 50% of the local median income. Not all eligible households receive a voucher, rather their names are placed on a waitlist that, in many communities, may be years in length. Upon receiving a voucher, a recipient generally has 60 days to find a housing unit to rent (the search time may be extended by local housing authorities in certain circumstances). If a household is unable to find a unit within the search window, the recipient must return the unused voucher to the issuing authority. If a recipient successfully finds a unit, that unit must be inspected by the government to ensure a minimum level of adequacy. The depth of the subsidy is a function of household income and prevailing market rents in a current metropolitan area. In each metropolitan area, a Fair Market Rent standard is established which is generally equal to the 40th percentile rent in each area. Voucher recipients may consume housing up to that value. The portion of the rent for which a recipient is responsible is equal to 30 percent of the household's income. The amount between 30 percent of a household's income and the Fair Market Rent standard is paid by the government.

Housing researchers have devoted significant energy to analyzing the housing outcomes of HCV programme participants. One motivation for this research is to assess whether the housing outcomes of voucher recipients are consistent with the stated goals of the programme: to improve housing affordability for eligible households, provide improved living conditions for low-income households and to allow voucher recipients to move to neighbourhoods with lower levels of race and poverty concentration (Graves, 2016; O'Regan, 2017; Teater, 2009). While the programme certainly improves affordability for voucher recipients, whether the programme allows recipients to secure better housing and to move to better neighbourhoods remains an open question.

Housing and neighbourhood outcomes

When households search for new housing, they consider a package of attributes that includes both unit characteristics and the type of neighbourhood in which they would like to live (Kleit *et al.*, 2016). In some cases, a prospective tenant may not be able to satisfy all their preferences and must therefore prioritize either unit specifications or neighbourhood attributes in their housing search. Existing research suggests that

when faced with this tradeoff, many low-income households prioritize housing unit quality over neighbourhood attributes (Chatman *et al.*, 2013; DeLuca *et al.*, 2013; Edin *et al.*, 2012; Pendall, 2000; Smith *et al.*, 2002; Wood, 2014). The field of behavioural economics provides an explanation of this decision-making by noting that when faced with a tradeoff between housing unit quality and neighbourhood attributes, households place higher value on private goods (a housing unit) and less value on public goods (neighbourhood attributes) (Chatman *et al.*, 2013). Therefore, one would expect an increased focus on housing unit quality when households make residential decisions in a constrained environment.

As opposed to the abundant research that analyses the neighbourhood outcomes of housing voucher recipients, studies that focus on housing outcomes are relatively rare. One such reason for the limited set of research that HUD requires is an inspection of any unit that will be leased to a household using a voucher. Therefore, housing units occupied by voucher recipients must meet minimum housing quality standards as defined by HUD. The AHS provides a housing adequacy measure, but few researchers use that variable in their analysis. Newman and Garboden (2013) conducted an analysis of the AHS adequacy variable to determine its reliability and validity as a tool to measure housing quality. They found significant shortcomings with this measure and called into question whether this tool should be used to measure the construct of housing quality. Newman and Garboden (2013) concluded that it 'now may be time to revisit the conceptualization and measurement of the elusive concept of housing quality' (p. 304). Additionally, Eggers and Moumen (2013) noted that fewer studies have focused on the adequacy of housing units. They argue that the dearth of studies on housing quality is due to the low number of housing units that are deemed inadequate and therefore there is limited variation in the AHS sample of housing units. The research that does focus on the housing quality of voucher tenants uses is a set of subjective quality measures found in the AHS. Ross *et al.* (2012) found that voucher households report a higher level of satisfaction with their housing units than comparable unassisted, low-income, renters. This finding is consistent with expectation given that unassisted, low-income, renters do not need to pass a government inspection prior to lease-up.

In the topic of the locational outcomes of voucher recipients, there is a robust body of research that examines this issue. In sum, studies of the HCV programme suggest that the locational outcomes of voucher recipients fall short, in many respects, of the stated goals of the programme. While there is a general consensus that many voucher holders reside in neighbourhoods with high levels of poverty and racial segregation (Basolo & Nguyen, 2005; Devine *et al.*, 2003; Graves, 2016; Kleit *et al.*, 2016; McClure & Johnson, 2014; Metzger, 2014; Pendall, 2000; Rosenblatt & DeLuca, 2012; Schwartz & Mcclure, 2016; Walter *et al.*, 2015), neighbourhood outcomes are a nuanced story that require a deeper investigation. One can compare the outcomes of voucher households to all renters, other low-income renters or participants in other housing subsidy programmes. For the purposes of this paper, a comparison to other low-income, but non-recipient, households is most relevant. Devine *et al.* (2003) and Pendall (2000) found that voucher households live in neighbourhoods with slightly lower rates of poverty than other poor, unassisted, households. While this modest

advantage is encouraging, it is underwhelming given the substantial increase in purchasing power provided by the voucher. Further complicating this picture, when compared to other low-income households, voucher holders reside in more economically and racially segregated neighbourhoods (Metzger, 2014) and near lower performing schools (Horn *et al.*, 2013). Additional evidence of sub-optimal locational outcomes is evident in research that finds that voucher recipients reside in neighbourhoods with high crime rates (Lens, 2013) and with limited access to transportation, jobs and other opportunities (Lens, 2014; Wang *et al.*, 2015). A set of studies also analyze the neighbourhood outcomes of voucher recipients using variables from the AHS. The results from these studies also suggest mixed, or somewhat disappointing, neighbourhood outcomes. Using measures of neighbourhood satisfaction and subjective assessments of neighbourhood quality from the AHS, voucher households do not report statistically significantly higher neighbourhood satisfaction or quality when compared to other low-income, unassisted, renters (Lussier, 2013; Phillips, 2017; Ross *et al.*, 2012). In sum, the HCV programme has not produced the favourable neighbourhood outcomes that were envisioned when the policy was established.

The effect of market conditions

Existing studies note how rental housing market conditions either help or hinder voucher recipients in their efforts to secure a unit that meets their housing and neighbourhood preferences. One of the paradoxes of the voucher programme is that so many recipients fail to use their voucher and must return the unused voucher to the housing authority that issued it. Research suggests that tight rental housing market conditions make it difficult for voucher recipients to find an available housing unit (Pashup *et al.*, 2005). One of the reasons why tight market conditions are so difficult for voucher holders is that landlords have less incentive to participate in the programme given the robust demand for rental housing (Katz & Turner, 2001).

Less scholarly attention has been directed at the relationship between market conditions and housing outcomes. A limited number of studies that have used vacancy rates to analyze housing outcomes have found that low vacancy rates present challenges for voucher recipients. Lens (2013) found that tight rental markets undermine the ability of voucher recipients to move to lower-crime neighbourhoods. While low vacancy rates present challenges for voucher recipients, loose markets can produce conditions that are more favourable. Pendall (2000) found that when vacancy rates are high, voucher households are more likely to move to lower poverty neighbourhoods and Galvez (2011) noted that there are lower concentrations of voucher households in poor neighbourhoods when vacancies are high. Existing literature demonstrates many sources of potential disadvantage for voucher recipients, but, in general, tight market conditions constrain voucher households most significantly.

In sum, existing literature examines the housing and neighbourhood outcomes of voucher recipients using a variety of data, measures and approaches. This study seeks to expand on this body of literature by highlighting how market conditions independently affect the housing and neighbourhood outcomes of low-income households. Notably, this study examines two measures of market conditions to assess how the

level of rents and prevailing vacancy rates affect housing market outcomes. Given the importance of market conditions on the housing outcomes of voucher recipients, this study seeks to expand our understanding of this important relationship.

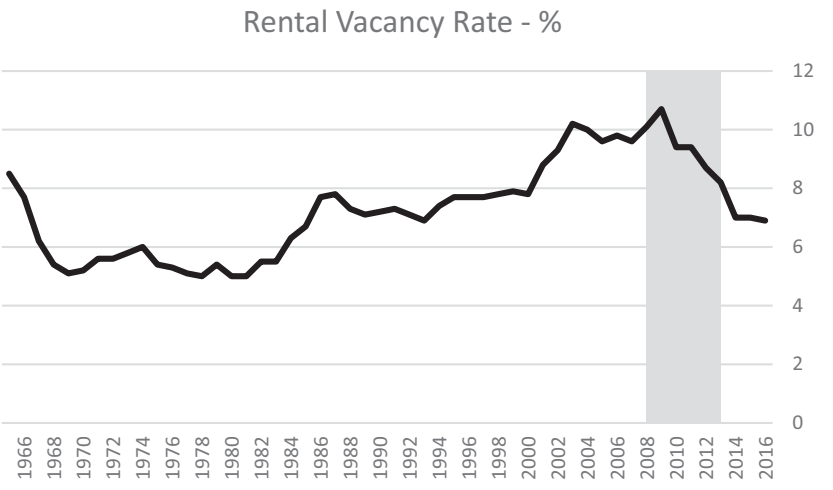
Data and methods

This study differs from prior studies of the HCV programme in two primary ways. First, I rely on questions from the American Housing Survey (AHS) that have not been used in other studies of the HCV programme. In the AHS, there is a sub-sample of households that have moved within the last 24 months. The responses of these 'recent movers' provide powerful empirical evidence about the ability of households to improve housing outcomes through mobility. Unlike other studies that rely on external, third-party, assessments of housing and neighbourhood quality, the survey asks recent movers whether their current housing unit is better than their prior unit, and whether their current neighbourhood is better than their previous neighbourhood. The simplicity of these questions eliminates the need to construct an index to approximate housing and neighbourhood quality; rather, one can listen to the responses and opinions of individual households. When responding to these questions, respondents create an immediate mental index of the factors that are important to them and the other members of their household. This personal 'index' will vary by household and most certainly will deviate from an index created by a third-party academic researcher. These measures are unique and exceedingly valuable because one can identify under what conditions households are able to achieve better housing and neighbourhood outcomes based on the unique criteria that are important to a specific household.

The second unique aspect of this study is the way in which I incorporate market conditions into the analysis of housing outcomes. Two measures of market conditions are used to test the relationship between market conditions and housing outcomes. First, to capture the cost of a market, I import the median rent for a two-bedroom unit from HUD for each Metropolitan Statistical Area (MSA) over time. Second, to address local market conditions, I include the prevailing rental market vacancy rate for each MSA over time. By including longitudinal measures of median rents and vacancy rates, the specific market conditions at the time that a household moved can be identified. Some previous studies have incorporated vacancy rates in their analysis (Lens, 2013; Pendall, 2000), but this approach has not been widely adopted.

Data

In this study, I rely on data from the 2011 and 2013 AHS Metropolitan Samples. These samples include households that live in 46 different MSAs throughout the United States (26 in the 2011 sample and 20 in the 2013 sample). As a result, this study only focuses on households that reside in urban and suburban locations and therefore does not reflect the experiences and outcomes of rural participants. I use the AHS because this dataset includes a rich set of questions that deal with housing and neighbourhood outcomes. In particular, I rely on a subset of observations from



Source: U.S. Census Bureau. Each annual measure is for the fourth quarter of that year. Shaded area is the period covered in this study.

Figure 1. U.S. vacancy rates: 1966–2016.

the Metropolitan Sample that are provided for households that have moved with 24 months of their interview (recent mover sub-sample).

To supplement the data from the recent mover sub-sample, I import data from three additional sources. First, I merge the 2011 and 2013 income eligibility thresholds for the HCV programme. These income limits are established for households of different sizes for each MSA and are published by HUD. Second, I merge US Census Bureau rental housing vacancy rates by MSA into the dataset. I imported six years of quarterly data (2008–2013) in order to calculate a trailing twelve-month vacancy rate at the time of a move for the households in the sample. It is important to note that the beginning of this observation period was a time of elevated vacancy rates when compared to historical norms – see Figure 1 below. The deviation from normal levels occurred during the period from 2002 to 2009 during the housing market boom and its immediate aftermath. Following the bust, vacancy rates quickly began to fall and, by 2013, vacancy rates had returned to a level consistent with vacancy rates over the preceding 30 years. Last, to identify the relationship between market rents and housing outcomes, I imported the two-bedroom 50th percentile rent from HUD for each MSA in the sample. The prevailing market rents at the time of each household move are captured in these data.

In constructing a final dataset, several sampling conditions were imposed to arrive at a clean, final dataset. From the full Metropolitan sample for both years, homeowners were dropped because I am only interested in renter households. I also drop households that live in public housing or that benefit from rent controls because I am interested in the experiences of voucher recipients in the private rental market. Next, I limit the sample to only those households that are included in the recent mover sub-sample. Finally, I keep only those households that, based on household income, are eligible for the HCV programme. Therefore, all analyses in this study analyze the effect of voucher receipt among a population of households, all of which

Figure 2. Metropolitan areas included in the data sample.

are eligible for the programme. After this process of sample selection and data cleaning, I have a sample of 11,124 households, of which 759 are voucher recipients.

From both the 2011 and 2013 AHS, there are 46 MSAs included in the analysis. Figure 2 below is an image of the United States and it identifies each MSA that is included in this study. As the map demonstrates, there is broad geographic representation in this sample. Table 1 lists all MSAs in the sample, the number of observations (voucher and non-voucher) from each MSA, the high and low median two-bedroom rents for each MSA during this period and the high and low vacancy rates during the years in which respondent households may have moved.

Dependent variables

In this analysis, there are two dependent variables: a measure of housing quality and a measure of neighbourhood quality. The first outcome variable measures the quality of the housing unit being occupied by the respondent. The ability of voucher households to secure safe and adequate housing is a goal of the HCV programme, and therefore warrants attention in this analysis. To measure housing quality, I rely on a variable from the recent mover subsample, in which respondents are asked whether their current housing unit is better, worse or about the same as their last housing unit. This variable is intriguing because it does not rely on an objective measure of housing quality that is established by a third party, rather it relies on the self-assessment of the tenant on whether the new unit is better or worse than their prior unit. Tenants will seek to maximize their own utility in a move and this measure helps

Table 1. Description of metropolitan areas in data sample.

	Households			Low median rent	High median rent	Low vacancy rate	High vacancy rate
	Non-voucher	Voucher	Total				
Atlanta, GA	248	14	262	920	955	11.7	16.6
Austin, TX	295	13	308	989	1,050	6.2	11.9
Baltimore, MD	151	16	167	1,231	1,263	8.2	11.7
Birmingham, AL	171	10	181	757	832	8.8	14.1
Boston, MA	170	24	194	1,483	1,569	5.5	7.4
Buffalo, NY	180	15	195	761	766	5.9	12.4
Charlotte, NC	222	10	232	783	861	8.4	13.1
Cincinnati, OH	263	37	300	777	805	9.9	13.0
Cleveland, OH	165	14	179	746	783	10.8	13.2
Columbus, OH	267	19	286	786	826	6.4	9.2
Denver, CO	291	17	308	891	1,007	6.8	10.3
Hartford, CT	149	23	172	1,038	1,113	7.1	11.7
Houston, TX	220	9	229	931	945	10.2	16.6
Indianapolis, IN	277	5	282	773	818	12.7	15.1
Jacksonville, FL	224	15	239	943	970	7.7	13.4
Kansas city, MO	257	27	284	791	842	11.8	14.7
Las Vegas, NV	269	11	280	1,024	1,108	11.8	14.6
Los Angeles, CA	328	10	338	1,486	1,559	5.4	7.2
Louisville, KY	162	15	177	701	779	7.0	10.3
Memphis, TN	264	23	287	806	847	14.7	23.0
Miami, FL	167	15	182	1,201	1,265	7.1	11.8
Milwaukee, WI	386	13	399	839	866	7.4	9.0
Minneapolis, MN	182	11	193	960	977	5.3	6.7
Nashville, TN	196	19	215	842	871	4.4	11.0
New Orleans, LA	210	60	270	1,021	1,070	13.1	18.0
Norfolk, VA	169	17	186	969	1,035	6.2	9.4
Oakland, CA	216	14	230	1,400	1,482	6.0	6.8
Oklahoma City,	222	24	246	733	795	9.1	10.7
Orlando, FL	283	9	292	996	1,043	14.8	20.1
Phoenix, AZ	315	15	330	923	984	11.0	18.6
Pittsburgh, PA	155	20	175	757	763	6.3 9.7	
Portland, OR	206	17	223	836	952	3.4	4.7
Providence, RI	204	17	221	996	1,017	7.4	8.9
Richmond, VA	221	8	229	882	979	12.5	17.9
Riverside, CA	318	9	327	1,195	1,213	8.4	13.6
Rochester, NY	196	19	215	840	911	2.9	6.6
Sacramento, CA	309	14	323	1,072	1,083	7.1	10.6
St. Louis, MO	177	20	197	794	833	10.8	12.6
San Antonio, TX	230	31	261	810	927	7.3	12.4
San Diego, CA	303	13	316	1,418	1,518	6.6	8.8
San Francisco, CA	162	4	166	1,748	2,046	6.0	6.8
San Jose, CA	222	13	235	1,428	1,837	4.8	8.5
Seattle, WA	208	15	223	1,181	1,263	5.1	7.3
Tampa, FL	134	16	150	972	992	9.5	14.1
Tucson, AZ	241	13	254	860	877	13.2	16.8
Washington, DC	160	6	166	1,461	1,532	6.2	8.7
	10,365	759	11,124				

one to assess whether households do in fact achieve higher quality housing based on their own assessment of quality.

The second dependent variable is a measure of neighbourhood quality. As noted earlier in this paper, assessing neighbourhood quality is a highly subjective exercise. Scholars have created indices of neighbourhood quality based on variables such as crime, school quality, levels of poverty, levels of segregation and other environmental factors. The challenge with these objective measures of neighbourhood quality is that they may not reflect the needs and preferences of the individual households

themselves. Therefore, to measure neighbourhood quality, I rely on an AHS variable that asks recent movers whether their current neighbourhood is better, worse or about the same as their previous neighbourhood. Once again, like in the case of housing quality, this variable allows the respondent to assess the factors that are most important to her and the other members of her family in determining whether their new neighbourhood is better than their previous neighbourhood.

It is important to note that the moves of voucher recipients may represent an initial lease-up with a voucher or a subsequent move once involved in the programme. Due to data limitations, I am unable to identify whether the moves for voucher holders represent an initial lease-up or a subsequent move. Intuitively, initial voucher lease-up should capture the effect of the purchasing power boost provided by a voucher, but existing research notes that many positive neighbourhood effects are achieved upon subsequent moves after initial lease-up (Eriksen & Ross, 2013; Feins & Patterson, 2005). Consistent with this thesis, in their study of voucher recipients and their proximity to good schools, Ellen *et al.* (2014) restrict their analysis to the subsequent moves of voucher households after initial lease-up under the programme. Ellen *et al.* (2013) did so in order to understand the effect of voucher receipt without the time constraints imposed by HUD upon initial lease-up. In this analysis, the self-reported measures of housing and neighbourhood satisfaction are based on both initial voucher lease-up as well as subsequent moves made with the support of a voucher. Therefore, these data provide a picture of the experiences of voucher households throughout the duration of their participation in the programme.

Analytical approach

To analyze these outcomes, I use logit regression models to predict the outcomes of interest based on my key independent variable, voucher status and a variety of other covariates.[1] As noted above, the sample includes only those households that are eligible for the HCV programme based on HUD thresholds. The outcome of this analysis provides a descriptive estimate of the effect of voucher receipt. The results of voucher households are compared to non-voucher households using the following general model specification:

$$\begin{aligned}\text{Logit}(\text{Outcome of Interest}) = {} & \beta_1 \text{Voucher}_i + \beta_2 \text{Vacancy}_{ct} + \beta_3 \text{Voucher}_i \times \text{Vacancy}_{ct} \\ & + \beta_4 \text{Median Rent}_{ct} + \beta_5 \text{Household Income}_i + \beta_6 \text{Household Characteristics}_{ic} \\ & + \beta_7 \text{Demographic Variables}_i + \eta_c + \gamma_t + \varepsilon_{itc}\end{aligned}$$

where, Voucher represents the voucher status of a household (1 = yes, 0 = no); Vacancy represents the prevailing rental market vacancy rate (at the time of the move) for the MSA to which a household moved (I also include a squared vacancy term to account for nonlinearity); Voucher × Vacancy is an interaction term between voucher status and vacancy rate (Voucher is also interacted with Vacancy^2 to account for non-linearity); Median Rent represents the prevailing median rent for a two-bedroom housing unit (at the time of the move) for the MSA to which a household moved; Household Income is an important control variable because of the need to

Table 2. Descriptive statistics.

	Voucher	Non-Voucher	Significance
No. of households	759	10,365	
Household income (mean)	10,725	16,311**	
Demographics (Head of Household):			
Female	83.4%	59.2%	**
Born in the U.S.	89.1%	77.5%	**
Age (mean)	42.6	38.3	**
White	22.7%	43.2%	**
Household Characteristics:			
More than two adults in household	5.3%	9.4%	**
Households with children	50.9%	36.6%	**
Outcome Variables:			
Unit Better	60.2%	46.6%	**
Neighborhood Better	46.1%	39.4%	*

Note: $^{**}p < 0.01$; $^{*}p < 0.05$.

control for differences in income within this sample of HCV eligible households; Household Characteristics include marital status, presence of children and number of adults in the household; Demographic Variables include age, gender, race/ethnicity, nativity, suburban status and education; η represents MSA fixed effects which are used to account for within-MSA variation; γ represents year fixed effects to account for the changing macroeconomic conditions during the period of this study. Finally, standard errors are clustered by MSA to account for non-constant variance.

To facilitate interpretation of the logit models for certain outcomes, predicted probabilities are calculated for specific outcome variables. To calculate predicted probabilities, the margins command in Stata was used to calculate the probability of a hypothetical household achieving a particular outcome. For all predicted probabilities in this study, I use the same hypothetical household which is based on demographic attributes that are most common in the HCV programme. The hypothetical household used in this study is a US born African American woman who has never been married. She has a high school degree, has at least one child in the household and lives in an urban setting.

Results

Prior to conducting inferential statistical analysis of these data, I present descriptive statistics for both voucher and non-voucher households. In this summary, shown in Table 2 below, descriptive statistics for the key independent and dependent variables in the regression models are provided. This analysis of independent variables demonstrates that there are key differences between voucher and non-voucher households. The key differences include that voucher households have lower income, are more likely to be headed by a woman, are more likely to be born in the US and are more likely to have children at home. Non-voucher households are far more likely to have a white head of household. Given the heterogeneity in the sample, I control for these observed differences in the logit regression models described above.

An analysis of the descriptive statistics for the key outcome variables yields results that are consistent with intuition. When compared to comparable households without a voucher, voucher households are more likely to say that both their new housing

Table 3. Regression results.

	Column A: Better housing no interaction	Column B: Better neighbourhood terms with interaction terms
Voucher	0.479**(0.092)	–0.812 (0.473)
Vacancy rate	0.023 (0.039)	0.042 (0.053)
Vacancy rate2	–0.001 (0.01)	–0.001 (0.002)
Voucher × vacancy rate	–	0.179*(0.089)
Voucher × vacancy rate2	–	–0.007 (0.004)
Median rent	0.000 (0.001)	0.000 (0.001)
Income	0.067 (0.075)	0.037 (0.090)
Age	0.041**(0.008)	0.025**(0.008)
Age2	–0.041**(0.008)	–0.026**(0.009)
Female	0.020 (0.046)	–0.082 (0.044)
White (reference)		
African-American	0.125*(0.055)	0.243**(0.052)
Hispanic	0.172*(0.069)	0.287**(0.061)
American Indian	0.139 (0.240)	0.380 (0.277)
Asian	0.160 (0.102)	0.324**(0.095)
Mixed race	0.218 (0.132)	0.476**(0.168)
U.S. born	–0.025 (0.061)	–0.156*(0.061)
Child in household	0.205**(0.049)	0.094 (0.054)
More than two adults in household	0.168*(0.066)	0.039 (0.065)
Suburb	0.031 (0.044)	0.167**(0.049)
Constant	–1.257 (0.833)	–1.900*(0.842)
Observations	10,377	9,788

Robust standard errors in parentheses.
**$p < 0.01$, *$p < 0.05$

unit and their new neighbourhood are better than their prior home and neighbourhood. This is not surprising given the significant boost in purchasing power provided by the receipt of a voucher. The next step is to assess whether these findings persist after using regression models to control for a host of independent variables, including prevailing market conditions.

Turning to inferential statistical analysis, I now examine the effect of market conditions on housing and neighbourhood outcomes using the regression models described in the methods section. First, I analyze how market conditions affect the ability of households to improve housing quality. In this model, the interactions between voucher receipt and vacancy rate are insignificant. Therefore, this analysis uses the model specification without the interaction terms. The results of this model are presented in Column A of Table 3 below. Next, I consider the impact of market conditions on the ability of households to move to a better neighbourhood. In this model, the interaction terms between voucher status and vacancy rate are statistically significant. The model output is presented in Column B of Table 3.

To facilitate interpretation of the regression results provided in Table 3, Figure 3 below summarizes the predicted probabilities of a household improving housing quality across a range of rental market vacancy rates. As the figure demonstrates, voucher households are more likely to improve their housing quality than eligible, non-recipients. The visual demonstrates that it is easier to improve housing quality in weaker markets (those with higher vacancy rates) and voucher households maintain a statistically significant advantage throughout the full range of vacancy rates. Therefore, it is safe to assume that this persistent advantage of voucher households is a function of voucher receipt rather than the effect of market conditions.[2]

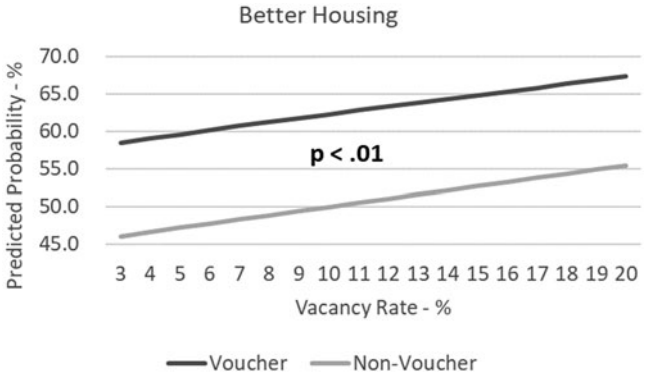


Figure 3. Vacancy rates and housing outcomes. Note: Full regression results included in Column A of Table 3.

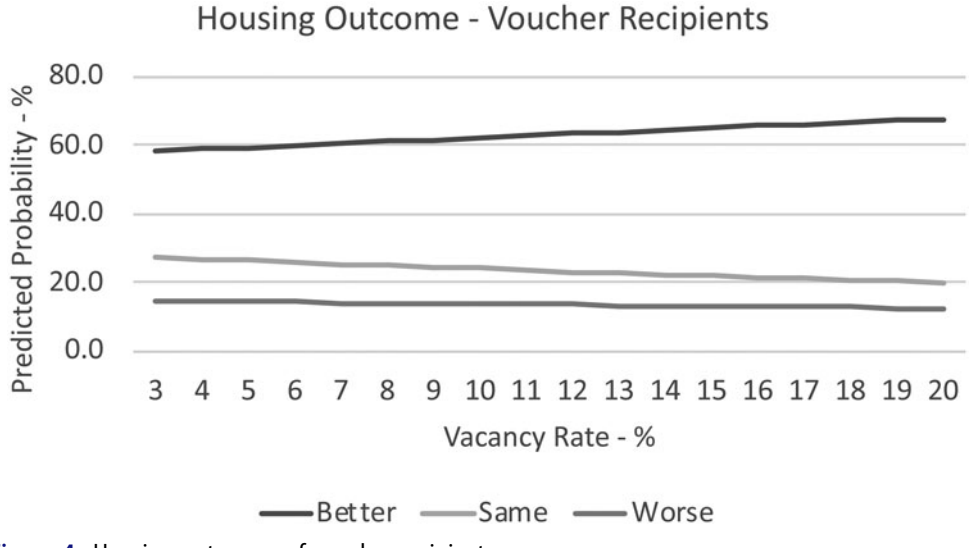


Figure 4. Housing outcomes of voucher recipients.

To provide more detail on the housing outcomes of voucher recipients, a different operationalization of the dependent variable is used. In the original AHS question, a recent mover household was asked whether their new housing unit is better, the same or worse than their prior unit. In this analysis, a multinomial logit model is used to predict all three potential responses to this question. Figure 4 provides the predicted probability of all three responses, which shows that the response 'better' is more likely at all vacancy rates, but it becomes increasingly likely as vacancy rates rise.

In the next stage of the analysis, I now consider the neighbourhood outcome dependent variable. Following the logic used to analyze the housing outcomes, in Figure 5, I provide a graphical depiction of predicted probabilities for voucher and non-voucher households on the neighbourhood outcome variable.[3] This figure provides visual evidence of the strong impact that vacancy rates have on the ability of voucher recipients to move to a better neighbourhood. While it is intuitive that it is easier to move to a better neighbourhood when rental markets are loose, the

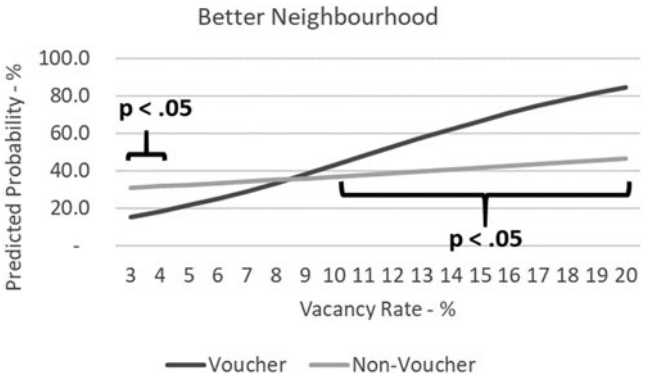


Figure 5. Vacancy rates and neighbourhood outcomes. Note: Full regression results included in Column B of Table 3.

importance of this analysis is the different effect that vacancy rates have on voucher households compared to non-voucher households. For both classes of households, the probability of moving to a better neighbourhood increases as market conditions soften. A difference arises given the different rates of change. In tight housing markets, with low rental market vacancy rates, voucher households are less likely to improve their neighbourhood outcome when compared to non-voucher recipients. In contrast, voucher households are more likely to improve neighbourhood outcomes in loose markets. At a vacancy rate of 20%, the predicted probability of households improving their neighbourhood outcomes is greater than 80%. One can easily draw a connection between this figure and the behaviour of landlords described in the literature. In a tight market, landlords have little incentive to participate in the voucher programme, while in loose markets, the steady, government-supported, stream of rental payments is particularly attractive to landlords who may otherwise struggle to lease their rental units.

The results shown in Figure 5 highlight the unique challenge of using vouchers in tight markets. A surprising result of this analysis is that voucher holders underperform eligible, non-recipients on self-assessments of neighbourhood quality when vacancy rates are lower than 5%. This suggests that in tight markets like Seattle, San Francisco, Boston and Washington, D.C., it may be easier for a non-voucher recipient to improve her neighbourhood outcome than a voucher recipient despite the obvious gap in purchasing power between these two households. On the positive side, this figure suggests that in looser markets, those with vacancy rates greater than 10%, the HCV programme has the ability to produce favourable neighbourhood outcomes for voucher recipients that are consistent with the stated objectives of the programme.

Similar to the analysis of housing quality, a different model specification is used to analyze the three potential responses to the question of whether a household's new neighbourhood is better, the same or worse than their prior neighbourhood. A multinomial logit model is used to generate the predicted probabilities that are presented in Figure 6 below. The interaction effect between voucher receipt and vacancy rate is also evident in this figure. There is a conspicuous, inverse relationship between 'better' and 'same' depending on the level of vacancy rate.

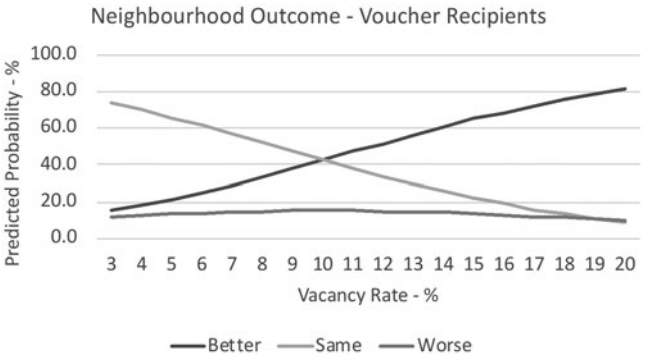


Figure 6. Neighbourhood outcomes of voucher recipients.

To conclude, the analysis in this section confirms intuition and prior analyses that market conditions play an important role in the housing outcomes of voucher recipients. Beyond that general understanding, this study provides three meaningful contributions to the existing literature. First, by using survey responses from the AHS, this study is able to assess whether households are able to use vouchers to improve their outcomes, based on the factors and variables that are important to those individual households. Second, this analysis assesses the relative importance of two measures of housing market conditions, vacancy rates and median rents, on housing outcomes. Interestingly, the prevailing median market rents (at the time of a household's move) have zero predictive power in these models. This finding also holds when MSA-level fixed effects are removed from the model specification. For voucher households, this finding is not surprising given that the voucher payment standard varies based on the relative cost of a city's housing market, but the finding also holds for non-recipient low-income households. In contrast, the importance of vacancy rates on housing outcomes (particularly neighbourhood outcomes) is notable. While rent levels continue to receive significant attention from policymakers and advocates, this finding suggests that greater attention should be focused on the prevailing vacancy rate in a given metropolitan area. Finally, this study provides empirical evidence of the different ways that voucher receipt facilitates improvements in housing and neighbourhood quality. Regardless of market conditions, voucher households are more likely to improve housing quality outcomes when compared to eligible non-recipients. There is no interaction effect between voucher receipt and vacancy rate, and market rents have no predictive power. In contrast, there is a strong interaction effect between voucher receipt and vacancy rates when it comes to neighbourhood outcomes. Therefore, when compared to eligible non-recipients, the ability of voucher recipients to move to a better neighbourhood is highly dependent on the prevailing vacancy conditions in a given market. The finding that voucher households are less likely to improve their neighbourhood outcomes when compared to eligible non-recipients in tight markets is a highly troubling finding for anyone concerned about the viability of the HCV programme in tight housing markets. In sum, the findings of this programme suggest that the voucher programme, in the right circumstances, can deliver on the stated goals of the programme.

Limitations

It is important to highlight certain limitations in the preceding analysis. None of these issues meaningfully undermine the findings of this study, but they warrant attention. One such limitation is the dependence on survey questions that rely on the successful recall of survey respondents. The questions about whether a respondent's new home and neighbourhood are better than their previous living situation is based on the accurate and successful recall of the respondents. While there is a risk of recall bias in the responses of AHS participants, two factors limit this risk. First, all respondents are being asked about moves that happened within the last two years, therefore these are all relatively recent events. Existing studies note an increasing risk of recall bias when events occur more than ten years prior to a survey (Yoshihama & Gillespie, 2002). Second, because the move window is relatively narrow, all respondents are subject to roughly the same recall window (less than two years).

A second limitation in this study is the inability to identify which voucher households are moving for the first time with a voucher, and which voucher households have made multiple moves with the support of a voucher. Existing evidence suggests that the benefits of voucher receipt may emerge upon subsequent moves after initial lease-up (Eriksen & Ross, 2013; Feins & Patterson, 2005). As a result, focusing only on the effects of initial lease-up may not capture the true effect of voucher receipt. There may be a few rare instances of a household that moved within the prior two years without the benefit of a voucher, and then received a voucher subsequently but did not move after voucher receipt. While impossible to quantify, the frequency of this situation occurring is likely quite low. Therefore, in this paper, the results for voucher households reflect the experiences and outcomes achieved by voucher recipients throughout the course of their participation in the programme, not simply the experiences upon voucher receipt.

The third limitation of this study is its failure to address unobservable differences in the comparison of voucher and non-voucher households in this study. As summarized in Table 2, there are substantial observable differences in the comparison groups and I control for those differences in the regression models. These controls do not, however, account for unobserved variation that may explain why some households receive a voucher while others do not. Other scholars have noted the challenge of identifying unobserved differences in the reasons why some households participate in the programme. In response, many researchers have used data from housing experiments to overcome this challenge (Eriksen & Ross, 2013). Other studies, that do not have the benefit of experimental data, simply acknowledge the potential bias that may arise from unobserved differences between assisted and unassisted households. In their study of the effects of housing assistance on earnings, Olsen *et al.* (2005) noted, 'due to self- and administrative selection, there are likely to be some determinants of this sort and hence some bias in the estimates of the effects of different types of housing assistance on this account. Only studies based on random assignment completely avoid such biases' (p. 171). In this study, I follow the lead of Olsen *et al.* and acknowledge that bias from unobservable differences in the two groups may exist in my study.

Discussion

The warning from the Executive Director of the Oakland Housing Authority about the viability of the HCV programme is significant. Given the importance of this programme in federal housing policy, concerns about the efficacy of the programme deserve attention. The findings of this study suggest that the outcomes of the programme are not uniformly positive or negative. Rather, the achieved outcomes are a function of the context in which the benefit is used. This paper argues for context-dependent policy-making, which is consistent with other policy recommendations made by housing scholars. For example, McClure (2017) advocates for fungibility in federal housing programmes. McClure argues that vouchers should be used in markets with ample housing supply in order to provide affordability, while production programmes, such as the Low-Income Housing Tax Credit, should be applied in tight markets with low vacancies where housing is scarce. The findings of this study confirm McClure's proposal given the important role that vacancy rates play in the neighbourhood outcomes of voucher recipients. Continued efforts to try to use vouchers in inhospitable markets may not be the best policy alternative for recipient households living in these cities.

In addition to creating fungible housing subsidies based on the context in which that subsidy is used, policymakers could pursue other policies designed to improve the neighbourhood outcomes of programme recipients. First, given the constraints associated with housing searches, longer search times would provide voucher recipients with additional flexibility they need in tight markets to find a home and neighbourhood that meets their needs and desires. Second, local, state and federal efforts to reduce discrimination based on source of income would place voucher recipients in a stronger position in the market. Last, providing access to all neighbourhoods in a metropolitan area could provide voucher recipients with higher neighbourhood satisfaction. HUD has initiated a programme called Small-Area Fair Market Rents (SAFMRs), which will create multiple payment standards throughout a metropolitan area. The variation in generosity throughout a region should provide voucher recipients access to neighbourhoods that they previously could not access. This reform, which has demonstrated positive findings from a demonstration in Dallas (Collinson & Ganong, 2016), has shown that voucher households have accessed higher opportunity neighbourhoods after the implementation of SAFMRs. This development has the potential to enhance the neighbourhood outcomes of voucher recipients.

In sum, the HCV programme provides an essential rent subsidy to millions of households in the US, but the outcomes achieved by recipients is far from uniform. A primary policy question, therefore, is how to handle the implementation of the HCV programme in contexts where outcomes fail to achieve the stated goals of the programme. Continuing along the current trajectory is unlikely to change the experiences and outcomes for voucher recipients in expensive cities with tight housing markets. The implementation of SAFMRs is a promising development, but more attention must be paid to outcome variation based on the vastly different vacancy rates that exist around the country. Therefore, given limited federal support for affordable housing, there is an urgent need for policymakers, practitioners and scholars to analyze and assess how best to allocate scarce housing resources. The radically

different contexts and settings in which federal housing support is provided calls for a policy response that recognizes this variation as it seeks to support low-income households across the US.

Notes

1. As a robustness test, propensity score matching (PSM) was also used to predict the outcomes of interest using the same model terms. PSM can only be applied to models without the interaction term between voucher and vacancy rate. The outcomes of the PSM models were consistent with the logit models that appear in the following analyses.
2. To test the robustness of this finding, I use an objective measure of housing adequacy (*zadeq* in the AHS) as a different dependent variable. The results are very similar to the better housing unit variable that serves as the primary dependent variable in this analysis. The results suggest that this finding holds for both objective and subjective measures of housing quality.
3. Because of low response rates for objective measures of neighbourhood quality in the AHS, this analysis is limited to the single, subjective measure of neighbourhood quality.

Disclosure statement

No potential conflict of interest was reported by the author.

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